THE

CYCLOPÆDIA;

OR,

Universal Dictionary

OF

ARTS, SCIENCES, AND LITERATURE.

VOL. XXIII.

Printed by A. Strahan,
New-Street-Square, London.

THE

CYCLOPÆDIA;

OR,

UNIVERSAL DICTIONARY

OF

Arts, Sciences, and Literature.

BY

ABRAHAM REES, D.D. F.R.S. F.L.S. *S. Amer. Soc.*

WITH THE ASSISTANCE OF

EMINENT PROFESSIONAL GENTLEMEN.

ILLUSTRATED WITH NUMEROUS ENGRAVINGS,

BY THE MOST DISTINGUISHED ARTISTS.

IN THIRTY-NINE VOLUMES.

VOL. XXIII.

LONDON:

Printed for LONGMAN, HURST, REES, ORME, & BROWN, Paternoster-Row,

F. C. AND J. RIVINGTON, A. STRAHAN, PAYNE AND FOSS, SCATCHERD AND LETTERMAN, J. CUTHELL, CLARKE AND SONS, LACKINGTON HUGHES HARDING MAVOR AND JONES, J. AND A. ARCH, CADELL AND DAVIES, S. BAGSTER, J. MAWMAN, JAMES BLACK AND SON, BLACK KINGSBURY FARBURY AND ALLEN, R. SCHOLEY, J. BOOTH, J. BOOKER, SUTTABY EVANCE AND FOX, BALDWIN CRADOCK AND JOY, SHERWOOD NEELY AND JONES, R. SAUNDERS, HURST ROBINSON AND CO., J. DICKINSON, J. PATERSON, E. WHITESIDE, WILSON AND SONS, AND BRODIE AND DOWDING.

1819.

CYCLOPÆDIA:

OR, A NEW

UNIVERSAL DICTIONARY

OF

ARTS and SCIENCES.

MATTHEW.

MATTHEW, or *Gospel of St. Matthew*, a canonical book of the New Testament. The writer of this gospel, an apostle and evangelist, surnamed Levi, and son of Alpheus, was, before his conversion to Christianity, a publican, or toll-gatherer under the Romans. He was a native of Galilee, but of what city in that country, or of what tribe of the people of Israel, we are not informed. Jesus found him at the receipt of custom, and called him to be witness of his words and works, thus conferring upon him the honourable office of an apostle. From this time he continued with Christ; and after his ascension, he was at Jerusalem, and partook of the gift of the Holy Ghost, with the other apostles. With them he bore testimony to the resurrection of Jesus; and, as we may reasonably suppose, preached for some time at Jerusalem, and in various parts of Judea, confirming his doctrine with miracles, which God enabled him to perform in the name of Jesus. Socrates, in the fifth century, says, that when the apostles went abroad to preach to the Gentiles, Thomas took Parthia for his lot, Matthew Ethiopia, and Bartholomew India; and it is now a common opinion, that Matthew died a martyr in Ethiopia, in a city called Naddabar, or Naddever; but the mode of his death is not ascertained. Others speak of his preaching and dying in Parthia or Persia; but we may infer from the diversity of these accounts, that none of them are well founded. Heracleon, a learned Valentinian, in the second century, whom Clement of Alexandria has cited, reckons Matthew among those apostles who did not die by martyrdom; nor does Clement contradict him. Chrysostom, though he mentions him with peculiar commendation, and speaks of his "coming from the presence of the council rejoicing," (see Acts, v. 41.) says nothing of his martyrdom. Hence we may infer, that there was not any tradition about it among Christians at that time, or that it was not much regarded.

St. Matthew is said by many to have written his gospel in Judea, at the request of the Jewish believers, when they were likely to be dispersed by persecution; and it is thought by some, as Baronius, Grotius, Vossius, Jones, Wetstein, &c. that he began it in the year 41, eight years after Christ's ascension. But according to others, as Basnage, Dr. Lardner, &c. who follow the testimony of Irenæus, this gospel was written in the time of Nero, about thirty years after our Saviour's ascension, or about the year 63, 64, or 65 of the vulgar epoch. At the year 64, or about that period, the gospel had been propagated in many Gentile countries, the times were troublesome in Judea, and the war was coming on: several of the apostles were dead, others of them, who survived, were going abroad, and many of the Jewish believers were about to seek shelter elsewhere: now, says Dr. Lardner, was a proper time to write a history of Christ, and of his miracles. Moreover in this gospel are recorded divers plain predictions of the miseries and desolations of Jerusalem, and the overthrow of the temple and the Jewish state, besides many other figurative intimations of the same things in many of our Lord's discourses and parables; which could not be well published to all the world in writing till about this time. The suitableness of St. Matthew's gospel to the state of the Christian religion, and of the Jewish people, about the year 64 or 65, leads to that time. And however unwillingly, from private apprehensions and prejudices, we may admit the thought of protracting so long the writing of the history of our Lord's ministry; the circumstances of things, says Lardner, will constrain us to acquiesce in this season as the most likely. Cave thought that it was written about the 15th year after our Saviour's ascension, in the year 48. It was written, according to the testimony of most of the ancients, as Papias, A. D. 116, Irenæus in 178, Origen in 230, Eusebius in 315, Athanasius, Cyril of Jerusalem,

Strahan and Preston,
New-street-Square, London.

Jerusalem, Epiphanius, Gregory Nazianzen, Jerome, Chrysostom, &c. in the Hebrew or Syro-Chaldaic language, which was then common in Judea; but the Greek version of it, which now passes for the original, is said to be as old as the apostolical times. However, many learned moderns, as Fabricius, Erasmus, Lightfoot, Calvin, Le Clerc, Beausobre, Whitby, &c. are of opinion, that this gospel was first written in Greek, which was much used at that time throughout the whole Roman empire, and particularly in Judea: and it is alleged that Papias, who first advanced the contrary opinion, was a weak and credulous man. Jones, Basnage, Lardner, Jortin, &c. are of this opinion. Dr. Lardner observes on this point, that if St. Matthew did not write till about thirty years after our Lord's ascension, which he thinks most probable, he would use the Greek language; but if he wrote his gospel within the space of eight years after Christ's ascension, it is most likely that he wrote in the Hebrew. He adds, farther, that there was very early a Greek gospel of St. Matthew, cited or referred to by Clement of Rome, Ignatius, Polycarp, Justin Martyr, and others, none of whom intimate that they made use of a translation: that many of the ancients do not seem to have fully believed that Matthew wrote in Hebrew, because they have shewn very little regard to the Hebrew edition of it: that there are not in our Greek gospel of St. Matthew any marks of a translation: that there is no where any probable account who translated this gospel into Greek; and besides, as the Greek gospel was translated into Hebrew in very early days of Christianity, many not examining it particularly, nor indeed being able to do it, for want of understanding the language, might imagine, that it was first written in Hebrew. Hence, according to Dr. Lardner, sprung the opinion, that Matthew published his gospel at Jerusalem, or in Judea, for the Jewish believers, and at their request, before he went abroad to other people: whereas he apprehends, that this gospel, as well as the others, were written and intended for believers of all nations; and that the Nazarene gospel was St. Matthew's gospel, translated from Greek, with the addition of some other things, taken from the other gospels, and from tradition. Allowing the date of this gospel already assigned, he cannot conceive the reason why Matthew should write in Hebrew any more than any of the other evangelists; for it may be reckoned highly probable, or even certain, that he understood Greek, before he was called by Christ to be an apostle. Whilst a publican, he would have frequent occasions both to write and speak Greek, and could not discharge his office, without understanding that language.

According to the testimony of Irenæus, all the Jewish believers in general received the gospel of St. Matthew entire, with the genealogy at the beginning: for Irenæus says expressly that Matthew "strove by all means to give to the Jews full satisfaction, that Christ was of the seed of David: wherefore he began with his genealogy." The first chapter of this gospel is quoted by Justin Martyr (A. D. 140) in his First Apology; by Tertullian (A. D. 200), who says that Matthew, "for no other reason than that we might be informed of the origin of Christ according to the flesh, began in this manner:"—"The book of the generation of Jesus Christ, the son of David, the son of Abr ham." Novatus (A. D. 251) several times quotes the first chapter of this gospel. The second chapter is referred to by Ignatius (A. D. 107), and by Hegesippus (A. D. 173), whence we are led to conclude, that this part of St. Matthew's gospel was owned by this Hebrew Christian. Epiphanius, however, informs us, that the gospel of the Ebionites begins thus: "It came to pass in the days of Herod, the king of Judea, that John came baptizing with the baptism of repentance in the river Jordan," which is the beginning of the third chapter of St. Matthew, a little altered: and he says expressly, that their gospel called according to Matthew, is "defective and corrupted." It is nevertheless plain from a passage in Hegesippus, that he received the history in the second chapter of St. Matthew; so that, as Lardner suggests, he used our Greek gospel. Or, if he used only the Hebrew edition of St. Matthew's gospel, this history must have been in it in his time. The first and second chapters of this gospel are referred to in the Sibylline oracles, a work of the second century, according to Lardner: and the second chapter is alluded to by Victorinus (A. D. 290.) Cerinthus, an early heretic, who is supposed to have lived in or near the age of the apostles, made use of the beginning of St. Matthew's gospel, and from thence endeavoured to prove, that Jesus was descended in a natural way from Joseph and Mary. These chapters, however, are of doubtful authenticity, and have been rejected by several ancient and modern writers; and the candid reader must allow that they are liable to various objections. The external testimony against them is strong; and their contents present us with difficulties that are not easily solved. It has been alleged, that though the ancients, with one consent, affirm that the gospel by St. Matthew was originally published in Hebrew or Syro-Chaldaic, some of them represent the copies of it as not having the two first chapters; and this circumstance, it is said, affords a strong presumption against their authenticity. Whether this Syro-Chaldaic or Hebrew gospel be the original copy or not, such a copy certainly existed at a very early period; and its authority must be allowed to have considerable weight in deciding this question; especially when it is considered that we have no *certain* references or allusions to these chapters till the days of Celsus the Epicurean, about the year 150, or later, and of Irenæus, about 178. As to this Hebrew copy, the reception of it by the Ebionites, and perhaps also by the Nazarenes, yields a strong argument in favour of its authority. Epiphanius says, that the Nazarene gospel was πληρεστατον, *i. e.* most entire, but that the Ebionite gospel was ουχ ὁλω πληρεστατον, *i. e.* not altogether entire. The former, it is thought by some, was the true original copy of St. Matthew; and the latter might be, in some degree, corrupted. Irenæus, Eusebius, and Epiphanius say, that the gospel received by the Nazarenes and Ebionites was the gospel of Matthew altered in some particulars, according to their different sentiments. Dr. Lardner adopts this opinion. Dr. Mills thinks, that the Nazarenes and Ebionites had the truest copy of St. Matthew's Hebrew gospel. That this Hebrew gospel was the original of St. Matthew, and that he wrote his gospel in Hebrew, is maintained by Papias, A.D. 116, the disciple and companion of Polycarp; Irenæus, A.D. 148; Tatian, A.D. 172; Hegesippus, A.D. 173; Origen, A.D. 230; Eusebius, A.D. 315; Pantænus, A.D. 192; Cyril of Jerusalem, Epiphanius, Gregory Nazianzen, Jerome, Augustin, Chrysostom, Isidore of Seville, Theophylact, and several other orthodox writers. Nor was this fact questioned, it has been said, till of late; for Erasmus was one of the first, who, in opposition to all antiquity, asserted that Matthew wrote in Greek; and he has been followed by many ingenious moderns; such are cardinal Cajetan, Oecolampadius, Flaccius Illyricus, Calvin, Vossius, and other foreigners, and Dr. Lightfoot, Dr. Whitby, Mr. Jer. Jones, Dr. Lardner, and other English divines.

Those who allow that there was a Syro-Chaldaic gospel of St. Matthew extant in very early times, and that the Nazarenes and Ebionites believed and declared it to be the original

original of St. Matthew, are nevertheless of opinion, that this gospel was originally written in Greek. To this purpose they allege, that the present Greek copy has no mark of a translation; that the Greek was the most proper language, because it was the most universal; and that St. Matthew, who was a publican before he became an apostle, must have been acquainted with it; that if our present copy of St. Matthew's gospel be only a translation, it must be of very doubtful and precarious authority, and that it must appear to be very strange and surprising that this Syro-Chaldaic gospel should be so soon lost, if it had been the work of an apostle. But to return from this digression to the question concerning the genuineness of the two first chapters: it has been urged that these chapters were not referred to for a considerable time after St. Matthew's gospel was publicly known. It is not certain that they are referred to by any of those who are usually called the apostolical fathers, though these fathers frequently refer to other parts of the gospel. Under this class we may comprehend Barnabas, A D 71; Clement of Rome, A.D. 96; Hermas, A.D. 100; Polycarp, A.D. 108. Irenæus, without doubt, acknowledged both the chapters as the genuine production of St. Matthew; so do also Clement of Alexandria, A.D. 194, and Tertullian, A.D. 200; and as we descend to later periods, allusions to them more frequently occur. The first and second chapters of St. Matthew's gospel are inserted in the Syriac version of the New Testament, and this may be considered as a strong argument in favour of their authenticity. The arguments from external testimony against their authenticity may be summed up in the following epitome: we have undoubted evidence that these two chapters were wanting in some very ancient copies of this gospel, which were used by the first Christians; the Ebionites certainly omitted these chapters, and we know that the genealogy was omitted by other Christians, nor have we any reason to think that they were inserted in the Hebrew or Syro-Chaldaic copy, which all the fathers jointly affirm to have been the original of St. Matthew: it is not probable that they would have been expunged, if they had been genuine, because there was but one point, *viz.* our Saviour's birth of a virgin, by which they seemed to oppose the notions of some particular sects of Christians, and that those sects might have overcome the difficulty in a much safer way, by either reasoning, as Cerinthus actually did, from the genealogy, that Jesus was the son of Joseph and Mary; or by receiving St. Mark's gospel, and rejecting St. Matthew's altogether. The collateral arguments against the authenticity of these chapters, deduced from their contents, are such as follow: it has been agreed by many writers, that St. Mark, in most places, agrees with the method and order of both St. Matthew and St. Luke, and so doth also St. John, after a short introduction concerning the Logos. St. Mark begins his gospel at what we call the third chapter of St. Matthew; that is, at the time when John came baptizing in the wilderness. As it is most probable that St. Luke was the first who published a gospel, and as he had given the genealogy, and a full account of the birth, &c. of Christ, there was no necessity for those who came after him to repeat the same things, as they were not particularly important to the virtue and happiness of man, the great end which our Saviour and his disciples had in view. Besides, St. Luke's account of the birth of Jesus, and of all the events which followed it, till Joseph and Mary carried him home to Nazareth, which he has fully detailed, is totally different from that which is found in the first and second chapters of St. Matthew's gospel. No coincidence occurs, except in Christ's being born at Bethlehem of a virgin, and in his dwelling at Nazareth. Hence it is inferred, that the absolute silence of St. Luke, respecting many remarkable events supposed to be related by St. Matthew, yields a strong negative argument against the authenticity of these two chapters. There is also in the contents of these chapters something peculiar both in the sentiments and language, such as does not occur in other parts of the New Testament, chap. i. 20 ii. 12, 13. 19. 22. The appearance of a star in the east, directing the wise men to the new-born Messiah, in Judea, has, it has been said, more the air of an eastern invention than of a real history. In chap. ii. v. 3. a circumstance is mentioned that is scarcely credible, *viz.* that "when Herod the king had heard these things, he was troubled, and *all Jerusalem* with him." Another peculiarity in these chapters is the behaviour of the Magi to the child Jesus; "they fell down and worshipped him," chap. ii. 11. Moreover, Dr. Wall observes, that the account of the genealogy in St. Matthew is the most difficult to reconcile with St. Luke, or with itself, of any place in the gospel: he adds that there are more difficulties in these two chapters than in the whole Bible besides. There are also in these two first chapters several prophecies of the Old Testament, said to be fulfilled, but which cannot easily be made to correspond with the events by which they are declared to be accomplished. (See chap. i. 22, 23. chap. ii. 6. compared with Micah. v. 2.) The slaughter of the infants at Bethlehem, though a very remarkable fact, is not mentioned by any writer but by the supposed St. Matthew in this second chapter, and by those who quote from him. To this is annexed a prophecy, cited from Jerem. xxxi. 15, &c. supposed to relate to a totally different subject. The passage cited from Hosea, xi. 1. does not seem to have the most distant reference to the Messiah. (See ACCOMMODATION.) The flight from Bethlehem seems to have been impracticable; and from Nazareth it was altogether unnecessary, because the slaughter of the infants did not extend so far.

In order to account for the interpolation of these two chapters, without impugning the authenticity of the whole gospel, those who dispute their genuineness, and maintain that the difficulties which they furnish cannot be obviated by the records of history and the aid of criticism, recur to one or other of the following hypotheses. They take for granted that the gospel was originally written in the Syro-Chaldaic language; and that when it was translated into Greek, the body of Christians had little acquaintance with the language of the original, and therefore left the translator at liberty to add, or, if he had been so disposed, to take away what he pleased, without much danger of detection. If the translator was a believing Jew, it is possible that he might think a few prophecies, cited from the Old Testament, by way of accommodation, would have considerable influence upon some of his unbelieving brethren abroad, who, having never seen the original, would naturally think that the Greek copy was, in every respect, a faithful translation of that original. Or, this interpolation might have happened without the least design. These chapters might originally be a kind of introduction to the gospel of St. Matthew, drawn up by the translator of it into Greek, and never intended by him to be considered as a part of it. When the Greek copy of the gospel was spread abroad, those who were unacquainted with the original would naturally think, that, as it was called the gospel by St. Matthew, it contained nothing but the authentic writing of that apostle; and accordingly, it might be received as such in the countries out of Judea. When Origen, Jerome, &c. perceived that these chapters were wanting in the Ebionite gospel, there was nothing unnatural in their supposing, that they were left out with design, because the Ebionites, &c. were then conſidered as heretics, and, of conſequence, capable of any fraud or impoſture. The Greek copy of St. Matthew ſoon gained reputation, becauſe it was uſed by the generality of Chriſtians, whereas the Syro-Chaldaic copy was uſed by only a few poor Jewiſh converts in Paleſtine; and theſe, reputed enemies to the true faith. Hence the former copy would be deemed of much greater reputation than the latter. Upon the whole it ſhould be obſerved, that no doctrine, or fact in Chriſtianity, will be affected by the omiſſion of the firſt and ſecond chapters of St. Matthew; for as to the genealogy, birth, &c. of Chriſt, we have, in St. Luke's goſpel, a full and conſiſtent account of them; whereas theſe chapters contain ſcarcely any thing that is not difficult and liable to objections. We do not, however, think the difficulties incapable of ſolution, nor the objections altogether unanſwerable. Profeſſor Michaelis, in his "Introductory Lectures, &c." ſtates, that if theſe chapters had been wanting in St. Matthew's original text, they ought not to be immediately rejected as an interpolation; for they may have been a ſeparate writing of St. Matthew, deſigned by him to give an account of the childhood of Chriſt, to which he prefixed the title Βιβλος γενεσεως, and to prevent its being loſt as a ſeparate compoſition, the tranſlator, as it related to the ſame ſubject, might join it to the goſpel of St. Matthew. The profeſſor acknowledges the difficulties that occur in theſe two chapters, but he thinks it unwarrantable to reject them on that account. See Williams's Free Enquiry, &c. firſt publiſhed in 1771, and republiſhed with additions in 1789. Michaelis's Introduction to the New Teſtament, by Marſh, vol. iii. part 1.

MATTHEW of Weſtminſter, in *Biography*, an ancient Engliſh chronicler, and Benedictine monk of the abbey of Weſtminſter, flouriſhed in the fourteenth century: he compiled a chronicle in Latin, commencing from the creation, and proceeding down to the year 1307, which was entitled "Flores Hiſtoriarum," hence its author was named "Florilegus." This work related almoſt entirely to Engliſh hiſtory, and is freely tranſcribed from Matthew Paris and others. The writer is applauded for veracity and accuracy, but biſhop Nicolſon holds him up as a mere compiler, without any great degree of judgment. The "Flores Hiſtoriarum," &c. was publiſhed at London in 1567, and again at Frankfort in 1601. It is divided into three books, 1. From the creation to the birth of Chriſt; 2. From that period to the Norman Conqueſt; and 3. From thence to the beginning of Edward II.'s reign. A period of ſeventy years was added by other hands. Gen. Biog.

MATTHEW, *St.*, in *Geography*, an iſland in the Atlantic ocean, diſcovered in 1516 by the Portugueſe, who have a ſettlement on the iſland. S. lat. 1° 45′. W. long. 13°.—Alſo, an iſland in the Indian ſea, near the coaſt of Siam. N. lat. 9° 35′. E. long. 97° 52′.—Alſo, a river of Lower Siam, which runs into the Eaſt Indian ſea, N. lat. 10° 5′.

MATTHEW's *Bay*, *St.*, a bay in the gulf of Mexico, W. of the gulf of Campeachy.—Alſo, a bay called *Mattheo* bay, on the coaſt of Peru, in the North Pacific ocean; ſix leagues to the N.E. by E. from Point Galera, and five or ſix leagues S.S.W. from the river St. Jago, with anchorage all the way.

MATTHEW's, *St.*, *Day*, is a feſtival obſerved on the 21ſt of September.

MATTHEW's *Shoals*, *St.*, in *Geography*, two rocky iſlets ſurrounded with ſhoals, in the Eaſt Indian ſea. S. lat. 5° 14′. E. long. 124° 54′.

MATTHEWS, a county of Virginia, 18 miles long and ſix broad, bounded W. by Glouceſter, N. by Middleſex, E. by the Cheſapeak, and S. by Mobjack bay; 193 miles from Waſhington.

MATTHIAS, St., in *Scripture Hiſtory*, an apoſtle, who was choſen in the room of Judas. He was qualified for the office to which he was appointed, by having been a conſtant attendant on our bleſſed Lord during the courſe of his miniſtry, and was probably one of the 70 diſciples. He preached in Judea and part of Ethiopia, and ſuffered martyrdom. The traditions, and alſo the goſpel of Matthias, are ſpurious. See GOSPEL.

MATTHIAS's *Day*, *St.*, a feſtival of the Chriſtian church, obſerved on the 24th of February.

MATTHIAS, in *Biography*, emperor of Germany, ſon of the emperor Maximilian II. was born in 1557. When he was twenty years of age, he was invited by the revolted ſtates of the Low Countries to take upon himſelf the government of thoſe provinces, which he accepted; appointing the prince of Orange to act as his lieutenant. His power was very circumſcribed, and ſerved only to give a ſort of reputation to the revolters as their nominal head; and in 1581, through the jealouſy of the houſe of Auſtria, he was honourably diſmiſſed. In 1594, he was appointed general of the army which his brother Rodolph II., emperor of Germany, ſent againſt the Turks. In this ſervice he was very ſucceſsful, and ſo well ingratiated himſelf with the Hungarians, that they conferred upon him the moſt diſtinguiſhed honours, and in 1607 elected him their king, on condition that he ſhould confirm all their privileges, and allow the Proteſtants the free exerciſe of their religion. After this he was proclaimed king of Bohemia, in prejudice to his own brother Rodolph, and was crowned at Prague in the year 1611: he had, previouſly to this, obliged his brother to yield him the poſſeſſion of the archduchy of Auſtria: and on the death of Rodolph, in 1612, Matthias was elected to ſucceed him. Such was the rapid elevation of this prince; but ſoon after he ſucceeded to the empire, a diet was convoked at Ratiſbon, at which the Proteſtants agreed to preſent a memorial to the emperor, complaining of his privy-council for interfering in various matters relative to religion, over which they, by right, had no juriſdiction, and making ſeveral demands for the purpoſe of ſecuring to them an equal adminiſtration of juſtice. An evaſive anſwer was given, and the Proteſtants declined giving ſupplies of men and money to the empire till their grievances were redreſſed. The Catholics, on the other hand, recriminated on the Proteſtants, and, during their conteſts, the Turks made an irruption into Tranſylvania. After a variety of fortune, in which Bethlem Gabor took a diſtinguiſhed part, peace was made in 1615, by which the grand ſeignor reſtored to the houſe of Auſtria all the places in Hungary that had been conquered by his arms, and re-inſtated the owners of all lands that had been alienated. Matthias now reſolved to curb his Proteſtant ſubjects; and took meaſures accordingly. The Proteſtants were, however, enabled to procure a convocation of the ſtates, and ſent deputies to renew their remonſtrances before the council. Theſe, being rouſed by the ill treatment which they experienced, could not reſtrain their paſſions, and actually threw ſeveral of the members of the council out of the window; but fortunately no lives were loſt on the occaſion. The count de la Tour, who was the principal actor in this buſineſs, foreſeeing its probable conſequences, perſuaded the Proteſtants to take up arms in their own defence. Matthias ſaw he had carried matters too far, and endeavoured to reclaim them by gentle means; but they returned bold remonſtrances to his declarations, and accuſed his prime miniſter, Kleſel, cardinal and archbiſhop of Vienna, of promoting the perſecutions that they

they had fuftained. The Proteftants of Silefia were equally difcontented, and made an alliance with the Bohemians, who were now in a ftate of actual rebellion. This was the commencement of that thirty years war which defolated Germany, and was productive of fo many great and difaftrous events. Matthias was obliged to banifh his minifters, and the war between the Proteftants and Catholics began with various fuccefs, but in the end Bohemia remained in the power of the Proteftants. Matthias died in 1619, at the age of fixty-three, after a reign of feven years as emperor. He left no legitimate iffue, and recommended moderation to his fucceffor Ferdinand. Univer. Hift.

Matthias Corvinus, king of Hungary, fon of the celebrated Huniades, was a prifoner at his father's death, together with his elder brother Ladiflaus, on account of the fhare which the latter had in the affaffination of the count de Cilley, for which he was afterwards executed. Matthias was detained in cuftody at Vienna, whence he was removed by a counterfeit order to Bohemia. He was ftill held in confinement at Prague, but upon the death of Ladiflaus the Pofthumous, in 1458, he was elected king of Hungary, being then about the age of eighteen. From his very early youth he had manifefted a martial fpirit, and had excelled in warlike exercifes. He could not obtain his liberation from the hands of the governor Podzebrafki, till he had paid a large ranfom and married his daughter. The emperor Frederic, having got poffeffion of the ancient crown of Hungary, refufed to deliver it up, and Matthias found himfelf obliged to go to war for its recovery, which at length he procured by a treaty. He then marched into Bofnia, and recovered Jaycza, the capital, from the Turks, which fultan Mahomet afterwards vainly attempted to reconquer. In 1468, he made a truce with the Turks, and being at peace in his own dominions, he was induced, as well from motives of ambition, as by the perfuafions of the pope, to accept the crown of Bohemia offered him by the pontiff, on condition of extirpating the herefy of the Huffites in that country. Againft this harmlefs people, and his father-in-law, the king of Bohemia elect, he carried on a fanguinary war, which was terminated by a treaty, fecuring to him the crown after the death of Podzebrafki. Two years afterwards, that event took place, but the Bohemians elected Uladiflaus, fon of the king of Poland. Matthias, enraged at this proceeding, marched an army into the country, in order to compel the people to acknowledge him for their fovereign; he was however fhortly recalled by a rebellion in Hungary, led on by Cafimir, fecond fon of the king of Poland, to whom the crown had been offered. Matthias ftopped his progrefs, and, in his turn, became the aggreffor. War was continued till 1475, when, by a treaty, the king of Poland kept Lufatia, and the part of Silefia bordering on Bohemia, and Matthias retained the reft of Silefia and Moravia. While engaged in thefe contefts, the Turks were making great progrefs in the frontiers of Chriftendom: Matthias, as foon as he had leifure, turned his arms againft them, and having, in a meafure, attained his object, he attacked the emperor Frederic III., with whom he had a quarrel in 1478. After ravaging Auftria, and laying fiege to Vienna, he confented to withdraw his troops, on being paid the expences of the war, and receiving the inveftiture of Bohemia from the emperor, who was to renounce his title of king of Hungary. The payment being refufed, and the title ftill retained, Matthias invaded Lower Auftria, of which, together with Vienna, he made himfelf the complete mafter in 1487. He died in that city in 1490, about the fiftieth year of his age, leaving no iffue but a natural fon. Matthias was reckoned one of the moft fplendid monarchs of his age; a man of great enterprize, and of fine military talents, liberal and magnificent, an encourager of learning and the fine arts: he was himfelf acquainted with a variety of languages, and was lively and pleafant in converfation. He was, however, ambitious, and fo violent in his temper, as fometimes to furpafs, in his refentment, the boundaries of juftice and humanity, though he was at no time deftitute of the generofity and magnanimity that characterize a great prince. Univer. Hift.

Matthias, *St.*, in *Geography*, an ifland in the Eaft Indian fea, about 90 miles in circumference. St. lat. 1° 50'. E. long. 144° 30'.

MATTHIEU, Peter, in *Biography*, was born at Porentru, in France, of a family in humble life. He ftudied among the Jefuits, became principal of the college of Verceil, and was afterwards an advocate at Lyons. He attached himfelf to the ftudy of the belles lettres, but was particularly partial to hiftory, to which he chiefly devoted himfelf when he took up his refidence at Paris. He had an intention of, writing the hiftory of Alexander, prince of Parma, but was not permitted to ftay long enough in the country to accomplifh his defign. He was introduced to Henry IV. by the prefident Jeannin, and at the death of Du Haillon was made hiftoriographer of France. He was affiduous in collecting memoirs of every kind, relative to the times in which he lived, as well as the earlier periods of French hiftory. He was continued in his office by Lewis XIII., and accompanied that king in his wars againft the Hugonots. He died at Touloufe in 1621. His works are not reckoned among thofe of the firft rank, but they are efteemed exceedingly ufeful for elucidating the periods on which he treats: among thefe are the following; "L'Hiftoire des Chofes memorables arrivèes fous le Regne de Henri le Grand:" "Hiftoire de la Mort dèplorable de Henri le Grand:" "Hiftoire de St. Louis et Louis XI.;" "Hiftoire de France fous François I, Henri II., François II., Charles IX., Henri III. et IV, et Louis XIII." This laft was a pofthumous work, and publifhed by his fon, who continued the hiftory of Lewis XIII. to 1621. He was author of fome moral verfes, entitled "Quatrains fur la Vie et la Mort;" and the tragedy "La Guifade." Moreri.

MATTHIOLA, in *Botany*, is a genus of Plumier's, named by him after Peter Andrew Matthiolus, the moft popular commentator on Diofcorides; fee the following article. Linn. Gen. 566. Schreb. 131. Willd. Sp. Pl. v. 1. 998. Mart. Mill. Dict. v. 3. Juff. 206. Plum. Gen. 16. t. 6.—Clafs and order, *Pentandria Monogynia.* Nat. Ord. *Rubiaceæ*, Juff.

Gen. Ch. (according to Linnæus) *Cal.* Perianth cylindrical, entire, erect, fhort, permanent. *Cor.* of one petal, very long, its flender tube gradually terminating in an undivided limb, waved at the margin. *Stam.* Filaments five, awl-fhaped, fhorter than the corolla; anthers fimple *Pift.* Germen globofe, inferior; ftyle thread-fhaped, the length of the corolla; ftigma thickifh, blunt. *Peric.* Drupa globofe, of one cell, crowned with the calyx. *Seed.* Nut globofe, with a globofe kernel.

Eff. Ch. Corolla tubular, fuperior, undivided. Calyx entire. Drupa with a globofe nut.

1. M. *fcabra.* Rough Matthiola. Linn. Sp. Pl. 1661. (M. folio afpero fubrotundo, fructu nigricante; Plum. Ic. 166. t. 173. f. 2. Rategal, arbore indiano; Zann. Ift. 167. t. 75. f. 1, 2? Guettarda fcabra; Vent. Choix de Pl. 1. t. 1.)—Gathered by Plumier in the Weft Indies. Ventenat fays, it is a native of the Caribbee iflands.

This has always been a very obfcure plant. Plumier reprefents presents it as a *shrub*, with scattered, obovate, entire, very rough *leaves*, the *flowers* somewhat cymose, with pinnated *bracteas*. This last character however is erroneous, as well as the same author's figure and description of the *flower*, from whence Linnæus took his generic characters. Reichard and Swartz have long ago suspected the *Matthiola* to be a *Guettarda*, and Ventenat has at length reduced it to that genus, in the new work, left unfinished at his death, entitled *Choix de Plantes*. He saw the plant in flower in the gardens at Paris, and appears to have had no doubt of its being the same as Plumier's. See GUETTARDA; to the species of which this should now be added, by the name of

G. *scabra*. Leaves obovate, pointed, rough; rugged above; veiny beneath. Flowers with six stamens.—The *stem* is as thick as that of an apple-tree, with numerous, horizontal, widely spreading branches, whose subdivisions are opposite, round, rough, with short grey hairs, and leafy at the extremity. *Leaves* opposite (not scattered), on short thick stalks, accompanied by a pair of awl-shaped *stipulas*. They are three inches long and above an inch broad, rough like the foliage of a fig, obovate, or somewhat elliptical, slightly wavy; dark green above; downy and whitish beneath. *Flower-stalks* axillary, shorter than the leaves, divided at the top into two spreading dense spikes of white, silky, short-lived, highly scented *flowers*, much resembling a jasmine. The *bracteas* are lanceolate and crowded, so that Plumier's figure, though not very inaccurate, easily missed Linnæus. The limb of the *corolla* is divided into six oval horizontal segments, one-third the length of its tube. *Drupa* as big as a cherry, black and bitter, its nut of from four to six cells.—This seems to be what Lamarck has figured in his t. 154. f. 3. He, like Ventenat, has properly preferred the name *Guettarda*, to the more ancient one of *Matthiola*, because of the number of species already known under the former appellation, which it would be inconvenient to call *Matthiolæ*. So the old *Genipa* of Plumier is rightly sunk in the modern but better known *Gardenia*. The synonym of Zannoni, quoted by Linnæus with hesitation, ought surely to be excluded. See GUETTARDA and GARDENIA.

MATTHIOLUS, or MATTIOLI, PETER ANDREW, in *Biography*, an eminent physician, and medical botanist, was born at Sienna, in Tuscany, in the year 1501, where his father practised the same profession. His early education was received at Venice; and thence he was sent to the university of Padua, for the purpose of studying the law; for which, however, he conceived an antipathy, and turned his attention to medicine. His studies were prematurely interrupted by the death of his father; but his conduct had acquired for him the good opinion of the professors, who gave him the degree of doctor before his departure from the university. He returned to Sienna, where he speedily succeeded in finding ample employment. He appears, however, to have quitted his native place subsequently, and to have gone to Rome; whence he removed, in 1527, to the court of cardinal Bernardo Clesio, prince bishop of Trent, who held him in great estimation. He resided 14 years in the valley of Anania, in the district of Trent, where he acquired the respect and affection of the inhabitants to such a degree, that on his departure, men, women, and children accompanied him on his way, calling him their father and benefactor. He next settled as public physician at Gorizia, where a singular proof of the esteem in which he was held was likewise given; when a fire having consumed all his furniture, the people flocked to him the next day, with presents of goods and money, that made him richer than before, and the magistrates advanced him a year's salary. After a residence of twelve years at Gorizia, he accepted an invitation from Ferdinand, king of the Romans, to take the office of physician to his son, the archduke Ferdinand. He was greatly honoured at the imperial court, and in 1562 was created aulic-counsellor to the emperor Ferdinand. Afterwards Maximilian II. prevailed upon his brother to part with him, and made him his first physician. Finding, however, the weight of age pressing upon him, Matthiolus took leave of the court, and retired to a life of repose at Trent, where he soon after died of the plague, in the year 1577.

He left several works, of which the following are the titles: "Dialogus de Morbi Gallici curatione," printed in the collection of Luisinus. "Apologia versus Amatum Lusitanum," Venice, 1558. "Epistolarum Medicinalium, Libri V." Prague, 1561. "Disputatio adversus viginti Problemata Melchioris Guilandi," Ven. 1563. "Opuscula de Simplicium Medicamentorum Facultatibus secundum genera et loca," ibid. 1569; which is a compendium of vegetable materia medica. His Epistolæ also relate chiefly to the virtues of plants, and their mode of exhibition.

The great work, however, by which this physician acquired his fame and honour, was his commentary on the writings of Dioscorides. His first Commentaries in illustration of this ancient botanist, were printed at Venice in 1548, in the Italian language, with the title of "Il Dioscoride, con li suoi discorsi, aggiuntovi il sesto libro de gli antidoti contra tutti i veneni." It was soon twice reprinted. He afterwards published it in the Latin language, and with the addition of small cuts, in 1554, with the title of "Commentarii in sex Libros P. Dioscoridis, adjectis quamplurimis plantarum et animalium imaginibus." Numerous editions, in Latin, enlarged and improved, were afterwards given; and the work was also many times reprinted in Italian, and in French and German translations by different persons. The best edition is that of Venice, 1565, folio, with large plates. Haller remarks, when speaking of the value of this work, that while the author was deeply versed in the study of the Arabians and their followers, he too much neglected the original sources, and the examination of plants. He was, therefore, frequently imposed upon by his correspondents, and sometimes even gave fictitious representations of plants, drawn merely from the descriptions of the ancients. He did not, however, altogether neglect the examination of plants; for he discovered several in Bohemia, and the district about Gorizia, the medicinal properties of which he made the subject of experiments on malefactors. He certainly contributed much to lay the foundation of botanical science; but, as Eloy remarks, the multitude of editions and versions of his work evinces the penury of the age in botanical books. An edition of all his works was published by Caspar Bauhin, with the addition of more than three hundred figures, at Basle, in 1598, folio, which was reprinted in 1674.

Matthiolus was twice married, and left several children: one of his sons was physician to the elector of Saxony. Gen. Biog. Eloy. Haller. Bibl. Botan.

MATTIA, in *Geography*, a river of Albania, which runs into the Adriatic, S. of Alessio.

MATTIACI, in *Ancient Geography*, a people who, according to Tacitus, resembled the Batavi in their habits and manners, and who had a common origin with them. They were alike valiant, but less firm in combat. They were taken under the protection of the Romans, and are supposed to have inhabited the country now called Zealand.

MATTIACUM, a town of Germany, placed by Ptolemy between Budoris and Artaunum; fuppofed to be Marpurg in Heffe.

MATTIG, in *Geography*, a river of Bavaria, which runs into the Inn, near Braunau

MATTIGAY, a town of Hindooftan, in Myfore, on the Cavery, oppofite to Allumbaddy.

MATTIGKOFEN, a town of Bavaria; nine miles S. of Braunau.

MATTINATELLO, a town of Naples, in Capitanata; feven miles E. of Monte St. Angelo.

MATTINS, from the Italian, *mattina*, or the French, *matin*, *morning*, the firft part in the daily fervice of the Romifh church.

Mattins are fometimes held early in the morning, fometimes at midnight, and fometimes the evening before; and infirm people, even in monafteries, are difpenfed from attending mattins.

MATTKEM, in *Ornithology*, a common name in Germany for the *Matkneltzel*.

MATTO-GROSSO, in *Geography*. See MATO-GROSSO.

MATTS, on board a *Ship*, a kind of broad, thick clouts wove out of fpun-yarn, or of a variety of ftrands, or feparate parts of a fmall rope, or of a number of rope-yarns, twifted into foxes; and ufed to preferve the main and fore-yards from galling againft the mafts at the ties, and at the gunnel of the loof. They alfo ferve to keep the clew of the fail from galling there; as alfo to fave the clews of the fore-fail from doing fo at the beak-head and boltfprit. The longeft and ftrongeft fort of thefe matts are called panches.

MATT-SEE, in *Geography*, a lake in the archbifhopric of Salzburg; 12 miles in circumference.—Alfo, a town of the fame archbifhopric; a fief of the bifhop of Paffau; 12 miles N. of Salzburg.

MATTUSCHKÆA, in *Botany*, named by Schreber, in commemoration of count Mattufchka, a German botanift, who was born in the year 1734, and died in 1779. The following works rank him in the lift of authors on botany. In 1776, and the following year, Mattufchka publifhed his *Flora Silefiaca*, in 2 vols. 8vo.; and in 1779 appeared his *Enumeratio ftirpium in Silefia fponte crefcentium*, in 1 vol. 8vo., a fort of compendium of the other work.—Schreb. 788. Willd. Sp. Pl. v. 1. 606. Vahl. Symb. p. 3. 11. Mart. Mill. Dict. v. 3. (Perama; Aubl. Guian. 54. Juff. 109. Lamarck Illuftr. t. 68.)—Clafs and order, *Tetrandria Monogynia*. Nat. Ord. *Vitices*, Juff.

Gen. Ch. *Cal.* Perianth inferior, cloven into four, ovate, acute, villofe fegments. *Cor.* of one petal; tube long; limb cloven into four roundifh lobes. *Stam.* Filaments four, nearly equal, the length of the clefts of the limb; anthers roundifh, two-celled. *Pift.* Germen fuperior, four-cleft, furrowed on each fide; ftyle thread-fhaped; ftigma fimple, (Aubl.) *Peric.* none. *Seeds* two or four, very fmall, naked (Juff.)

Eff. Ch. Calyx in four deep fegments. Corolla funnel-fhaped, equally four-cleft. Seeds naked.

1. M. *hirfuta*. Willd. n. 1. (Perama hirfuta; Aubl. Guian. t. 18.)—A native of moift and fandy places at Aroura and Orapu, in Guiana, where it flowers in June or July. According to Aublet, the whole plant is completely covered with reddifh or rufty hairs. *Stem* flender, branched, villofe, from one to two feet high. *Leaves* oppofite, feffile, ovate, villofe, longitudinally ribbed. *Flowers* capitate, terminal, yellow. *Receptacle* chaffy, with fringed fcales between each flower.—Vahl's defcription of this plant differs fomewhat from the former, for which reafon we fubjoin profeffor Martyn's tranflation. "*Stem* thread-fhaped, erect, frequently quite fimple; hirfute, as is the whole plant, efpecially the calyx. *Leaves* almoft like thofe of *Thymus ferpyllum*, feffile, oppofite, acute, veinlefs, obfcurely three-nerved; the loweft fmaller, approximating, ovate; the upper oblong, remote, three lines long. *Flowers* in a terminal feffile head, the fize of a pea. This plant is a finger's length in height, or more, but never fo gigantic as Aublet has drawn it, according to an obfervation of Van Rohr, an eye-witnefs, who gathered it in Guiana."

MATTUT, in *Geography*, a town of Perfia, in Chufiftan; 15 miles N.E. of El-Tiib.

MATTY'S ISLAND, an ifland in the Pacific ocean, difcovered by Capt. Carteret in 1767. S. lat. 1 45. E. long. 143° 2'.

MATUARO, an ifland near the N.E. coaft of New Zealand, on the S.E. fide of the Bay of Iflands. S. lat. 35°. E. long. 156 28'.

MATUGUAN, a town of Peru, in the audience of Lima; 60 miles N. of Guanca Velica.

MATVIEV, an ifland of Ruffia, in the ftraits of Vagatfkoi. N. lat. 69 15'. E. long. 52 14'.

MATVIEVKA, a town of Ruffia, in the government of Ekaterinoflav, on the Bug; 40 miles N.W. of Cherfon.

MATUITI, in *Ornithology*, a name given by Ray, Willughby, and Buffon, to the Brafilian fpotted king-fifher of Latham, or *Alcedo maculata*. See ALCEDO.

MATUITUI, a name given by Marcgrave to the fea-lark or ringed-plover. See CHARADRIUS *Hiaticula*. See alfo TANTALUS *Grifeus*.

MATULAM, *Hydrops ad Matulam*. See HYDROPS.

MATURA, in *Geography*, a fmall village and fort at the fouthernmoft point of Ceylon; 30 miles E. of Point de Galle. (See GALLE.) The country round Matura is very wild, but well fupplied with provifions of all forts, and particularly game, which is abundant. The houfe for the commandant is tolerably good, agreeably fituated near the river, which is broad here, and runs into the fea at a fmall diftance. The circumjacent country abounds with elephants, and here they were principally caught for exportation. Every three or four years the elephant is hunted here, by order of government. In 1797, at one of thefe hunts, 176 were caught, and this was the greateft number ever known to be taken at one time. Matura is four miles diftant from DONDRE *Head*; which fee.

MATURA, a chain of villages of Egypt, on the right bank of the Nile; 12 miles N. of Enfeneh.

MATURANTIA, in *Medicine*, &c. *ripeners*; or fuch things as promote maturation; are fuppofed to favour the production and complete formation of pus in inflammatory humours. There are, certainly, fays Dr. Cullen, means which may be employed for favouring thefe operations of nature; but as it cannot be admitted that any medicines are endowed with any fpecific powers to this purpofe, the term, as applied to medicine, feems to be quite improper. See SUPPURATION.

MATURAQUE, in *Ichthyology*, the name of an American fifh, of the harengiform kind, and having only one fhort fin on the back. It feldom grows to more than four inches long, and is fomewhat flattifh, but not very broad; its head is very broad, and covered with a fhelly cruft; it is caught in lakes, not in rivers, and is a well-tafted fifh.

MATURATION *of* FRUIT, in *Gardening*. See CAPRIFICATION, FORCING, and HOT-*Beds*.

MATURATION, in *Pharmacy*, a preparation of fruits, or other fimples, gathered before their maturity, to fit them to be eaten, or for other ufes. See FRUIT, &c.

MATURU,

MATURU, in *Geography*, a town of Brazil, on the river Xingi; 45 miles S.W. of Curupa.

MATUSARUM, in *Ancient Geography*, a town of Lusitania, S.E. of Scalabis. The Itinerary of Antonine marks it upon the route from Lisbon to Emerita.

MATUSFALVA, in *Geography*, a town of Hungary; 25 miles N.E. of Caschau.

MATY, MATTHEW, in *Biography*, a physician and man of letters, was the son of a refugee Protestant clergyman, from Beaufort in Provence, and was born at Montfort, near Utrecht, in 1718. He was originally intended for the clerical profession; but, in consequence of some mortifications which his father had received from the synod, on account of his sentiments relative to the Trinity, his attention was turned to the profession of medicine. He graduated at Leyden in 1740, and came to settle in England, his father having determined to quit Holland for ever. In 1747, he published at Leyden, "Essai sur le Caractère du Grand Medecin, ou Euloge critique de Boerhaave." Three years afterwards he began to publish at the Hague, in French, an account of the principal books printed in England, under the title of "Journal Britannique." This journal was well received, and answered the chief end which he had in view, by introducing him to the notice of some of the most respectable literary characters of the country, which he had adopted as his residence, and to whose active and uninterrupted friendship he owed the places which he afterwards obtained. At the institution of the British Museum in 1753, he was appointed an under-librarian; and at the death of Dr. Knight, in 1772, he became principal librarian to that establishment. In 1758 he was elected a fellow of the Royal Society; and in 1765, on the resignation of Dr. Birch, who soon afterwards died, and made him his executor, he was chosen secretary to that learned body. He filled these offices with great reputation, and was in general esteem for the benevolence of his private character, and the extent of his literary information. He died in 1776. In his medical capacity, Dr. Maty was distinguished as an active and zealous promoter of the practice of inoculating the small-pox; and actually re-inoculated himself, unknown to his family, in order to disprove the supposition that it might be produced a second time in this way. He translated, in 1768, Dr. Gatti's "New Observations on Inoculation," which had been originally written by the author at his request. He had nearly completed, at the time of his death, the "Memoirs of the Earl of Chesterfield," which were finished by his son-in-law, Mr. Justamond, and prefixed to an edition of the "Miscellaneous Works" of that nobleman, in 1777. Gen. Biog. Hutchinson's Biog. Med. Anecdotes of Bowyer.

MATY, PAUL-HENRY, son of the preceding, was born in 1745. He was educated at Westminster-school, whence, in 1763, he was elected to Trinity college, Cambridge, and obtained from thence a travelling fellowship. He passed three years on the continent, after which he was appointed chaplain to lord Stormont, ambassador at the court of France. He might, from his connections, have secured preferment in the church, but scruples concerning its doctrines and ceremonies prevented him from continuing to perform the duties of a minister in it. After his father's death he retired from its service, and, in 1777, he published his reasons for this step. From this period he devoted himself to a literary life, and was almost immediately appointed assistant librarian to the British Museum; he was elected one of the under librarians, and likewise succeeded Dr. Horsley as one of the secretaries of the Royal Society. In 1782 he commenced a review of select works, English and foreign, which he carried on almost without any assistance till 1786. He died, in the following year, at the age of forty-two. Mr. Maty published a translation of Riesbeck's travels through Germany, and translated into the French language the descriptions in the "Gemmæ Marlburienses." After his death a volume of sermons was published for the benefit of his family: they are spirited and original compositions; but the editor, through some inadvertence, printed, as Mr. Maty's, three that had been copied from the sermons of archbishop Secker. Gen. Biog.

MATYLUS, in *Ancient Geography*, a town of Pamphylia, placed by Ptolemy between the mouth of the river Cataractus and that of the river Caster.

MATZEN, in *Geography*, a town of Austria; seven miles S. of Zisterstorff.

MATZENDORF, a town of Switzerland, in the canton of Soleure; six miles N. of Soleure.

MATZOL, a cape of Russia, at the mouth of the Obskaia gulf. N. lat. 72° 30'. E. long. 75° 30'.

MATZUNEA, a town of Poland, in the palatinate of Kiev; 24 miles S.W. of Kiev.

MAU, a town of the island of Ceylon; 40 miles W.N.W. of Candi.

MAVA, a river of Africa, which passes through the country of Quoja, and runs into the Atlantic near cape Monte.

MAUBAL, a town of Candahar; 65 miles N.N.E. of Candahar.

MAUBECHE, in *Ornithology*, a name given by Buffon to the TRINGA *Calidris*; which see.

MAUBEUGE, in *Geography*, a town of France, in the department of the North, and chief place of a canton, in the district of Avesnes, situated on the Sambre. The place contains 4726, and the canton 14,084 inhabitants, on a territory of 205 kiliometres, in 32 communes. N. lat. 50° 16'. E. long. 4° 2'.

MAUBOURGUET, a town of France, in the department of the Upper Pyrenées, and chief place of a canton, in the district of Tarbes; 15 miles N. of Tarbes. The place contains 1400, and the canton 7345 inhabitants, on a territory of $102\frac{1}{2}$ kiliometres, in 11 communes.

MAUCAUCO, in *Zoology*. See LEMUR and VIVERRA *Caudivolvula*.

MAUDERDALLY, in *Geography*, a town of Hindoostan, in Coimbetore; 10 miles W.N.W. of Coimbetore.

MAUDIHOCA, the cassada, or the poisonous root of which bread is made in many parts of the West Indies.

MAUDISIMILIA, in *Geography*, a town of Hindoostan, in Bahar; 35 miles S.E. of Bahar.

MAUDLIN, in *Botany*. See YARROW, and AGERATUM.

MAUDUIT, JAQUES, in *Biography*, said by M. Laborde to have been a great musician in the time of Henry IV. who accompanied wonderfully on the lute. (Essais sur la Mus. t. iii. p. 519.) We are likewise told, that he added a sixth string to viols, which had originally but five; and that he was the first in France who introduced these instruments in concert, instead of base-viols.

Père Mersenne, who had a particular regard for this musician, has given us an engraved head and eloge of him in his "Harmonie Universelle;" with the chief part of which we shall present our readers.

"Jaques Mauduit, descended from a noble family, was born in 1557. He had a liberal education, and travelled during his youth into Italy, where he learned the language of that country, together with Spanish and German, which, with the literature he had acquired at college, enabled him to read the best authors of almost every ki[nd]. He had a general knowledge of most sciences as well a[s] mechanics; and studying music with unwearied diligen[ce] without any other assistance than that of books, he rendered himself so eminent, that he was honoured, even during [h]is life, with the respectable title of *Père de la Musique*," f[athe]r of music. "And with reason," says his panegyrist, "be[ing] the inventor of good music in France, by the many ex[ce]llent works he published, both vocal and instrumental, wh[ich] have been long the ornament of our concerts.

"His merit obtained him admission into the [fa]mous Academy of Music, instituted by the learned B[aïf], 1583; and many writers of his time seem to have produ[ced] their poetical effusions, in order to have them immortali[ze]d by the airs of Mauduit.

"The first composition in which he distinguished himself as a learned harmonist, was his mass of Req[uie]m, which he set for the funeral of his friend, the celebra[ted] poet Ronsard; it was afterwards performed at [th]e funeral of Henry IV. and, lastly, at his own, 1627, under the direction of his son Louis Mauduit, at which [o]ne Mersennus officiated in the sacred function as priest.

"He left behind him innumerable masses, [h]ymns, motets, fancies, and songs. A small hereditary pla[ce] at the court of requests descended to him from his fa[th]er, which he seemed to exercise for no other purpose th[an] to oblige and serve his friends. At the siege of Paris, [wh]en the Fauxbourg was taken by storm, he ventured thro[ug]h the victorious soldiers to the house of his friend Baïf, [t]hen dead, and saved all his manuscripts, at the hazard of h[is] own life.

"Upon a similar occasion, in which there [w]as still greater difficulty and danger, he saved the *douze mod[es]* de Claude le Jeune, and his other manuscript works, at th[e] time that this composer was seized at the gate of St. D[en]is as a Hugonot; so that all those who have since receive[d] pleasure from the productions of this excellent master, [a]re obliged to Mauduit for their preservation, as he saved the[m] from destruction by seizing the arm of a serjeant at the [ve]ry instant that he was going to throw them into the flames; [p]ersuading the soldiery that these papers were perfectly inn[o]cent and free from Calvinistical poison, or any kind of trea[so]n against the League: and it was by his zeal and address, [w]ith the assistance of an officer of his acquaintance, that C[l]aude escaped with his own life."

Such are the praises bestowed upon Jaques Mauduit, by his friend the learned and benign Mersennus, w[ho]se diligence, science, and candour, far surpassed his taste. The Requiem, by Mauduit, is printed in the Harm. Univ. in five separate parts; but in scoring it, neither the harmony nor modulation offer any thing that is either curious or uncommon, at any period of counterpoint. It is in literally *plain* counterpoint of crotchets and minims moving all together, as in our cathedral chanting. The chief merit of this production is in the exact accentuation of the words, *à l'antique*: a minim for a long syllable, and a crotchet for a short.

Mersennus, in his Commentary on Genesis, has illustrated his musical remarks with many of his friend Mauduit's compositions, in which we have never been able to dig out the least fragment that would do honour to this composer or his country.

MAVEBARA, in *Geography*, a town of South America, in the province of Choco; 20 miles N. of Zitara.

MAVELAGONGUE, a river of Ceylon, which runs into the sea at Trinconomaly.

MAVELICAN, a town of Hindoostan, in the Carnatic; 40 miles from Travancore.

MAVENHELLY, a town of Hindoostan, in the Mysore, ceded to Great Britain in 1799; 60 miles S.E. of Seringapatam.

MAUG, Tuhas, or *St. Laurence*, one of the smalle[st] of the islands called "Ladrones," composed of three rocks, about 20 miles in circumference; 15 miles from the island of Assumption.

MAUGERVILLE, a township of Sunbury county, in the province of New Brunswick, in St. John's river, 30 miles above Belisle. N. lat. 45° 59'. W. long. 66° 40'.

MAUGHOLD Head, a cape on the E. coast of the Isle of Man; 40 miles W.S.W. from St. Bee's Head. N. lat. 54° 18'. W. long. 3° 28'.

MAUGSEE, three small islands in the East Indian sea, between Borneo and Paraguay. N. lat. 7° 33'. E. long. 117° 30'.

MAUGUIO, a town of France, in the department of the Herault, and chief place of a canton, in the district of Montpellier; six miles E. of Montpellier. The place contains 1167, and the canton 3386 inhabitants, on a territory of 160 kiliometres, in five communes.

MAUHLIA, in *Botany*. Dahl. Obs. Bot. 25. Thunb. Prod. 60, is the same genus with the *Agapanthus* of Solander in Ait. Hort. Kew. ed. 1. v. 1. 414, the *Tulbaghia* of Heister; see Agapanthus. The only genuine species is *Agapanthus umbellatus*, Curt. Mag. t. 500. Redout. Liliac. t. 6. (Crinum africanum; Linn. Sp. Pl. 419.) Thunberg however has added a second, by the name of *Mauhlia ensifolia*, and he is followed by Willdenow; but their plant is our *Massonia ensifolia*. See Massonia.

The name of *Mauhlia* was given by Dahl, (see Dahlia,) in honour of Mr. John Mauhle, who, as this author informs us, had for many years the superintendance of the Swedish mercantile affairs in China; and has, since his return, laboured, with great ardour, to promote various economical objects at home. He is said to have furnished Dahl with the sum necessary for the purchase of the Linnæan Museum; (see Linnæus the son,) in order that it might not go out of Sweden; and the narrator above-mentioned asserts that "the same sum of money for which it passed into foreign hands, was offered to retain it." This assertion bears hard upon the honour and patriotism of the highly respectable professor Acrel, who alone was entrusted with the sale of the collection in question, and we have his authority to say the account is incorrect. We know also that this excellent man was falsely accused of having received a bribe from the actual purchaser, because he behaved honourably and impartially in his trust; and we know moreover that he did reject with indignation an offer, from another quarter, to betray it. He had even to resist the dishonest cupidity of the heirs of the younger Linnæus, who, on receiving unlimited offers from the empress of Russia, would have left in the lurch the person with whom they were in treaty, and who did not hesitate to purchase the whole at their own price, and in their own way. S.

MAVILE, in *Geography*, a town of Hindoostan, in the circar of Cicacole; 27 miles S.W. of Cossimcotta.

MAVIS, in *Ornithology*, the common name of the song-thrush, or throstle. See Turdus *musicus*.

MAUKS, in *Agriculture*, a provincial word applied to maggots.

MAUL, in *Rural Economy*, a provincial term signifying a beetle, mallet, &c.

MAULDAH, in *Geography*, a circar of Bengal, of a triangular form, and about 45 miles in circumference; situated between Rajemal and Dinagepour.—Also, the capital of of the said circar, which is a place of considerable trade; 52 miles N. of Moorshedabad. N. lat. 25° 3'. E. long. 88° 16'.

MAULE, a river of Chili, which runs into the Pacific ocean, S. lat. 35° 12'.

MAULEN, a town of Prussia, in the province of Natangen; seven miles S.W. of Konigsberg.

MAULEON, a town of France, and chief place of a district, in the department of the Lower Pyrenées, having a castle on a rock, formerly deemed impregnable; 12 miles W. of Oleron. The place contains 1010, and the canton 12,497 inhabitants, on a territory of $317\frac{1}{2}$ kiliometres, in 28 communes. N. lat. 43° 13'. W. long. 0° 49'.

MAULEON-*en-Barousse*, a town of France, in the department of the Upper Pyrenées, and chief place of a canton, in the district of Bagnères; nine miles S.E. of La Barthe. The place contains 612, and the canton 6495 inhabitants, on a territory of 185 kiliometres, in 25 communes.

MAULI, a river of Sicily, which runs into the sea, about eight miles S.S.W. from Ragusa. N. lat. 36° 40'. E. long. 13° 45'.

MAULIAVERAM, or SEVEN PAGODAS, a town of Hindoostan, in the Carnatic, situated on the coast; 30 miles S. of Madras.

MAULPOUR, a town of Hindoostan, in Lahore; 10 miles N. of Rahoon.

MAULSURDA, a town of Bengal; 55 miles S.S.W. of Doesa.

MAUM, in *Agriculture*, a term provincially signifying a certain dry mellow quality in land. A sort of dry fine loam.

MAUMUSSON, in *Geography*, a channel or narrow sea between the isle of Oleron and the continent of France.

MAUNCH, in *Heraldry*, the figure of an ancient sleeve of a coat, which is borne in many gentlemen's escutcheons; as in the earl of Huntingdon's.

MAUNCORE, in *Geography*, a town of Bengal; 20 miles N W. of Burdwan.

MAUND, in our *Old Writers*, a kind of great basket or hamper, containing eight bales, or two fats; it is commonly a quantity of eight bales, of unbound books, each bale having one thousand pounds weight.

MAUND, in *Commerce*, the denomination of a weight in the East Indies. In Bengal heavy goods are weighed by the maund of 40 seers, each seer being divided into 16 chittacks. The maund of the English factory in Bengal weighs 74lb. 10 oz. $10\frac{2}{3}$dr. avoirdupois; so that the seer is 1lb. 13 oz. $13\frac{7}{8}$dr. and the chittack 1oz. $13\frac{3}{8}$dr. The Bengal Bazar maund is 10 *per cent.* heavier than the maund of the factory, and therefore weighs 82lb. 2oz. $2\frac{2}{11}$dr. avoirdupois; and in this case, the seer is 2lb. 0 oz. $13\frac{3}{5}$dr., and the chittack, 2oz. $0\frac{5}{8}$dr. Grain is sold by the Khahoon of 16 soallee, which is equal to 40 maunds. Liquids are sold by the chatack of 5 sicca weight; 16 chatacks making 1 pouah, 4 pouah 1 seer, and 40 seers 1 maund. At Madras goods are sold by the candy of 20 maunds, and the maund is divided into 8 vis, 320 pollams, or 3200 pagodas. The candy of Madras is 500lb. avoirdupois. In the Jaghire, or territory belonging to the English company round Madras, and in most other parts of the Coromandel coast, the Malabar weights are used, and are as follow: the gursay, called by the English garce, contains 20 baruays or candies; the baruay, 20 manungus or maunds; the maund 8 visay or vis, 320 pollams, or 3200 varahuns; each varahun weighing $52\frac{3}{4}$ English grains; so that the visay is 3lb. 3dr., the maund, 24lb. 2oz., the baruay, $482\frac{1}{4}$lb., and the gursay $9645\frac{1}{2}$lb. avoirdupois, 4 tons 6cwt. nearly. In corn measure, the garce is = $\frac{1}{2}$ English quarters nearly. When grain is sold by weight, $16\frac{1}{2}$lb. are reckoned for 1 garce, being 18 candies $12\frac{1}{2}$ mds. At Bombay the commercial weight is the candy 20 maunds, the maund being subdivided into 40 seers, anhe seer into 30 pice. The candy is 560lb., the maund 2., and the seer $11\frac{1}{5}$oz. avoirdupois. Goods are likewise ld by the Surat maund, and the Pucca or Bengal mau, so that, in every contract, the particular maund, or dy, should be mentioned. A bag of rice weighs 6 mnds, or 168lb. avoirdupois, and a candy is equal to 25 'nchester bushels nearly. At Calicut, on the Malabar coa the candy weight contains 20 maunds, and the maund 1 pools or paloons. The maund used here by the English ighs 30lb., and the candy, 600lb. But the common weigs are those of Malabar, the maund weighing 24lb. 2oz., a the candy $482\frac{1}{2}$lb. avoirdupois. At Carwar, on the Malab coast, the maund is 26lb. avoirdupois, and is divided into seers or 1000 pice, and the candy is 20 maunds. At Cochin the maund is 27lb. $2\frac{4}{5}$oz. avoirdupois, and the candy = 20 maunds = 543lb. 8 oz. avoirdupois. At Goa the und contains 24 rattles, = $24\frac{3}{4}$lb. avoirdupois, so that t candy of 20 maunds is equal to 495lb. avoirdupois. Cornnd rice are sold by the candy of 20 maunds, which are equ to 14 English bushels nearly. At Mangalore, the manor maund, by which goods are sold in the market, contas 46 seers, or 28lb. $2\frac{1}{4}$oz. avoirdupois: the maund, by wh the merchants buy and sell, weighs 16 rupees more, th is 28lb. $4\frac{1}{2}$oz. avoirdupois; the baru or candy is 20 maids. At Masulipatam the candy is 20 maunds, the maund 8 v, 40 seers, 600 neves, or 900 dabous. This maund weighs $4\frac{1}{2}$lb. avoirdupois nearly. At Pondicherry the commerci weight is the candy of 20 maunds, or 160 vis. The mad is = 24lb. French poids de marc, or 25lb. 14oz. $5\frac{1}{2}$r. avoirdupois. At Scindy heavy goods are weighed by t maund of 40 seers. The cutcha or Surat maund is = 7lb. 5oz. $5\frac{1}{3}$dr. avoirdupois, and is divided into 16 annas, or 32 pice; the Pucca maund is double the former. At Surat, the maund for weighing heavy goods is 40 seers, and the seer 30 pice: 20 Surat maunds, or 10 Pucca or Bengal factory maunds make 1 candy, or 746lb. 10oz. 10dr. avoirdupis. But these weights vary. At Tranquebar the maund weighs 68lb. Danish, or $74\frac{4}{5}$lb. avoirdupois. At Acheen, in the isle of Sumatra, a maund of 75lb. of rice contains 21 banboes, a bamboe being 4 and sometimes 5 cauls. Kelly's Cambist. vol. i.

MAUNEA, in *Geography*, a town of Bengal; 30 miles N.W. of Nattore.

MAUNEAR, a town of Bengal; 10 miles W. of Midnapour.

MAUNDY, or MAUNDEY *Thursday*, *Dies Mandati*, the Thursday before Easter; so called from the French *mande*, i. e. *portula*; it being a custom on that day to give a largess or bounty to certain poor men, whose feet the king formerly washed, as a mark of humility, and in obedience to the command of Christ.

MAUNDYGAUT, in *Geography*, a town of Hindoostan, in the soubah of Delhi; 27 miles E.N.E. of Secundara.

MAUNSEE, a town of Austria, near a lake of the same name; 16 miles S.W. of Voglabruck.

MAUNSI, a river of Bengal, which falls into the Toorsha, and after their confluence they assume the name of Neelcoomer, and shaping their course through Baharbund, fall with their united streams into the Berhampooter.

MAUNTRY,

MAUNTRY, a town of Hindoostan, in Mohurbunge; 12 miles S. of Harriorpour.

MAUPERTUIS, Peter-Lewis Moreau de, in *Biography*, a celebrated French mathematician and philosopher, who flourished in the eighteenth century, was born at St. Malo in the year 1698. He was privately educated till he was sixteen years of age, when he was sent to the college of La Marche, at Paris. He shortly discovered a strong inclination to mathematical pursuits, and a considerable taste for instrumental music, which he practised with success. At the age of twenty he determined on a military life, and entered among the mousquetaires, but after remaining two years in that corps, he obtained a company in a regiment of cavalry, which he held about three years. During this time he devoted all his leisure hours to scientific studies, and at length he quitted the profession of arms, and applied his mind entirely to mathematics. In 1723 he was received into the Royal Academy of Sciences, on which occasion he read his first performance, which was "A Memoir upon the Construction and Form of musical Instruments." He now paid a good deal of attention to natural philosophy, and discovered great knowledge and dexterity in observations and experiments upon animals. In 1728 he, with all the zeal of a devotee, visited the country which had given birth to Newton, of whose principles he became a zealous admirer and follower; and during his residence in London he was honoured with an admission into the Royal Society. Upon his return to France, he made an excursion to Basil, where he formed a friendship with the celebrated Bernouillis. On his return to Paris from Switzerland, he applied to his favourite studies with redoubled ardour, and enriched the transactions of the academy with a vast number of his communications, between the years 1724 and 1744. In some of these the most sublime and intricate questions in the mathematical sciences are discussed with precision, clearness, and elegance. In 1736, he was sent by Lewis XV., at the head of the French mathematicians, into Lapland, for the purpose of measuring a degree of the meridian within the polar circle, in order to determine the figure of the earth. The reputation which he acquired by this undertaking was so great, that he was admitted a member of almost every academy in Europe. In 1740 he was invited by the king of Prussia to go to Berlin, to be the president and director of the Royal Academy of Sciences and Belles Lettres in that place, which he readily accepted. When he arrived, the king was at war with the emperor, and our philosopher, whose love for his first profession of arms was not entirely effaced, determined to follow the king to the field. He was present at the battle of Molwitz; but before victory declared itself for the Prussians, his horse ran away with him into the enemy's ranks, where he was taken prisoner, and very roughly used. Being carried to Vienna, he there met with the most honourable reception from the emperor. This noble-minded prince, hearing him regret the loss of a watch by Graham, the celebrated English artist, which had been of great use to him in his experiments and astronomical observations, having another by the same maker, but enriched with diamonds, presented it to him, saying, "The hussars were only in jest with you, they have sent me your watch, and I gladly restore it to you." Notwithstanding his talents as a philosopher and mathematician, he was capable of paying well turned compliments to persons of the highest rank in life: in the course of conversation with the empress-queen, her majesty observed to him that she had heard the princess Louisa-Ulrica of Prussia was the most beautiful princess in the world. "Till this moment, madam," replied Maupertuis, "I was entirely of that opinion." He was soon afterwards allowed to depart for Berlin, loaded with favours by the emperor and empress. From thence Maupertuis went to Paris, and in 1742 was chosen director of the Academy of Sciences: during the following year he was received into the French Academy, and was the first instance of a person's being member of both the academies of Paris at the same time. After this he again assumed the character of a soldier, and was present at the siege of Fribourg, and, upon the surrender of that citadel, was appointed to carry the news of the event to the French king. In 1744 he returned to Berlin, and married a lady of great beauty and merit, to whom he was extremely attached, and his alliance with whom he considered as the most fortunate event of his life. In 1746, the king of Prussia declared our philosopher president of the Royal Academy of Sciences at Berlin, and soon afterwards honoured him with the order of Merit; and farther distinguished him with his own most intimate confidence. These accumulated honours served to stimulate him in his application to scientific researches, not only in mathematics, but in metaphysics, chemistry, botany, and polite literature. His temper was not good, and he was frequently involved in disputes with persons of distinguished talents: one of these was with Koenig, professor of philosophy at Franeker, in which Voltaire took a decided part against him. Maupertuis threatened to take on him personal revenge, to which Voltaire replied by reiterating the strokes of the most ludicrous satire. The constitution of the philosopher had been long impaired by fatigues of various kinds, and particularly by the hardships which he had undergone in his Lapland expedition; but the vigour of his mind was unabated, even at a time when, from severe illness, he was incapable of taking the chair of the academy. He died in 1759, when he was about the age of sixty-one. He was author of many works, of which the following may be noticed; "An Essay on Cosmology:" "A Discourse on the different Figures of the Stars:" "Philosophical Reflections upon the Origin of Languages, and the Signification of Words:" "An Account of the Expedition to the Polar Circle, for determining the Figure of the Earth, or, the Measure of the Earth at the Polar Circle:" "Observations on the Comet of 1742:" "The Measure of a Degree of the Meridian at the Polar Circle."

MAUPHAZE-Bunder, in *Geography*, a town of Hindoostan, in the circar of Cicacole; 4 miles S.E. of Cicacole.

MAUPIN, La, in *Biography*, one of the early and most extraordinary female singers in the operas of Lulli. M. Laborde has assigned, in his "Essais sur la Mus.," a piquant article to most of the favourite performers in these splendid musical dramas, with which Louis XIV. and the whole French nation were so delighted and so proud. Almost every individual of this syren troop is marked by some singularity of character, or peculiar circumstances; but none more so than La Maupin, the successor of La Rochois. She was equally fond of both sexes: fought and loved like a man, and resisted and fell like a woman. Her adventures are of a very romantic kind. Married to a young husband, who was soon obliged to absent himself from her, to enter on an office he had obtained in Provence, she ran away with a fencing-master, of whom she learned the small-sword, and became an excellent fencer, which was afterwards a useful qualification to her on several occasions. The lovers first retreated from persecutiou to Marseilles; but necessity soon obliged them to solicit employment there, at the opera; and, as both had by nature good voices, they were received without difficulty. But soon after this she was seized with a passion for a young person of her own sex, whom she seduced;

duced; but the object of her whimsical affection, being pursued by her friends and taken, was thrown into a convent at Avignon, where the Maupin soon followed her; and having presented herself as a novice, obtained admission. Some time after, she set fire to the convent, and, availing herself of the confusion she had occasioned, carried off her favourite. But being pursued and taken, she was condemned to the flames for contumacy; a sentence, however, which was not executed, as the young Marseillaise was found, and restored to her friends.

She then went to Paris, and made her first appearance on the opera stage in 1695, when she performed the part of Pallas, in "Cadmus," with the greatest success. The applause was so violent, that she was obliged, in her car, to take off her casque to salute and thank the public, which redoubled their marks of approbation. From that time her success was uninterrupted. Dumeni, the singer, having affronted her, she put on men's clothes, watched for him in the Place des Victoires, and insisted on his drawing his sword and fighting her; which he refusing, she caned him, and took from him his watch and snuff-box. Next day Dumeni having boasted at the opera-house, that he had defended himself against three men who attempted to rob him, she related the whole story, and produced his watch and snuff-box in proof of her having caned him for his cowardice. Thevenard was nearly treated in the same manner, and had no other way of escaping her chastisement than by publicly asking her pardon, after hiding himself at the Palais Royal during three weeks. At a ball given by Monsieur, the brother of Louis XIV., she again put on men's clothes, and having behaved impertinently to a lady, three of her friends, supposing the Maupin to be a man, called her out. She might easily have avoided the combat by discovering her sex, but she instantly drew, and killed them all three. Afterwards, returning very coolly to the ball, she told the story to Monsieur, who obtained her pardon. After other adventures, she went to Brussels, and there became the mistress of the elector of Bavaria. This prince quitting her for the countess of Arcos, sent her by the count, husband of that lady, a purse of 40,000 livres, with an order to quit Brussels. This extraordinary heroine threw the purse at the count's head, telling him, it was a recompence worthy of such a scoundrel and —— as himself. After this she returned to the opera stage, which she quitted in 1705. Being at length seized with a fit of devotion, she recalled her husband, who had remained in Provence, and passed with him the last years of her life in a very pious manner, dying in 1707, at the age of thirty-four.

MAUR, in *Geography*, a town of Austria; 7 miles S. of Mauttern.

MAUR, *St.*, a town of France, in the department of the Indre and Loire, and chief place of a canton, in the district of Chinon; 15 miles S.E. of Chinon. The place contains 2271, and the canton 8357 inhabitants, on a territory of 185 kiliometres, in 12 communes.—Also, a town of France, in the department of Paris; 6 miles S.E. of Paris.

MAUR, *St.*, *Congregation of*, in *Ecclesiastical History*, a famous society of Benedictines, which was founded in the year 1620, by the express order of Gregory XV., and enriched by Urban VIII. in 1627, with several donations and privileges. This society has been distinguished by the great number of excellent rules and institutions that are observed in it, and by the regular lives and learned labours of its members. Those who have any acquaintance with the history and progress of learning in Europe, well know what signal advantages the republic of letters has derived from the establishment of this famous congregation, whose numerous and admirable productions have cast a great light upon all the various branches of philology and belles lettres, and whose researches have taken in the whole circle of sciences, philosophy excepted. These Benedictines still maintain their literary fame, by the frequent publication of laborious and learned productions in all the various branches of sacred and profane literature.

MAURACONDA, in *Geography*, a town of Africa, in the kingdom of Bursali. N. lat. 13° 40'. W. long. 15° 25'.

MAURANDIA, in *Botany*, received its name from Dr. Ortega, the professor of botany at Madrid, in honour of the lady of Dr. Maurandy, the botanical professor at Carthagena, said to be an ardent admirer and prosecutor of the same study with her husband. Cavanilles had given the generic appellation of *Usteria* to this plant, not being aware of its having been previously bestowed on another genus by Willdenow; for which reason, joined to that of complimenting the above named lady on her botanical acquirements, Ortega was induced to change it to *Maurandya*. In the Botanical Magazine we perceive that Dr. Sims, though he has adopted the genus, is not perfectly satisfied with it, or rather that "he cannot cordially coincide with Dr. Ortega, in the propriety either of his generic or trivial name." We content ourselves with reforming his orthography. Orteg. Hort. Matrit. dec. 2. 21. Jacq. Hort. Schoenb. v. 3. 20. Willd. Sp. Pl. v. 3. 389. (Usteria; Cavan. Ic. v. 2. 15.)—Class and order, *Didynamia Angiospermia*. Nat. Ord. *Personatæ*, Linn. *Bignoniæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, permanent, cloven nearly to the base into five linear-lanceolate, acute, erect, almost equal segments. *Cor.* of one petal, two-lipped; tube shorter than the calyx; throat twice as long as the calyx, rather depressed, broad, with various furrows on each side, somewhat incurved; limb ringent, in five nearly equal, roundish, emarginate segments, two above and three below. *Stam.* Filaments four, thickened and hairy at the base, not so long as the throat of the corolla, two of them shorter; anthers oblong. *Pist.* Germen superior, ovate, with a furrow on each side; style awl-shaped, the length of the stamens; stigma simple. *Peric.* Capsule as long as the calyx, of two cells, each opening at the top with five, half-ovate, acute, reflexed valves. *Seeds* numerous, rather ovate, rough, affixed to each side of the partition.

Ess. Ch. Calyx inferior, in five deep segments. Corolla ringent; tube bell-shaped, furrowed. Capsule of two cells, opening by five teeth at their summit.

1. M. *semperflorens*. Climbing Maurandia, or Bastard Foxglove. Sims in Bot. Mag. t. 460. Jacq. Hort. Schoenb. t. 288. Usteria scandens; Cavan. Ic. t. 116. Andr. Bot. Repos. t. 63.

This, the only species known, is a native of Mexico, and an elegant greenhouse plant, flowering for months together in the summer. *Root* perennial, branched, sending forth numerous, annual, climbing, round, darkish, branched *stems*, about the thickness of a quill. *Branches* green, about three feet long, somewhat divided. *Leaves* alternate, on long twining footstalks, very numerous, spear-shaped, three, five, or seven-nerved. *Flowers* solitary, drooping, on long, twisted, axillary stalks, of a beautiful lilac, or purple and white, colour. They have great affinity to those of the Foxglove. *Seeds* oblong and black.

This truly elegant climber, which is beautifully figured in the works above quoted, from being easily propagated by cuttings as well as seeds, seems in a fair way of becoming common in our greenhouses, though said to be rather better suited to the conservatory.

MAURBACH, in *Geography*, a town and chartreux of Austria; nine miles W.N.W. of Vienna.

MAURE, *Mademoiselle* Catherine-Nicole le, in *Biography*, one of the last favourite singers in the French serious opera of the old school. She was born at Paris in 1704, and, according to M. Laborde, gifted with the finest voice that nature ever bestowed on a mortal. She was admitted, in 1719, only as a chorus-singer, and remained in that humble station till 1724, when she appeared in the character of Cephile, in the first part of "L'Europe Galante."

From that moment she never ceased to delight the audience, even to extacy, in every part that was assigned her. Her beautiful voice, manner of singing, and embellishments, were equally captivating. Mademoiselle le Maure, diminutive in figure, and ill made, moved on the stage with incredible dignity; she penetrated every heart so much by what she had to utter, that she drew tears from hearers the most frigid; she animated and transported them; and though she had neither beauty nor wit, she excited the most lively sensations.

She quitted the stage and returned to it several times, till 1743, after which period she never performed in public, except in the festivals given in celebration of the dauphin's first marriage, in 1745.

Her retreat was rather occasioned by caprice than fading talents; she might have remained on the stage ten years longer with her usual eclat. For after her retirement we have very frequently been present (continues M. Laborde) when she has sung and acted whole operas without appearing fatigued. The undertakers of the Colisée prevailed upon her to sing two or three times in 1771, and there never was so great a crowd assembled at a public place as she attracted to hear her. Mademoiselle le Maure continued to the end of her life superior to what might be expected from her age.

No one could dispute the perfection of her voice; and even young people, though a great change was begun in our music, found the charms of her vocal organs irresistible.

It would be an interesting inquiry to investigate the cause of that exquisite pleasure which the mere tone of a fine voice excites, without the concurrence of any reasoning faculty. Mademoiselle le Maure had no imposing figure, was neither pretty, nor gifted with superior intellects or reflections, without taste or education; yet, denied all these advantages, she had only to open her mouth, and breathe two or three sounds, to produce every effect resulting, with great difficulty, from the union of all the advantages of which she was in want. To what are we to ascribe this prodigy? It is one of those mysteries of nature which philosophy has not yet unfolded.

Mademoiselle le Maure, in 1762, was married to M. de Monbruelle; but she still remained best known, after her marriage, by her maiden name; so true it is that our place in society is determined by talents and useful faculties.

Maure, in *Geography*, a town of France, in the department of the Ille and Vilaine, and chief place of a canton, in the district of Rédon; 15 miles N. of Rédon. The place contains 4110, and the canton 8370 inhabitants, on a territory of 205 kiliometres, in nine communes.

Maure, *St.*, or *Leucadia*, an island in the Mediterranean sea, about 50 miles in circumference, formerly joined to the continent, but now separated from it. (See Leucadia.) This island produces great plenty of game, wine, oil, citrons, pomegranates, almonds, and other fruits, with fine pastures. Its inhabitants are Greeks, subject to a bishop. It had formerly three considerable towns, with a very magnificent temple of Venus. The town which gives name to the island, contains about 6000 inhabitants; as it is situated in the water, and defended by walls and towers, it is not easy of access either by land or water. Beyond its works, in a morass, are two well inhabited islands, or suburbs; and the little islands between this and the continent communicate by bridges. It has repeatedly changed master, being sometimes under the dominion of the Turks, and sometimes under that of the Venetians. By the treaty of Campo Formio it was ceded to France; but in 1799, it was declared one of the seven islands formed into a republic. N. lat. 39° 4'. E. long. 20° 39'.

MAUREPAS, John Frederic Philippeaux, *Count de*, in *Biography*, a French statesman, was born in 1701, and in 1715 was appointed secretary of state; which, considering his youth, must have been a sinecure. In 1723, he was made superintendant of the marine, and, in 1738, minister of state. By the intrigues of madame Pompadour he was exiled to Bourges in 1749. He was not recalled till 1774, when Louis XVI. entrusted the public affairs to his management. He attended greatly to the marine department, and was a liberal encourager of the sciences; but the part he took in assisting America against England is a reflection on his political prudence. He died in 1781. His Memoirs, by himself, are curious, but carelessly written; they were printed at Paris in 1792, 2 vols 8vo. Nouv. Dict. Hist.

Maurepas, in *Geography*, an island on the N.E. coast of lake Superior, in Upper Canada, N.E. of Portchartrain island, about half way between Elbow island and the bay of Michipicoten; 40 miles in circumference. N. lat. 47° 42'. W. long. 85° 30'.—Also, an island on the coast of cape Breton, the same as the "Isle Madame;" which see.—Also, a lake in West Florida, communicating westward with the Missisippi river, through the gut of Ibberville, and eastward with lake Portchartrain; ten miles long and seven broad.

MAURIAC, a town of France, and chief place of a district, in the department of the Cantal; 18 miles N.N.W. of Aurillac. The place contains 2572, and the canton 11,337 inhabitants, on a territory of 250 kiliometres, in 11 communes.

MAURICE, (Mauritius), in *Biography*, emperor of the East, was born, about 539, at Arabissus, in Cappadocia. He entered at an early age into the army, and was, on account of his prudence and valour, placed by the emperor Tiberius Constantine at the head of the army sent against the Persian king Hormisdas. He gained two victories over the Persians, and returning to Constantinople, was rewarded with the hand of the emperor's daughter, and the high dignity of Cæsar. At the death of Tiberius, in 582, Maurice succeeded to the throne without opposition. War was renewed with doubtful success, but in the end Hormisdas was deposed, and Chosroes, with the assistance of Maurice, was placed on the Persian throne. Peace was now restored between the two emperors, after which the arms of the emperor were turned against the Avars, a barbarian tribe on the Danube, who had made incursions into Thrace: of these it is said that 60,000 were slain, and a great number taken prisoners. The enemy, however, in the same contest, captured 12,000 of the soldiers in Maurice's army, which they put to death on the refusal of their king to pay a ransom for their lives and liberty. This and other circumstances rendered him extremely unpopular among the troops; and upon the arrival of an order for them to cross the Danube into the enemy's country, they broke out into a general mutiny, and marched back to Constantinople. The populace in that city, partaking

taking in the disaffection, rose in revolt, and assaulted the emperor with stones. He was now glad to make his escape to the Asiatic shore, whence he sent his eldest son to implore the protection and assistance of the Persian king. Phocas, a centurion, had been invested with the purple, and as the emperor quitted the capital he entered it, and was consecrated by the patriarch. Shortly after this he sent his executioners to prevent the possibility of future rivalship. They dragged the unfortunate man from his sanctuary, and having murdered five of his children before his face, slew him in the twentieth year of his reign, A.D. 602. Maurice is highly extolled by ecclesiastical historians for his piety and orthodoxy, and it is generally admitted that he was a virtuous character, possessed of very good intentions, though certainly unequal to his high station. He was well acquainted with the military art, and composed twelve books on the subject, which are still extant. They were published in 1664, at the end of the Tactics of Arrian. Univer. Hist. Gibbon.

Maurice, elector of Saxony, son of Henry the Pious, of the Albertine branch of the Saxon family, was born in 1521. He came to the possession of his territories when he was about twenty years of age, at which time he was distinguished by gracefulness of person, and great dexterity in all martial exercises. He had been educated in a zealous attachment to the Protestant doctrines, yet, when the princes of that persuasion entered into the league of Smalcalde in defence of their civil and religious liberties, he refused to join in it, and attached himself to the party of Charles V. His cousin, John-Frederick, then elector of Saxony, was one of the chiefs of that league; and the unjust design of supplanting him, with the view of making himself the head of the house, was probably the spring of his conduct from his first appearance as a public character. At the diet of Worms, in 1545, he differed from his Protestant brethren, by shewing an inclination to gratify the emperor, in opening a communication with the council of Trent, and granting an aid towards the Turkish war. In the following year, when the Protestant confederacy declared war against Charles, Maurice made a secret treaty with him, by which he engaged to assist him as a faithful subject, stipulating that he should be rewarded with the dignity and territories of which his kinsman, the elector, might be despoiled. He, nevertheless, lulled the suspicions of the other party, till he actually invaded and took possession of almost the whole electorate of Saxony. For this he was branded with the names of traitor and apostate, and became the theme of the bitterest invectives from the pulpit and the press. The elector soon after recovered his dominions, and not contented with this, he seized upon a part of the hereditary possessions of Maurice. His success was short-lived, for in 1547 he lost his sovereignty and his liberty, and his antagonist Maurice was, in the same year, formally invested in the electoral dignity at the diet of Augsburg. He now entered most fully into the emperor's views, and joined him in the project to reduce the whole Germanic body to a state of subjection; nor was it doubtful that the final ruin of Protestantism was a part of his determination. Maurice, sincerely attached to his religion, and feeling his consequence as its head in Germany, resolved henceforth to appear in a character suited to his station and principles. He enforced throughout Saxony "The Interim," or temporary plan of religion, which was to continue till its final settlement, but which was highly obnoxious to the zealous Protestants. In this he was supported by Melancthon and others of the moderate party. He still professed a full adherence to his alliance with the emperor, but as his own plans approached nearer to execution, he strengthened himself by a treaty with the French king, Henry II, the professed object of which was to restore the landgrave of Hesse to liberty, and to preserve the German constitution. At length, in March 1552, Maurice suddenly joined in Thuringia a considerable army which he had collected, and issued a manifesto containing his reasons for taking arms. The king of France added one in his own name, and both their forces began to act. Maurice now threw off the mask very completely, he advanced into Upper Germany, at every place restoring the magistrates whom the emperor had deposed, and reinstating the Protestants in the churches from which they had been ejected. By hasty marches, attended with great success, he proceeded towards Inspruck, where the emperor then was. A temporary mutiny among his troops gave that powerful monarch time to escape out of the town in a litter by torch-light, before Maurice entered it. He fled across the Alps, having first liberated the former elector of Saxony; the council of Trent broke up in confusion, and the affairs of Germany assumed a totally new face. Negociations for peace were opened at Passau, where Maurice appeared at the head of the Protestants, and Ferdinand, king of the Romans, represented his brother the emperor. Maurice's demands were supported by the princes of the empire, as well Popish as Protestant, and the emperor found it necessary to enter into terms of accommodation. At length the "Peace of Religion," as it was called, was concluded at Passau, in August 1552, by which the landgrave was to be set at liberty, a diet was to be holden within six months for setling all religious dissentions, and in the mean time each party was to enjoy equal privileges, and the undisturbed exercise of its religion. Thus Maurice, who, by his conduct, had been suspected of apostacy from the Protestant cause, had the glory of establishing the reformation in Germany upon the solid basis on which it has ever since subsisted. After this treaty was agreed on, and signed, he accompanied Ferdinand into Hungary at the head of 20,000 men, in order to take the command of the Turks, but mutinies among the troops and dissentions between the generals prevented him from doing any thing worthy of his reputation. In the following year a confederacy was formed against Albert of Brandenburg, of which Maurice was appointed commander-in-chief, and on the ninth of June, 1553, the two armies met at Sievenhausen, when a fierce engagement ensued, which ended in Albert's total defeat. But the victors had to deplore the loss of many brave officers of distinction, among whom was Maurice himself, who, on leading a body of cavalry to a second charge, was shot in the belly with a pistol-bullet, of which wound he died two days after, in the thirty-second year of his age, and the sixth from his possession of the electoral dignity. Univer. Hist. Robertson.

Maurice of Nassau, son of William prince of Orange, by his second wife Ann, daughter of the preceding Maurice of Saxony, was about eighteen years of age, and a student in the university of Leyden, at the time of his father's assassination in 1584. Upon that fatal event he was appointed by the states of Holland and Zealand their stadtholder and captain-general, and soon after he took his post as an antagonist of the prince of Parma, the most celebrated general of that age. In 1590 he made himself master of Breda; and in the following year, being created stadtholder of Guelderland, he took several important places, ending with Nimeguen, by which he acquired a very high degree of popularity and fame. In 1593 he captured the strong fortress of Gertruydenberg, which raised him to a parity with the ablest generals of the time, and he appeared to unite with vigour and enterprize of youth all the caution and

and vigilance that are usually the result of age and experience. Attempts were made to take away his life, but they were unsuccessful, and he continued for many years in an uninterrupted course of military transactions, and gradually recovered almost all the places within the seven provinces which had been taken by the Spaniards. He gained the memorable battle of Nieuport against the archduke Albert. Several towns fell into his hands in consequence of this success, though he ever after reflected upon himself for putting his country to such a risk as was incurred by this action. After the death of the prince of Parma, Maurice had next Spinola for his antagonist. Every stratagem of war was exhausted in the campaigns between these two masters of the military art, who balanced each other's success. The Spaniards now began to be tired of war, and negociations were entered upon for a peace, but Maurice threw obstacles in the way of an accommodation, while, on the other hand, the constitutional republicans, at the head of whom was the grand pensioner of Holland, Barneveldt, were on that account the more solicitous to promote it, and in the end they carried their point, and a truce for twelve years was concluded in April, 1609. From this period Maurice appears chiefly in the less respectable light of head of a party, and aiming at a degree of power and influence not at all compatible with a free constitution. Religious disputes succeeded the external tranquillity of Holland: these gave Maurice a pretext to interpose with a strong hand, by virtue of his office as stadtholder. The Arminian doctrine was embraced by Barneveldt, Grotius, and many other illustrious characters, who united sentiments of religious liberty with republican politics. These, however, were the smaller number, and Maurice threw all his influence into the scale of their enemies, who would not acquiesce in a proposal for an equal toleration of Calvinists and Arminians: they demanded a national synod to settle their disputes, not doubting that their party would be found to be the majority. To this proposal Maurice lent his assistance, and at length, in 1618, the famous synod of Dordrecht or Dort was assembled. The result of its deliberations was the absolute condemnation of the doctrines of Arminius, and of those who held them. Maurice now exhibited in his own conduct and character the traits of a vile and infamous persecutor, for every man who lifts his arm against the rights of conscience ought, in right, to be held up as infamous: he ordered the apprehension of Barneveldt, Grotius, Hoogenberts, and other heads of that party, who were imprisoned in the castle of Louvenstein. Barneveldt was brought to trial, and though innocent of the charges exhibited against him, was condemned to death by a pusillanimous and iniquitous court, and no intercessions could avert the fate of one whom the prince was so much interested to remove. He died a martyr to his principles, and his death not only fixed an indelible stain on the memory of this prince, but greatly injured his popularity, as soon as the nation became cool enough to estimate the man they had lost. The truce between Spain and Holland expired in 1621, and a renewal of war followed, but Maurice's military transactions were not now remarkable; they were thought to denote the languor of broken spirits and declining health. A conspiracy was formed against his life by the younger son of Barneveldt, joined by some zealous Arminians: it was, however, discovered, and the leaders in it executed. Maurice died at the Hague in 1625, in the fifty-eighth year of his age. He had spent the greater part of his life in the service of his country, of which he was, notwithstanding his defects, considered the preserver, and was unquestionably the greatest statesman and warrior of the period in which he flourished. Vigilant, indefatigable, penetrating, cautious, and sagacious, he united all the qualities of a general and a hero with the knowledge of a scholar. Ambition, said to be the weakness of a great mind, was his only foible; this rendered him dangerous to that liberty which he had before nobly asserted. There was no part of the science of war with which he was not thoroughly acquainted, but he particularly excelled in the art of fortification, and in the selection of strong posts. He cultivated a taste for the fine arts, and his temper and talents were calculated to support a tottering cause and render it triumphant, and he has been regarded as one of the founders of Batavian independence. Univer. Hist.

MAURICE, or *Morris*, in *Geography*, a river of New Jersey, whic runs southerly through Cumberland county, into Delaware bay; navigable for vessels of 100 tons ten miles, and for smaller craft considerably further.

MAURICE *Bay, St.*, a bay on the W. side of cape Farewell island, or south extremity of East Greenland, and the principal harbour of that sea.—Also, a bay on the S. coast of the island of Java. N. lat. 7° 38′. E. long. 109° 3′.

MAURICE *Port*, a small cove, which has anchorage before it, in 12½ fathoms, about half a mile from the shore, over coral rocks, on the E. coast of Terra del Fuego island, on the W. shore of Le Maire straits, between that island and Staten Land, on the E. and N. of the bay of Good Success.

MAURICE, *St.*, a town of Switzerland, in the Vallais, situated between the two chains of mountains that bound this country in their approach towards the Rhone The town is built almost totally upon the rock, at the foot of steep mountains, and at a small distance from the river. This was anciently called "Agaunum;" and the name of St. Maurice is derived from an abbey erected in the beginning of the sixth century, by Sigismond, king of Burgundy, in honour of a saint who is supposed to have suffered martyrdom in this place: he was, as tradition says, the leader of the famous Theban legion, reported to have been massacred by the order of Maximin, for not renouncing Christianity. A few Roman inscriptions, chiefly sepulchral, and two defaced columns, are the only incontrovertible remains of the antiquity of St. Maurice. It is principally distinguished as being the chief entrance from the canton of Bern into the Vallais. This entrance is formed by a narrow pass, so strongly fortified by nature, that a small number of men might defend it against a considerable army. The stone bridge over the Rhone is much admired for its bold projection; it is of a single arch, and the span is 130 feet. The pass just mentioned is a great thoroughfare for all goods and persons from the lake of Geneva, through the country of Vallais, and over mount St Bernard; 35 miles E. of Geneva. N. lat. 46° 15′. E. long. 6° 52′.—Also, a town of Canada, on a river of the same name; 9 miles N.W. of Trois Rivieres.—Also, a town of France, in the department of Mont Blanc; 11 miles N.N.W. of Chambery, and another in the same department; 24 miles W. of Aosta.—Also, a town of France, in the department of the Orne; 12 miles N.E. of Mortagne.

MAURICE, *St.*; and *St. Lazarus*, an order of knights in Savoy. The order of St. Maurice was instituted in 1440, by Amadeus VII. duke of Savoy, who was afterwards pope, by the name of Felix V. He assigned for its badge a cross pomettée, made either of white taffeta, or of white linen cloth, placed on the knight's breast. In the year 1572 Philibert, duke of Savoy, being made grand-master of the order of St. Lazarus, which, in 1565, had been renewed in Savoy by pope Pius IV., obtained permission from Gregory, then pope,

pope, for the union of the two orders; ever since which time they have been styled the order of St. Maurice and Lazarus. When this union was effected, the badge was a cross pomettée argent, upon a cross of eight points vert; being the respective badges of the two orders before they were united, and to be worn pendent to a green ribband.

MAURICEAU, Francis, in *Biography*, a surgeon, eminent in the practice of midwifery, was born at Paris, where he applied, with great industry, to the study and practice of surgery, for many years, especially in the great hospital of that city, the Hôtel-Dieu. He had already acquired there so much experience in the obstetrical department of practice, before he commenced public practice, that he rose almost at once to the head of his profession. His reputation was farther increased by his writings, and maintained by his prudent conduct and acknowledged skill during a series of years; after which he quitted practice entirely, and retired into the country, where he died, in October 1709. He published the following works, all relative to the particular branch of the art which he practised; they contain a great store of useful facts, though ill arranged, and mixed with false reasoning peculiar to his time. 1. "Traité des Maladies des Femmes grosses, et de celles qui sont accouchées," Paris 1688, in 4to. which has been often reprinted, and translated into Latin, as well as into most of the modern European languages. 2. "Aphorismes touchant l'Accouchement, la Grossesse, et les Maladies des Femmes," ibid. 1694, which contains a summary of the doctrines of his larger work. 3. "Observations sur la Grossesse et l'Accouchement des Femmes, et sur leurs Maladies, et celles des Enfans nouveaux nés," ibid. 1695, 4to. This may be considered as a second volume of the first treatise, and contains a great number of cases and observations, in illustration of the doctrine there stated. 4. "Dernieres Observations sur les Maladies des Femmes grosses et accouchées," 4to. ibid. 1708; which contains an additional collection of cases. The whole of these works were collected, and reprinted together, after his death, in 1712, and subsequently with figures. Eloy. Dict. Hist. Gen. Biog.

MAURIENNE, or Morienne, *County of*, in *Geography*, was lately a province of Savoy, consisting of a long narrow valley; it now belongs to France, and is included in the department of Mont Blanc.

MAURIPIDA, one of the Laccadive islands. N. lat. 10° 58'. E. long. 72° 21'.

MAURITANIA, Mauretania, or, as it is called by Strabo, *Maurusia*, in *Ancient Geography*, a considerable part of the northern region of Africa, extending from Numidia towards the east to the Atlantic ocean on the west. Mauritania Propria, or Tingitania, considered as unconnected with Mauritania Cæsariensis, was bounded on the E. by the river Malva or Mulucha; on the W. by the Atlantic ocean; on the S. by Gætulia or Libya interior; and on the N. by the Mediterranean. This kingdom, being reduced to the form of a Roman province in the reign of Claudius, was denominated by that prince Mauritania Tingitana; and it was called by the Romans at that time, as well as afterwards, Tingitana, from its principal city Tingi or Tingis, and thus distinguished from Mauritania Cæsariensis. The Tingitania of the ancients very nearly corresponds to the kingdoms of Fez and Morocco. As to the extent of Mauritania properly so called, it may be estimated by considering that the Malva or Mullooïah, its eastern limit, about 1° 15' W. of London, is rather more than 240 miles distant from the Atlantic ocean. Some modern geographers make the kingdom of Fez to be 270 miles long, and that of Morocco, from cape Non to the mountains which divide it from Segelmessa above 370; but this computation, with respect to the ancient Tingitania, is, without doubt, more erroneous than that of Pliny, which amounts only to 170 miles.

Mauritania and Maurusia, the names of this country, are derived from the Mauri, an ancient people who inhabited it; and Bochart considers Maurus as equivalent to Mahur; or as an elision of gutturals is very common in the Oriental language, Maur, *i.e.* one from the west, or an occidentalist, Mauritania being west of Carthage and Phœnicia. As to the origin and general history of the Mauritanians, we may direct our attention to three principal epochas. 1. The period during which the first population, derived from Mizraim by his sons and grandsons, extended from the E. to the W. 2. That in which the Canaanites, expelled from Palestine by Joshua, traversed sea and land to escape from his victorious and destructive arms, established themselves along the coasts of Africa, and partly in the interior of the country. To this purpose Procopius says, that in his time two pillars of stone were to be seen in this country, with the following inscription in the Phœnician language and character upon them: "We are the Canaanites who fled from Joshua, the son of Nun, that notorious robber." 3. The time when the Phœnicians, impelled by the activity of their commercial spirit, formed upon these coasts considerable establishments. We might also mention an influx of Arabians, who came here from Arabia Felix, in the first century of the Christian era, and the invasion of the Mahometan Arabs, in the seventh and eighth centuries. This country, it is well known, bore the name of Barbary, of which there are several derivations. To those that occur under Barbary, we shall here add, that the name may be formed from the oriental "Bar-Barca," or the sea of Barca, a town of the Pentapolis, called afterwards Ptolemais.

The Mauritanians, according to Ptolemy, were divided into several cantons or tribes, which it is needless for us now to enumerate. The metropolis of Tingitania was Tingis or Tingi; which see. Some of its other principal towns were, Zelis, supposed by some to be the modern Arzilla:—Lixus, the residence of Antæus, who was here vanquished by Hercules, and not far from the gardens of the Hesperides; conjectured to be the present Larache:—the city of Hanno, called Thymiaterion:—Sala, near a river of the same name, not far from the Atlantic ocean:—the port and town of Rutubis, 213 miles S. of Lixus:—the Exilissa of Ptolemy, supposed to be the Ceuta of the moderns:—Rusadir, presumed to be Melila or Melilla; and in the interior of the country, the Ascurum of Hirtius:—Herpis:—Volubilis, supposed to be the modern Fez:—Gilda, corresponding to Mequinez:—Prisciana:—the Tocolosida of Ptolemy, perhaps the modern Amergue; the Trisidis of Ptolemy:—Gontiana, answering to a small town between Fez and Mequinez, called Gamaa:—Banasa:—Chalce:—Calamintha, &c. &c. Among the rivers of Tingitania we may mention the Malva, Molochath, Mulucha, or Mullooïah; the Thaluda, Taluda, or Tamuda; the Lixus; the Subur; the Sala, &c. &c. The chief capes or promontories of Tingitania were, the Metagonitis of Ptolemy, and Metagonium of Strabo; the Sestiarium promontorium of Ptolemy, or the Russadi of the Itinerary; the promontorium Oleastrum; the Phœbi promontorium; the cape Cottes or Ampelusia, now cape Spartel; Mons Solis; promontorium Herculis; and Usadium. Among the principal mountains we may rank Abyle or Abyla or Abenna, called by the ancients one of Hercules's pillars, and by our countrymen Apes hill; the Septem fratres of Mela, or Heptadelphi of Ptolemy, near Abyla; mount Cotta not far from the Lixus; and mount Atlas. The chief ports of this country were Rusadir, Sinus Emporicus,

Cotta,

Cotta, Rutubis, and Myſocaras. The principal iſlands on the coaſt of Tingitania were the Tres Inſulæ of the Itinerary, N.W. of the Mulucha; Gezira or Jezeirah, in the river Lixus, about three leagues from the ſea, where the ancients placed the Heſperides; Ptolemy's Pæne and Erythia, two obſcure iſlands in the Atlantic; the latter of which is now called Mogador; the Inſulæ Purpuraſiæ, ſaid by Hardouin to be Madeira and Porto Santo; and the Inſulæ Beatæ, or Fortunate iſlands, of which ſome reckoned ten, others ſeven, and others three.

The government of Mauritania, from the earlieſt ages, is ſaid to have been an abſolute monarchy. However Appian ſays, that ſeveral tribes of Moors were governed by their own laws, or at leaſt under the direction of their own chiefs and leaders, in oppoſition to that form of government which was eſtabliſhed in the greateſt part of this country. The independent Arabs, mentioned by Dr. Shaw in his Travels, who are ſeated in the kingdom of Algiers and Tunis, and who ſometimes hover about the frontiers of Morocco, may probably be the poſterity of theſe free-born Moors. Whether this be allowed or not, moſt of the provinces of Mauritania, if not the whole country, were ſubject to one prince in the reign of the elder Dionyſius. It appears alſo from Juſtin and Appian, that at ſubſequent periods they had ſovereigns, but it is likely that they exerciſed their ſovereign authority according to fixed laws, or certain political maxims, which directed the conduct of their rulers.

As to their religion, Neptune was one of the principal objects of their adoration. They likewiſe paid religious honours to the ſun and moon, in common with the other Libyan nations. Seneca aſſerts that they offered human ſacrifices to their gods, in imitation of the Phœnicians and Carthaginians, or ſome other ancient people, from whom they derived their origin. Bacchus was alſo worſhipped by the Mauritanians; and, in ſhort, we may form a notion of their religion from that of the Egyptians, Phœnicians, Perſians, and Carthaginians. Their language and character ſcarcely differed from thoſe of the Numidians. As to their cuſtoms and habits, they at firſt uſed only clubs in their military conflicts, till they were taught the uſe of the ſword. All perſons of diſtinction were clad in rich apparel, ornamented with gold and ſilver, and they took great pains in curling their hair, curiouſly and elegantly, cleanſing their teeth, combing their beards, which were long, and paring their nails. In time of action the Mauritanian infantry uſed ſhields made of elephants' ſkins, and they were clad, both night and day, in thoſe of lions, leopards, and bears. The cavalry were armed with broad ſhort lances, and carried targets or bucklers, made of the ſkins of wild beaſts. They uſed no ſaddles. Their horſes were ſmall and ſwift, and ſo much under command, that they would follow them like dogs. Herodotus intimates, that the ſhield and helmet came from them to the Greeks. Notwithſtanding the fertility of their ſoil, the poorer Mauritanians never attended to agriculture, but roved about the country in a wild ſavage manner, like the ancient Scythians or Arabian Scenites. They lived in ſmall and inconvenient tents; their food was corn and herbage, which they frequently ate green, and without any preparation; their habit was the ſame in ſummer and winter, and conſiſted of a tattered, though thick, garment, covered with a coarſe rough tunic; they repoſed on the ground, ſometimes ſpreading their garments under them, as the African Kabyles and Arabs now do. According to a paſſage in Horace, they ſhot poiſoned arrows; in preparing and uſing which they were ſkilful, having acquired the art from ſelf-defence againſt the wild beaſts, to which they were expoſed. With regard to the arts and ſciences, the Mauritanians were rude and barbarous; but if they excelled in any art, it muſt have been in navigation. To magic, ſorcery, and divination, they were much addicted. Strabo differs from Mela in his deſcription of Tingitania; for he repreſents it, not as poor and deſpicable, but as an opulent kingdom.

The hiſtory of the Mauritanians preſents to our notice nothing remarkable, except the defeat of Antæus, till the Roman times. Salluſt informs us that nothing of the Mauri, except their name, was known to the Romans ſo late as the Jugurthine war; and the moſt ancient Greek writers conſidered them merely as a branch of the Libyans. Bogud, king of Mauritania, who was contemporary with Julius Cæſar, contributed very much to his great ſucceſs in Africa; and he aſſiſted him alſo in Spain. After Cæſar's death, he joined Antony againſt Octavius, but when he attempted to make a diverſion in Spain, in favour of the former, the Tingitanians revolted, and being ſupported by Bocchus's troops in the intereſt of Octavius, Bocchus ſucceeded and was put in poſſeſſion of Tingitania, and Octavius granted to the inhabitants of Tingis the privileges of Roman citizens. After Bocchus's death, Tingitania was reduced to the form of a Roman province. Auguſtus gave the younger Juba the two Mauritanias, together with part of Gætulia, ſome time after his marriage with the younger Cleopatra, inſtead of his father's kingdom, *i. e.* Numidia, which ſtill remained a Roman province. The Mauritanians, however, did not quietly ſubmit to the Roman yoke. At the commencement of the reign of Tiberius, Tarfarinas, a Numidian ſoldier, enterpriſing and courageous, famed among the Romans in the art of war, entered into a confederacy with ſome diſcontented Moors, and refuſed to acknowledge the authority of Rome. Tarfarinas was defeated by the proconſul Cornelius Dolabella. In this war Ptolemy, the ſon of Juba II. and grandſon of Juba I. rendered very conſiderable aſſiſtance to the Romans. However, he was put to death under Caligula. Eudemon, his freedman, raiſed an army in order to avenge his death. Claudius, who ſucceeded Caligula, ſent an army againſt the Moors, and they were completely defeated.

In conſequence of a treaty of peace between the two commanders, Mauritania was delivered entirely into the hands of the Romans; for we find it ſoon after divided into two provinces, the one called Tingitania, or Mauritania Tingitana, from the city Tingis, and the other Mauritania Cæſarienſis, from Cæſar, a ſurname which Claudius had in common with the other Roman emperors.

The Mauritanians, being completely ſubjected to the Romans, returned to their cuſtomary occupations, and having abandoned a military life, devoted themſelves to the care of their lands, herds, and flocks. But the diſſentions that occurred on occaſion of the pretenſions of Otho and Vitellius to the empire, put them again in motion. Under the immediately ſucceeding reigns nothing very material occurred; but under the empire of Diocletian, they engaged in a conteſt with Maximin, his aſſociate in the empire. In this conflict they were great ſufferers; being obliged to deliver up their arms and to abandon their country. After the abdication of Diocletian, they were involved in new troubles. The troops of Africa revolted and proclaimed Alexander their lieutenant; upon which they were attacked and defeated by Maxentius.

Conſtantine, after his acceſſion, granted ſingular privileges to the African churches, which ſoon became very numerous. But when the ſeat of government was transferred to Byzantium by Conſtantine, the diſtant provinces were abandoned to the oppreffion of their governors. The Mauritanians fuffered, and their country was once and again the fcene of tumult and of war. When the Vandals were deftroyed in Africa under the reign of Juftinian, by the activity of Belifarius, the Mauritanians found themfelves expofed to the tyranny and oppreffion of Greek prefects. The people revolted; and at length, under the empire of Heraclius, the caliphs having conquered Egypt and Syria, fent an army on their coaft. The whole country, as far as the columns of Hercules, fubmitted to their domination, under which it has more or lefs continued. See Moors.

Mauritania *Cæfarienfis*, or *Cæfariana*, a part of Mauritania fo denominated under the reign of Claudius. This province had been feparated from Numidia: it extended from Mauritania Tingitana, from which it was feparated by the river Malva on the weft as far as the Ampfagee. See Numidia.

Mauritania *Sitifenfis*, a part of Mauritania Cæfarienfis on the eaftern fide, adjacent to Numidia, fo called from Sitifi, a town in that territory.

MAURITIA, in *Botany*, a Palm fo named by the younger Linnæus, after the appellation by which it is known to the Dutch fettlers in Surinam, *Mauritii-Boom*, or Maurice tree. Whether this appellation originated in any compliment to the memory of their great prince Maurice, or of any other perfon of the fame name, or whether the tree were thought to have been brought from the ifland of Mauritius, we are not informed.—Linn. Suppl. 70. Schreb. 779. Mart. Mill. Dict. v. 3. Juff. 40. Lamarck Dict. v. 3. 739.—Clafs and order, *Dioecia? Hexandria.* Nat. Ord. *Palmæ.*

Gen. Ch. Male an oblong feffile *catkin*, covered entirely with clofely crowded flowers, having obtufe fcales between them. *Cal.* Perianth of one leaf, cup-fhaped, abrupt, entire, triangular, fhort. *Cor.* of one petal; tube fhort, the length of the calyx, with three futures, by which the divifions of the limb are eafily continued down to the bafe; limb in three deep, equal, flightly fpreading, lanceolate, obtufe, channelled, rigid, and almoft woody, fegments. *Stam.* Filaments fix, thick and very fhort, inferted into the mouth of the tube; anthers linear, angular, the length of the corolla, three of them fpreading horizontally between its fegments, the alternate three erect, clofely preffed to the channel of each fegment.

Female unknown.

Eff. Ch. Male an oblong feffile catkin. Calyx of one leaf, cup-fhaped, undivided. Corolla of one petal, with a fhort tube, and three-cleft limb.

1. M. *flexuofa.* Linn. Suppl. 454. Syft. Veg. ed. 14. 986.—Sent, from the woods of Surinam, by Dalberg, being a part of the botanical collection, preferved in fpirits of wine, which king Guftavus III. of Sweden prefented to Linnæus. (See Gustavia.) It is defcribed as a nearly leaflefs *tree*, with angular, zigzag, fmooth *branches*, compofed of fhort joints fwelling upwards and fomewhat recurved, each joint terminating in a cup-like, doubly-pointed *fheath*. From thefe *fheaths*, over the whole ftem, fpring folitary feffile *catkins*, of an ovate-oblong cylindrical figure, rather above an inch in length, widely fpreading in two ranks, each having at its bafe a pair of larger erect falcate fcales. The flowers are of a rufty hue, at leaft in the preferved fpecimens, and clofely cover the whole catkin, ftanding at a right angle with its common ftalk. The *fcales* which feparate the flowers are round and obtufe, fmaller than the pair at the bottom of the catkin. The *flowers* fall when faded, leaving the catkin and its fcales permanent. Linnæus juftly fpeaks of this tree as very fingular, being almoft deftitute of foliage, and laments that he knew nothing of the female flowers or fruit. Thefe are prefumed to be borne on a diftinct individual.

Mauritia, in *Gardening*, comprehends a plant of the exotic tree kind, of which the fpecies cultivated is the maidenhair tree, or ginkgo, (M. flexuofa.)

Method of Culture.—It may be increafed by laying down the young branches in the fummer feafon, and when they have ftricken root fully, taking them off and planting them with earth about their roots in pots filled with light frefh mould, placing them in the greenhoufe, where they muft be kept.

And the cuttings of the young fhoots may alfo be planted in pots in the fame manner, plunging them in a moderate hotbed till they have ftricken root, when they may be managed as the other plants are directed to be.

This plant affords variety in the greenhoufe, and when trained againft walls; but in the laft cafe muft be fheltered by mats, in fevere weather in the winter feafon.

MAURITIO, St., in *Geography*, a town of France, in the department of the Po; feven miles N.N.W. of Turin.

MAURITIUS, or *Ifle of France*, an ifland in the Indian fea, firft difcovered by the Dutch in 1598, and fo called by them in honour of the prince of Orange. On their firft arrival the Dutch anchored with a fleet of five fhips in a fafe port capable of containing 50 large veffels, and which, in honour of their vice-admiral, they called Warwick's Haven. The country was found to abound with cattle, fowl, fifh, and fruits; and afforded a feafonable fupply of neceffaries to the crew and of refrefhments to the fick, who went on fhore for their recovery. Of the importance of this ifland they were fufficiently apprifed, infomuch that they recorded in their journals an obfervation, that it might be commodioufly vifited by outward bound fhips, as that of St. Helena might be on their return: neverthelefs, they made no fettlement in this ifland for forty years, and they were juft in time to preclude the French from taking poffeffion of it. They had the precaution to build a fort for the defence of the haven and watering place; and in 1640 they had two or three fmall fettlements in the ifland, befides their fort. But as they wanted flaves to cultivate their plantations, they applied to the French governor of Madagafcar, and prevailed upon him to fteal 50 blacks out of the number of thofe who were under his protection. This fraudulent act induced the people of Madagafcar to withdraw their confidence from the French; and as to the negroes that were carried to Mauritius, many of them fled into the woods and mountains, where they became robbers or banditti, or, as they are denominated in the Weft Indies, maroons. Thefe were joined by other perfons of a fimilar defcription, and became fo powerful, that the Dutch, notwithftanding their garrifon of 50 men in the fort, could not fecure themfelves againft their infults and depredations. About the beginning of the laft century, the Dutch Eaft India company in Holland determined to abandon it; and actually withdrew their colony from it in 1712, and removed it to the Cape of Good Hope. The ifland, fays the Abbé Raynal, was uninhabited when the French landed there in 1720, and changed its name from Mauritius to the Ifle of France, which name it ftill bears. Its firft inhabitants, he fays, came over from the Ifle of Bourbon; but it remained in a neglected ftate for almoft fifteen years. At length, in 1734, the French company refolved to make fome important fettlement here, and the project was entrufted to the execution of Mahe de la Bourdonnais. As foon as he arrived he was indefa-

indefatigably active in executing every plan for the improvement of the island, which his sagacity devised: and to him the French were afterwards indebted for aqueducts, bridges, hospitals, and storehouses. Exciting by his example a spirit of emulation and industry in the colonists, he changed the whole aspect of the island and the condition of its inhabitants, during the twelve years of his administration. By his recommendation the French made choice of the harbour to the N.W. of this island, in preference to that which is more spacious and more commodious to the S.E.; a harbour to the leeward possessing many advantages in latitudes where the general winds prevail. The spirit which he excited led the inhabitants to the cultivation of corn, which became the most prosperous of all the branches of agriculture practised at this island; where the fields yield annually in regular succession a crop of wheat and another of maize or Indian corn. The manioc or cassava, which was brought from Brazil by M. la Bourdonnais, served as common food to the blacks. In consequence of the improvements of this governor, ships going to India found all the refreshments and conveniences they wanted after a tedious passage. The continual supplies afforded to ships and squadrons have contributed to check the increase of cattle, which it was the object of La Bourdonnais to multiply. However, the island produces excellent pasture, which springs up in the beginning of the rainy season. It completes the whole course of its vegetation in the course of three months, during which interval the inhabitants feed their herds. This island has occasionally suffered much from hurricanes, so that the colony has been preserved by the attention of the governor in procuring supplies from the Cape of Good Hope. The cultivation of corn in this island has been much promoted by M. Poivre; and in a variety of other ways, particularly by introducing the nutmeg and clove, and the rice of Cochinchina, he contributed to enrich the colony entrusted to his care. M. Cerè procured from Ceylon, and planted in this island, of which he was governor, a great number of cinnamon, clove, and nutmeg trees, which have been very prosperous. But in 1786, the Dutch, actuated by the true spirit of monopoly, sent a vagabond to the island in order to destroy these plantations; but the plot was discovered in time, and the vagabond escaped merited punishment.

The soil of this island is, generally speaking, red and stony; towards the sea-coasts it is mountainous, but within land there are many spots both level and fertile. Some of the mountains are high, but none exceed 426 fathoms in elevation: it is said, however, that their summits are covered with snow throughout the year. The whole island is well watered; and it produces all the trees, fruits, and herbs, which grow in this part of the globe, in great plenty; groves of oranges as well as citrons; and the pine-apple grows spontaneously in great perfection. The chief produce is sugar. When this island was first discovered, the ground was covered with wood up to the summits of the mountains, so that it was one immense forest full of beautiful trees. M. Rochon observed in it different kinds of the palm-tree, bamboos, ebony, mat-wood, tacamaca, stinking wood, and many other kinds of valuable trees. No venomous animals, except scorpions and millepedes, are known here. For fineness of climate, and salubrity of air, this island, as well as that of Bourbon, may be compared with the Fortunate islands. The whole extent of the island is about 150 miles, and its form is nearly circular. The population, in the year 1790, exclusive of the military, was estimated at 8000 whites and 12,000 blacks. This island, the last remains of the French possessions in the Indian seas, was taken by the English, December 2, 1810. S. lat. 20° 12'. E. long. 58° 27'.

MAURO, St., a town of Naples, in Lavora; 4 miles S.E. of Capua.—Also, a town of Naples, in Basilicata; 22 miles S.E. of Acerenza.—Also, a town of the county of Tyrol; 12 miles N.N.E. of Trent.—Also, a town of Naples, in Calabria Citra; 3 miles W.S.W. of Rossano.

MAUROCENIA, in *Botany*, Linn. Hort. Cliff. 108. Gen. ed. 1. 85, was named by Linnæus in honour of Giovanni Francesco Mauroceno, a Venetian senator, who had a very fine and rich garden at Padua, of which a catalogue was published there by Antonio Tita in 1713, being an 8vo of 183 pages, besides 13 pages describing a journey of the author's over the mountains of Trent. This genus was subsequently sunk in *Cassine*, the only species of which it consisted being *Cassine Maurocenia*, Linn. Sp. Pl. 385. See Cassine.

MAUROLICO, or Maurolicus, Francis, in *Biography*, who flourished in the sixteenth century, descended from a noble Greek family, (but driven to seek an asylum in Sicily from the persecution of the Turks,) was born at Messina in the year 1494. He was, at a very early period, distinguished by his proficiency in polite literature, the learned languages, and, above all, in mathematical learning. He devoted himself to theology as a profession; but his favourite studies were those of the belles lettres, and the sciences properly so called. For a considerable time he was professor of mathematics in his native city, and was much followed and admired on account of the great perspicuity with which he explained and illustrated the most difficult questions. His fame, as a mathematician, extended over the whole of Europe. He excelled in geometry, astronomy, optics, and architecture; and he enjoyed the esteem and friendship of the most illustrious persons of his time. He was by his countrymen regarded as their second Archimedes. He restored the fifth book of Apollonius, which had been lost; and he discovered a new method of demonstrating the properties of the conic sections, in which he has been followed by many modern geometers. He made discoveries in the art of dialling, of which he published an account in his "De Lineis Horariis." He wrote on optics, and is mentioned by Dr. Priestley and others as the person who discovered that it is the crystalline humour which collects and unites on the retina the rays which it receives from external objects, and brings every pencil to its proper focus; and by means of it, he was able to explain the phenomena of long and short-sightedness, which had been till then inexplicable. He is said also to have given the first solution of the problem concerning the image of the sun appearing round, though the rays that form it are transmitted into a dark room through an angular aperture. He died at the advanced age of eighty, leaving behind him numerous works, that attest to the greatness of his talents, and his unceasing industry and perseverance, though he was for many years an invalid. His biographers have given the titles of the following as his principal works: "The Spherics of Theodosius;" "Emendatio et Restitutio Conicorum Apollonii Pergæi;" "Archimedis Monumenta omnia;" "Euclidis Phænomena;" "Opuscula Mathematica;" "Arithmeticorum Libri duo;" "Photismus de Lumine et Umbra;" "Problemata Mechanica ad Magnetem et ad Pyxidem nauticam Pertinentia." Priestley's Light and Colours. Moreri.

MAURON, in *Geography*, a town of France, in the department of the Morbihan, and chief place of a canton, in the district of Ploermel; 10 miles N. of Ploermel. The

 place

place contains 4212, and the canton 9035 inhabitants, on a territory of 192½ kiliometres, in 7 communes.

MAUROUSE, the name of a creature of the deer kind, mentioned by Joſſelyn. It ſeems to be the ſame with the *dama Virginiana* of Mr. Ray, one of which creatures was, in his time, kept alive in St. James's park.

This is not certain, however; for Joſſelyn's deſcription is very imperfect: he only ſays it is like the mooſe-deer, but is ſmall, and has ſmall horns.

MAURS, in *Geography*, a town of France, in the department of the Cantal, and chief place of a canton, in the diſtrict of Aurillac; 18 miles S.S.W. of Aurillac. The place contains 2045, and the canton 11,029 inhabitants, on a territory of 262½ kiliometres, in 13 communes.

MAURSEE, a conſiderable lake of Pruſſia, in the province of Culm; 10 miles E. of Raſtenburg.

MAURUA, or MAUROOA, one of the Society iſlands, in the South Pacific ocean, of ſmall ſize, wholly ſurrounded by a reef, and deſtitute of harbour for ſhipping. It is inhabited, and bears the ſame produce as the neighbouring iſlands. Its middle riſes in a high round hill, that may be ſeen at the diſtance of 10 leagues. S. lat. 16° 26′. W. long. 152°.

MAURUCA, a kingdom on the eaſt coaſt of Africa, ſituated in about S. lat. 14° 30′. E. long. 37° 14′.

MAUSAHEID, or MESEK, a town of Arabia; 35 miles N. of Mocha.

MAU-SIDS, a town of Arabia, in the province of Yemen; 24 miles N. of Mocha.

MAUSOLEUM, a magnificent tomb, or funeral monument, decorated with architecture and ſculpture, and inſcribed with an epitaph; erected in honour of ſome emperor, prince, or other illuſtrious perſon.

The word comes from *Mauſolus*, the name of a king of Caria, to whom Artemiſia, his widow, erected a moſt ſtately monument, that has ſince been numbered among the ſeven wonders of the world; calling it, from his name, Mauſoleum. It was ſixty-three feet long, almoſt four hundred and eleven feet in compaſs, and about thirty-five feet high, ſurrounded with thirty-ſix columns, that were beautified in a wonderful manner. Pliny has deſcribed it, lib. xxxvi. cap. 5. Afterwards the ſame name was given to all coſtly monuments. Thus the ſtately monument was called, which Auguſtus built, during his ſixth conſulſhip, between the Flaminia Via and the Tiber, to be a burial-place for him and his family, and which Strabo has deſcribed in his fifth book. It is alſo the name which Florus, lib. iv. cap. 11. gives to the monuments of the kings of Egypt, wherein Cleopatra ſhut herſelf up, and put herſelf to death. Many authorities teſtify, that the Romans gave this name to thoſe ſepulchres whoſe ſtructure was magnificent.

MAUSOLEUM is alſo uſed to ſignify the decoration of a fictitious tomb, or catafalca, in funeral pomp.

MAUSSAC, PHILIP-JAMES, in *Biography*, a learned critic, was born at Toulouſe in the year 1590, where his father was a counſellor of parliament. He was educated for the profeſſion of the law, and became preſident of the court of aides at Montpellier, where he died in 1650. He was accounted one of the beſt Greek ſcholars of his time. He wrote "Notes and Corrections on Harpocration," "Remarks on the Treatiſe on Mountains and Rivers aſcribed to Plutarch," and various other works. Moreri.

MAUTCHONG-COUNSAN, in *Geography*, a mountain of Thibet. N. lat. 31° 38′. E. long. 83° 44′.

MAUTEN, a town of Carinthia, at the conflux of the Moledin and the Geil; 18 miles S.W. of Saxenburg.

MAUTERN, a town of the duchy of Stiria; 8 miles N. of Windiſch Gratz.

MAUTH, a town of Bohemia, in the circle of Beraun; 18 miles S.E. of Beraun.

MAUTHAUSEN, a town of Auſtria, on the left bank of the Danube; 7 miles E. of Steyregg.

MAUTOUR, PHILIBERT BERNARD MOREAU DE, in *Biography*, auditor of the chamber of accompts at Paris, and member of the academy of inſcriptions. He was born at Beaune in 1654, and died in 1737. He wrote ſome papers in the Memoirs of the Academy of Belles Lettres, and poems. He was alſo the editor of an abridgment of Petavius's Chronology, 4 vols. 12mo. Moreri.

MAUTTERN, in *Geography*, a town of Auſtria, on the ſouth ſide of the Danube, oppoſite to Stein; 32 miles W.N.W. of Vienna. N. lat. 48° 23′. E. long. 15° 38′.

MAUTTERNDORF, a town of the principality of Salzburg; 11 miles S. of Radſtadt.

MAUVEZIN, a town of France, in the department of the Gers, and chief place of a canton, in the diſtrict of Lectoure; 17 miles S.S.E. of Lectoure. The place contains 2005, and the canton 9083 inhabitants, on a territory of 192½ kiliometres, in 26 communes.

MAUVILLON, JAMES, in *Biography*, profeſſor of the military ſciences in the Caroline college at Brunſwick, was deſcended from a French family, and born at Leipſic in 1743. His father being profeſſor of the French language in the Caroline college, he had an opportunity of proſecuting his ſtudies under the celebrated men who, at that time, were an ornament to the ſciences which they taught. The favourite purſuits of the ſon were the languages, drawing, and mathematics. He ſoon diſplayed a ſtrong attachment to a military life; but as this was oppoſed by his father, who wiſhed him to ſtudy the law, he went privately and offered to inliſt himſelf with general Wallmoden. Though his ardour was great, his ſtature was ſo ſmall and diminutive, that the general refuſed to admit him into the ſervice. At length, however, he was received into the corps of engineers; but, at the concluſion of the war, he was, at the perſuaſion of his father, induced to repair to Leipſic to ſtudy the law. His mind was not at all formed for legal ſtudies, and he preferred to theſe the drudgery of aſſiſting in a ſchool. Here he improved himſelf in the Latin language, and ſoon after, on the recommendation of the general, was appointed engineer of bridges and highways at Caſſel, and teacher of the military ſciences. About this period he became a contributor to ſome periodical works, and wrote his "Letters on the Merits of the German Poets," which, on account of the ſeverity of his animadverſions, excited againſt him many enemies. In 1775 he gave proofs of his diligence, as well as his talents, by tranſlating Raynal's "Hiſtory of the Indies," a work of Turgot's, and Arioſto; beſides being engaged in ſeveral journals. In 1777 he was appointed captain of a corps of cadets, and obtained the friendſhip of profeſſor Dohm, afterwards the Pruſſian miniſter. To this perſon he addreſſed his "Phyſiocratic Letters," which were publiſhed in 1780; and in the ſame year he was elected a member of the Society of Antiquaries at Caſſel, and wrote ſeveral papers, which were inſerted in its tranſactions. In 1781 he publiſhed his "Introduction to the Military Sciences," with an Eſſay on the thirty years' war, and another on the influence which the invention of gunpowder has had in modern wars. Theſe were all publiſhed in the French language. His ſituation in the corps of cadets ſubjected him to much uneaſineſs; and about this time he repaired to Potzdam, and ſolicited

solicited an appointment from Frederic II., which would have been readily granted; but he found his wife so averse from settling in Prussia, that he gave up the idea, and returned to his former situation at Cassel. He studied religion as well as military tactics, and in 1787 published what he entitled a "System of Religion." He had, previously to this, formed an acquaintance, which ripened into friendship, with the celebrated Mirabeau. An account of the joint pursuits of these friends may be found in Mirabeau's "Lettres du Compte de Mirabeau à un de ses Amis en Allemagne, ècrites durant les Annees 1786-90." Mauvillon died in 1792. The last work which he published was entitled "Man and Woman," written in opposition to a book by Brandes, in which the female sex had not been treated with that degree of justice which Mauvillon thought due to them. He began a "Life of Prince Ferdinand of Brunswic," which is said to be the best of all his productions. Mauvillon was fond of company; and in the early part of life, the whole object of his labour was that he might gratify his taste without running into debt. In his manners and dress he was exceedingly simple; he had no attachment to wine, but was excessively fond of coffee; he was a zealous advocate for the principles of toleration, and in all kinds of company avowed his sentiments with the greatest freedom. He was friendly to the French revolution, but disapproved of the horrid scenes which attended it. Gen. Biog.

MAUZAT, in *Geography*, a town of France, in the department of the Puy-de-Dôme, and chief place of a canton, in the district of Riom. The place contains 1565, and the canton 9072 inhabitants, on a territory of 242½ kiliometres, in 10 communes.

MAUZE', a town of France, in the department of the Two Sevres, and chief place of a canton, in the district of Niort. The place contains 1600, and the canton 6876 inhabitants, on a territory of 145 kiliometres, in 8 communes.

MAW, a sea-port of Ceylon, at the mouth of a river on the west coast; 50 miles W. of Candy. N. lat. 7° 45'. E. long. 75° 55'.

MAW. See ABOMASUS.

MAW-*Skin*, in *Rural Economy*, a provincial word used to signify the stomach of the calf prepared for cheese-making.

MAWAR-UL-NERE, denoting "the country beyond the river, or "Transoxiana," in *Geography*, a country of Independent Tartary, lying beyond the Oxus, or modern Gihon or Jihon; and beyond the lower parts of the courses of that river, and the Sihon, or ancient Iaxartes.

MAWHELLIPOUR, a town of Hindoostan, in Bahar; 3 miles S.W. of Bahar. N. lat. 25° 21'. E. long. 84° 55'.

MAWRI, a sea-port town of Africa, in the country of Sabu, on the Gold coast, inhabited chiefly by fishermen. In the middle of the town is Fort Nassau, built by the Dutch, with a small garrison.

MAWS, ST., a borough town in the parish of St. Just, hundred of Powder, and county of Cornwall, England, is situated on the east side of Falmouth harbour; one mile distant from Falmouth, and 270 from London. It consists only of one street, containing about twenty houses, inhabited chiefly by fishermen. A fair is held annually, but the town has never been incorporated, and has neither church, chapel, nor meeting-house; yet it sends two representatives to parliament, and has done so ever since the fourth year of queen Elizabeth. It is governed by a portreeve, who has the title of mayor. The principal influence and property of the borough are now possessed by the marquis of Buckingham. King Henry VIII. erected a castle here, opposite to that of Pendennis, to which it is very inferior both in size and situation, though built nearly at the same time, by the same monarch, and for the same purpose, *i. e.* the security of Falmouth harbour. The works are completely commanded by a hill, which rises immediately behind them. Beauties of England and Wales, vol. ii.

MAXANTELLA, an island near the port of Matanchel, on the west coast of New Mexico, in the North Pacific ocean.

MAXDORF, a town of Bohemia, in the circle of Leitmeritz; 10 miles W. of Kamnitz.

MAXEN, a town of Saxony, famous for a victory obtained by the Austrians, commanded by count Daun, over the Prussians, in 1759, when 20,000 Prussians laid down their arms and surrendered prisoners of war; 80 miles S. of Dresden.

MAXENTIUS, MARCUS AURELIUS VALERIUS, in *Biography*, a Roman emperor, was the son of Maximian, and married the daughter of Galerius. The abdication of Maximian and Dioclesian, in 305, made room for the elevation of Galerius and Constantius to the rank of Augustus: of course, two new Cæsars were to be appointed; but Maxentius, on account of his vicious propensities, was passed over, though, from his birth and rank in the state, he seemed best entitled to that honour. Deprived of what he thought was his natural right, he waited only for an opportunity of asserting his claims; and in 306 he declared himself independent emperor, and, without remorse or compunction, put to death the prefect, and other magistrates who adhered to Galerius. His abdicated father, by this time, weary of retirement, resuming his dignity, joined him; and Severus, the newly-made Cæsar, who marched against them, finding himself deserted by his army, surrendered himself prisoner to the victorious emperors. He was at first received with great humanity, and treated with a respect due to his rank. Maximian himself conducted the captive emperor to Rome, and gave him the most solemn assurances that he had secured his life and happiness, by the resignation of the purple. But, in spite of the honour of an emperor, Severus could only obtain an easy death, and an imperial funeral. In February 307, the sentence was signified to him, but the manner of executing it was left to his own choice. He preferred the favourite mode of the ancients, that of opening his veins; and as soon as he expired, his body was carried to the sepulchre which had been constructed for the family of Gallienus. Galerius, at this time, entered Italy with a powerful army, for the purpose of dethroning Maxentius; but he found the new emperor so strongly defended, and his own troops so wavering in their fidelity, that he thought it best to consult his safety by a retreat. Maximian also became his rival, and attempted to depose him; but the soldiers decided in favour of the younger claimant, and Maximian, who aimed at all, lost all, and was obliged to retire with shame and humiliation. Maxentius was now the undisputed master of Italy. He passed into Africa, where he rendered himself odious by his cruelty and oppressions. His suspicions frequently endangered the lives of persons of rank; and the honour and chastity of their wives and daughters were daily exposed to violation from his brutal desires. The heroic conduct of a Christian lady, who plunged a dagger into her breast, in order that she might escape his impure embraces, has been recorded by some writers to her honour, though others have questioned the lawfulness of the act; but none have hesitated to hold up the conduct of the tyrant to that contempt and infamy which it so justly merited. Upon the return of Maxentius

Maxentius to Rome, he was informed that Conſtantine was come to dethrone him. The reſources of Maxentius, both in men and money, were ſtill conſiderable. The Prætorian guards felt how ſtrongly their own intereſt and ſafety were connected with his cauſe, and an army was ſpeedily collected. It was far from the intention of the emperor to lead his troops in perſon. "A ſtranger," ſays the hiſtorian, "to the exerciſes of war, he trembled at the apprehenſion of ſo dangerous a conteſt; and as fear is commonly ſuperſtitious, he liſtened with melancholy attention to the rumours of omens and preſages, which ſeemed to menace his life and empire. Shame at length ſupplied the place of courage, and forced him to take the field, being unable to ſuſtain the contempt of the Roman people. The circus reſounded with their indignant clamours, and they tumultuouſly beſieged the gates of the palace, reproaching the puſillanimity of their indolent ſovereign, and celebrating the heroic ſpirit of Conſtantine. Before Maxentius left Rome, he conſulted the Sibylline books. The guardians of thoſe ſacred oracles were as well verſed in the arts of this world, as they were ignorant of the ſecrets of fate; and they returned him a very prudent anſwer, which might adapt itſelf to the event, and ſecure their reputation, whatever ſhould be the chance of arms." At length he aſſembled his forces, and gave his enemy battle; but loſt the day, and fled with the utmoſt precipitation to the city. The bridge, over which he was to croſs the Tiber, was in a decayed ſituation, and he fell into the river, and was drowned. This happened on the 24th of September, A.D. 312. The cowardice and luxuries of Maxentius were as conſpicuous as his cruelties. He oppreſſed his ſubjects with heavy taxes, to gratify the cravings of his pleaſure, or the avarice of his favourites; and he was ſo debauched in his manners, that neither virtue nor innocence was ſafe, if within his reach. He was naturally deformed, of an unwieldy body, and the ſmalleſt exertions to him were as Herculean labours. Gibbon, vol. ii. 8vo. Univer. Hiſt.

MAXILLA, in *Anatomy*, the jaw. The term is uſually applied to the bones. The maxilla ſuperior contains ſix pairs of bones, and one ſingle bone; the maxilla inferior is a ſingle bone. See CRANIUM.

MAXILLA, *Fractures* and *Diſlocations of*, in *Surgery*. See FRACTURE and LUXATION.

MAXILLARIS, MAXILLARY, in *Anatomy*, an epithet applied to various parts about the jaws. There is an external, an internal, and an inferior maxillary artery (ſee ARTERY); one inferior and two ſuperior maxillary bones (ſee CRANIUM); a maxillary gland, which is a mucous gland of the cheek, placed near the back upper teeth; a ſuperior and inferior maxillary nerve, branches of the fifth pair (ſee NERVE); a maxillary ſinus or antrum maxillare, which is a large hollow of the ſuperior maxillary bone. See CRANIUM and NOSE.

MAXILLARY SINUS, *Abſceſs of*, in *Surgery*. See ABSCESS.

MAXILLARY *Sinus*, *Fungus of*. See FUNGUS.

MAXIM denotes an eſtabliſhed propoſition or principle; in which ſenſe it amounts to much the ſame with axiom.

Maxims are a kind of propoſitions, which have paſſed for principles of ſcience; and which, being ſelf-evident, have been by ſome ſuppoſed innate.

A maxim in law is ſaid to be a propoſition, of all men confeſſed and granted without argument or diſcourſe.

Maxims of the law are holden for law; and all other caſes that may be applied to them, ſhall be taken for granted. (1 Inſt. 11. 67. 4 Rep.) The maxims in our law-books, which are many and various, are ſuch as the following, *viz.* It is a maxim, that land ſhall deſcend from the father to the ſon, &c. That if a man have two ſons, by divers venters, and the one purchaſe lands and die without iſſue, the other ſhall never be his heir, &c. That as no eſtate can be veſted in the king, without matter of record, ſo none can be diveſted out of him but by matter of record. That an obligation, or matter in writing, cannot be diſſolved by an agreement by word, without writing. Co. Litt. 11. 141. See LAW.

MAXIMA CÆSARIENSIS, in *Ancient Geography*, one of the five provinces into which Britain was divided by the Romans; but the reaſon of the name, and the time when this province was erected, are not certainly known. It was bounded on the ſouth by the Humber, on the eaſt by the German ocean, on the weſt by the Iriſh ſea, and on the north by the wall of Severus; and contained the countries of the Pariſi and the Brigantes, which are now the counties of York, Durham, Lancaſter, Cumberland, and Northumberland. For the other four provinces, ſee FLAVIA *Cæſarienſis* and VALENTIA.

MAXIMA, *Lat.*, *Maxime*, *Fr.* See MASSIMA and TIME-*Table*.

MAXIMA *et Minima*, in *Analyſis and Geometry*, are the greateſt and leaſt values of a variable quantity; and the method of finding theſe greateſt and leaſt values is called the *method de maximis et minimis*, which forms one of the moſt intereſting inquiries in the modern analyſis. This ſubject was conſidered geometrically by ſome of the moſt ancient mathematicians, particularly by Apollonius, in the fifth book of his Conics; and there are ſtill a few problems of this kind, which ſucceed better by the geometrical than by the analytical method: their number, however, is very limited, compared with thoſe which may be elegantly performed by analyſis. To the latter, therefore, we ſhall principally direct our attention, only ſhewing, in a few caſes, how the ſame may be accompliſhed by means of the pure elements of geometry.

The method de maximis et minimis, according to the analytical doctrine, firſt aroſe at the beginning of the ſeventeenth century, after the invention of Deſcartes for expreſſing the properties of curve lines by means of algebraical equations, and claſſing them into different orders, according to the degree of the equation which expreſſed the relation between the abſciſs and ordinate. Beſides the method of Deſcartes, we have alſo thoſe of Fermat, Hudde, Huygens, Sluſe, and ſome others, which are now all ſupplanted by the general and elegant method of fluxions; yet as theſe ſeveral methods may be conſidered as ſo many ſteps towards the diſcovery of the latter, it will be intereſting to have a brief abſtract of them, in order to ſhew how ſlow and progreſſive are the ſteps to knowledge, and by what imperceptible degrees we arrive towards perfection.

Fermat's Method de Maximis et Minimis.—The principle upon which Fermat formed his operation conſiſted in this: that when the ordinate of a curve was the greateſt poſſible, if we augmented the variable quantity x, which repreſents the abſciſs, by an indefinitely ſmall quantity e, the ordinate correſponding to this abſciſs will be equal to the former, or will approach towards equality indefinitely near; or, which is the ſame, the increaſe or decreaſe of an ordinate, when it approaches indefinitely near its maximum or minimum, is nothing; and, therefore, theſe two ordinates may be conſidered as equal, whence an equation is obtained, from which cancelling the like quantities, and all thoſe powers of e beyond the firſt, becauſe they are indefinitely ſmall with regard to the others, and dividing the other terms by e, the value

value of x will be obtained, that renders the function a maximum or a minimum.

For example: let it be propofed to find that value of x, in the equation $y^2 = 2ax - x^2$, which renders y a maximum.

Increafe the variable quantity by e; then,

$$y^2 = 2a(x+e) - (x+e)^2,$$

$$\text{or, } 2ax - x^2 = 2ax - x^2 + 2ae - 2ex + e^2,$$

$$\text{or, } 0 = 2ae - 2ex;$$

by rejecting e^2, which is indefinitely fmall: whence again,

$$2ae = 2ex, \text{ or } x = a.$$

Again: required the value of x, in the equation $y^3 = ax^2 - x^3$, which renders the whole function a maximum.

Making, as before, $x = x + e$, we have

$$ax^2 - x^3 = ax^2 - x^3 + 2axe + ae^2 - 3ex^2 - 3e^2x - e^3,$$

$$\text{or, } 0 = +2axe - 3ex^2;$$

by fuppreffing thofe powers of e above the firft: whence,

$$3ex^2 = 2axe, \text{ or } x = \tfrac{2}{3}a.$$

Thefe examples will be fufficient to fhew the fpirit of Fermat's rule, which is in principle much the fame as the fluxional method; only that it wants that generality and elegance which conftitute the diftinguifhing characteriftics of the latter.

Defcartes' Method.—This confifted in making two of the roots of the equation equal to each other; in which cafe, two of the ordinates of the curve became equal, and thus indicated the maximum or minimum ftate. This, however, being much lefs eligible than the preceding, we will not enter into farther explanation, but proceed to Hudde's method, which is in principle the fame as Defcartes's, but more elegant and concife.

Hudde's Method.—This, as we have obferved, confifted, like that of Defcartes, in making two of the roots of the propofed equation equal to each other, and for which he gave the following rule: *viz*, multiply each term of the equation, arranged according to the power of x, by the terms of an arithmetical progreffion, *viz*. the firft by the firft, the fecond by the fecond, &c.; and the equation thus obtained will indicate the maximum or minimum required.

Let us take, for example, the equation above, $ax^2 - x^3 = y^3$.

Arranging this equation according to the powers of x, and fupplying the deficient term, we have

$$\begin{array}{ll} & x^3 - ax^2 \pm 0x - y^3 = 0. \\ \text{Arith. prog.} & \underline{3, \quad 2, \quad 1, \quad 0.} \\ & 3x^3 - 2ax^2 = 0 \\ & 3x^2 = 2ax^2, \text{ or } x = \tfrac{2}{3}a, \text{ as above.} \end{array}$$

Again: let $x^2 - ax + y^2 - 2by + b^2$, be propofed.

$$\begin{array}{ll} \text{Writing this,} & x^2 - ax + (y^2 - 2by + b^2) = 0. \\ \text{Arith. prog.} & \underline{2, \quad 1, \quad 0.} \\ & 2x^2 - ax = 0, \text{ or } x = \tfrac{1}{2}a. \end{array}$$

This rule, though not fo general as could be wifhed, is ftill extremely fimple and ingenious; and, confidering the ftate of analyfis at the period it was difcovered, it is highly creditable to its author, to whom we are alfo indebted for feveral other analytical and geometrical improvements.

Huygens' Method.—As the rule of Hudde, defcribed above, was a fimplification of that of Defcartes, fo the following one is founded on the principle of Fermat, and can only be confidered as a fimplification of his method. Inftead of fubftituting $x + e$ for x, and then cancelling the like terms, fuppreffing thofe in which e rifes to a higher power than the firft, and finally dividing by e; Huygens, as alfo Slufe, arrive at the final equation at once by the following fimple rule: multiply each of the terms in which x is found by its exponent, rejecting all thofe into which it does not enter; divide the refult by x, and make the whole equal to zero; and the equation thus arifing will give the value of x required.

For example: required the value of x in the equation $3ax^2 - x^3 = y^3$.

Multiplying each of thofe terms by the exponent of x in them, we have $6ax^2 - 3x^3$; then dividing by x,

$$6ax^2 - 3x^2 = 0, \text{ or } 3x^2 - 6ax = 0,$$

$$\text{or, } x^2 - 2ax + a^2 = a^2, \text{ or } x = a \pm a;$$

that is, $x = 0$, or $2a$.

This rule differs in no refpect from our fluxional operation, except that we divide by $\dot{x}$ inftead of x; yet the generality of the latter is fuch, that the rules above defcribed have long been forgotten, and are only given here as prefenting an hiftorical view of the methods employed by our predeceffors; and in this refpect they are entitled to particular notice; for in them is evidently contained the germ of the modern analyfis. Farther advances were made in thefe kinds of operations in the method of tangents, but they are foreign to our prefent enquiry; of thefe the *differential triangle* of Barrow is particularly interefting. See TANGENTS.

Of the method de maximis et minimis according to the fluxional or differential calculus.

1. The fluxion of a quantity, when it is a maximum or a minimum, is equal to zero, or 0. This is obvious from the definition of a fluxion, for this being the meafures or rates of increafe or decreafe of a variable quantity; when this quantity becomes a maximum, or a minimum, its fluxion muft be $= 0$, becaufe at that point it admits of no farther increafe or decreafe.

2. If a quantity be a maximum or minimum, any power or root of that quantity muft then evidently be a maximum or minimum. For the power or root of a quantity will increafe or decreafe as long as the quantity itfelf increafes or decreafes, and no longer.

3. Any conftant multiple, or part, of a quantity, which is a maximum or a minimum, muft alfo be a maximum or a minimum. For the multiple or part of a quantity will increafe or decreafe as long as the quantity itfelf increafes or decreafes, and no longer; therefore, when its fluxion is made equal to zero, the conftant multiplier may be neglected.

4. The fluxion of a conftant quantity $= 0$. For this admitting of no increafe or decreafe has no fluxion, or its fluxion $= 0$.

1. To divide a given number (a) into two fuch parts x and y, that $x^m y^n$ may be a maximum.

Since $x + y = a$, and $x^m y^n =$ a maximum, the fluxions of each $= 0$; the former becaufe it is conftant, and the latter becaufe it is a maximum, whence

$$\dot{x} + \dot{y} = 0$$
$$m y^n x^{m-1} \dot{x} + n x^m y^{n-1} \dot{y} = 0:$$

from the firft we have $\dot{x} = -\dot{y}$; and fubftituting this in the fecond, gives

$$m y^n x^{m-1} \dot{x} - n x^m y^{n-1} \dot{x} = 0, \text{ or}$$
$$m y^n x^{m-1} = n x^m y^{n-1}, \text{ or}$$
$$m y = n x; \text{ whence}$$

$y =$

$$y = \frac{n}{m} x$$

Consequently, $x + \frac{n}{m} x = a$, or

$$x = \frac{m a}{m + n}, \text{ and } y = \frac{n a}{m + n}.$$

If $m = n$, then the two parts are equal.

Hence, to divide a quantity (a) into three parts, x, y, z, so that $x y z$ may be a maximum, the three parts must be all equal amongst themselves. For whatever one of the parts may be, if it be constant, the product of the other two will be the greatest when they are equal to each other; and in the same manner, if we consider any one of the parts as constant, the rectangle of the other two will be the greatest when they are equal to each other; whence it is obvious, that the product will be the greatest when the three parts are equal to each other. And in the same manner, if the given quantity be divided into any number of parts, the product of them, or the product of any equal powers of them, will be the greatest when the several parts are all equal amongst themselves.

2. To divide a given number (a) into two such parts, x and y, that the sum of their alternate quotients may be a maximum.

Here we must have $x + y = a$,

$$\text{and } \frac{x}{y} + \frac{y}{x} = \text{a maximum.}$$

Now since the first is constant, and the latter a maximum, we have $\dot{x} = -\dot{y}$, and

$$\frac{\dot{x} y - \dot{y} x}{y^2} + \frac{\dot{y} x - \dot{x} y}{x^2} = 0;$$

or, substituting for $\dot{x}$ its equal $-\dot{y}$, this becomes

$$-\frac{y \dot{y} + x \dot{y}}{y^2} + \frac{x \dot{y} + y \dot{y}}{x^2} = 0, \text{ or}$$

$$\frac{x \dot{y} + y \dot{y}}{x^2} = \frac{y \dot{y} + x \dot{y}}{y^2};$$

whence we have $\frac{1}{x^2} = \frac{1}{y^2}$, or $y^2 = x^2$, or $x = y$; that is, each of the required quantities is equal to $\frac{1}{2} a$.

3. Of all right-angled triangles, having the same hypothenuse; to determine that which shall have the greatest area.

Let the given hypothenuse be represented by h, and the required sides by x and y; then we have these two equations;

$$x^2 + y^2 = h^2$$
$$x y = \text{a maximum.}$$

In the first we have $2 x \dot{x} + 2 y \dot{y} = 0$, or $\dot{x} = -\frac{y \dot{y}}{x}$; in the second $\dot{x} y + \dot{y} x = 0$.

Substitute for $\dot{x}$, and we obtain

$$-\frac{y^2 \dot{y}}{x} + \dot{y} x = 0, \text{ or } y^2 = x^2, \text{ or } y = x;$$

and, consequently, both x and $y = \frac{a \sqrt{2}}{2}$.

This result is also readily obtained from the pure elements of geometry; for the hypothenuse being given, let there be described upon it a semicircle; then it is obvious, that the area of that triangle will be the greatest whose perpendicular, let fall upon the hypothenuse from the right angle, is the greatest; and this evidently is the case when that perpendicular is equal to the radius, or when the right-angled triangle is also isosceles.

4. To find the greatest cylinder that can be inscribed in a given cone.

Let the altitude of the cone be represented by a, the diameter of its base by b, the altitude of the cylinder by x, and the diameter of its base by y: also put $.7854 = p$.

Now by similar triangles, as

$$a : b :: b - x : \frac{b}{a}(b - x) = y;$$

and by the question $p y^2 x =$ a maximum, or substituting for y, and suppressing $\frac{b^2 p}{a^2}$, because it is a constant multiplier, we have

$$b^2 x - 2 b x^2 + x^3 = \text{a maximum, or}$$
$$b^2 \dot{x} - 4 b x \dot{x} + 3 x^2 \dot{x} = 0; \text{ whence}$$
$$3 x^2 - 4 b x = -b^2,$$

which reduced, gives $x = \frac{1}{3} b$.

5. To divide a given arc A into two parts such, that the mth power of the sine of one part, into the nth power of the sine of the other, may be a maximum.

Let P and Q represent the two arcs, x and y their sines, radius being unity, then we must have

$$x^m \times y^n = \text{a maximum,}$$

and consequently, $m y^n x^{m-1} \dot{x} + n x^m y^{n-1} \dot{y} = 0$; whence we find $m y \dot{x} = -n x \dot{y}$.

$$\text{Now } \dot{P} = \frac{\dot{x}}{\sqrt{(1 - x^2)}}, \text{ and } \dot{Q} = \frac{\dot{y}}{\sqrt{(1 - y^2)}}$$

from the known doctrine of fluxions; also

$\dot{P} + \dot{Q} = 0$, because $P + Q = A$, whence $\dot{P} = -\dot{Q}$;

$$\text{or, } \frac{\dot{y}}{\sqrt{(1 - y^2)}} = \frac{-\dot{x}}{\sqrt{(1 - x^2)}}.$$

Multiply this equation by the equation

$$m y \dot{x} = -n x \dot{y},$$

and we obtain

$$m \times \frac{y}{\sqrt{(1 - y^2)}} = n \times \frac{x}{\sqrt{(1 - x^2)}}$$

or, which is the same,

$m \,.\, \tan.\ P = n \,.\, \tan.\ Q$,

whence

$m : n ::$ tan. Q : tan. P

$(m + n) : (m - n) ::$ (tan. Q + tan. P) : (tan. Q − tan. P)

But

(tan. Q + tan. P) : (tan. Q − tan. P) :: sin. (Q + P) : sin. (Q − P);

or, $(m + n) : (m - n) ::$ sin. A : sin. (Q − P);

whence, sin. (Q − P) = sin. A $\times \frac{m - n}{m + n}$.

Now, therefore, knowing the sine of the difference, we know also the difference of the arcs, whence the sum being also given, the arcs themselves are readily determined. We might have obtained the same result from the known trigonometrical formula; *viz.*

sin. (P + Q) = sin. P . cos. Q + sin. Q . cos. P,

that is, the above notation remaining, and making

sin. (P + Q), or sin. A $= a$.

$x \sqrt{}$

$$x\sqrt{(1-y^2)} + y\sqrt{(1-x^2)} = a,$$

and we have also $x^m y^n$ = a maximum: from which two equations the values of x and y may be determined; and, consequently, the arcs of which they are the sines.

6. To find the value of x in the equation x^x = a minimum. Make $x^x = z$, then x log. x = log. z, and

$$\dot{x}\log. x + x \times \frac{\dot{x}}{x} = \frac{\dot{z}}{z} = 0,$$

because, x^x, or z, is to be a minimum,

whence $\log. x = -1$,

that is, x is that number of which the hyperbolic logarithm is -1.

Application of Maxima et Minima to physical Problems.

7. Given two elastic bodies A and C to find an intermediate body x, so that the motion communicated from A to C, through x, may be a maximum.

Put a = the given velocity of A, w the velocity communicated to C, and z the velocity communicated to x; then by the known theory of elastic bodies

$$A + x : 2A :: a : w$$
$$x + C : 2x :: w : z$$

taking the product of corresponding terms

$$(Ax + x^2 + AC + Cx) : 4Ax :: a : z, \text{ or}$$

$$A + x + \frac{AC}{x} + C : 4A :: a : z$$

Now as the two mean terms are constant, the last term varies inversely as the first; and, therefore, as the last is to be a maximum, the first term must be a minimum; and, consequently, its fluxion = 0; that is,

$$\dot{x} - \frac{AC\dot{x}}{x^2} = 0; \text{ whence } x = \sqrt{AC};$$

that is, x must be a mean proportional between the two given bodies.

8. To determine at what angle the wind ought to strike against the sails of a windmill, so that the effect to put it in motion may be the greatest possible.

Let x = the cosine of the required angle, then the $\sin.^2 = 1 - x^2$, radius being unity; hence by the principles of hydrostatics, the effect being as the product of the cosine into the square of the sine, we must have

$$x \times (1 - x^2) = x - x^3 = \text{a maximum},$$

whence $\dot{x} - 3x^2\dot{x} = 0$, or $x = \sqrt{\tfrac{1}{3}} = \text{cos. } 54^\circ\ 44'$,

which is the required angle.

9. Given the solidity of a cone to find the base and height, when the time of its vibration shall be a minimum, the point of suspension being at the vertex.

Let x = the radius of the base, y = the altitude, p = 3.1416; then $\frac{1}{3}pxy^2 = s$, the given solidity.

Now the distance of the point of suspension from the centre of oscillation, in a cone suspended at its vertex, $= \frac{4x^2 + y^2}{5x}$. See OSCILLATION. And this, from the nature of the problem, must be a minimum.

But $y^2 = \frac{3s}{px}$, whence $\frac{4x^2 + y^2}{5x} = \frac{4px^3 + 3s}{5px^2}$.

This being put into fluxions gives

$$\frac{60p^2x^4\dot{x} - 40p^2x^4\dot{x} - 30psx\dot{x}}{25p^2x^4} = 0,$$

or, $6px^3 - 4px^3 - 3s = 0$,

whence $x = \sqrt[3]{\frac{3s}{2p}}$, and $y = \sqrt{2} \times \sqrt[3]{\frac{3s}{2p}}$,

consequently, $x : y :: 1 : \sqrt{2}$.

10. To find the position of the planet Venus, when it gives the greatest quantity of light to the earth

Let S be the sun, (*fig.* 1. *Plate* XIII. *Analysis*,) E, the earth, V, Venus, produce E V, on which let fall the perpendicular S B, and with the centre V, and distance V S, describe the circular arc S A. Put S E = a, S V = A V = b, E V = x, B V = y; then A B = $b - y$, the versed sine of the angle S V A; and by the known astronomical theory, the quantity of light received by the earth from Venus varies as $\frac{b-y}{x^2} = \frac{b}{x^2} - \frac{y}{x^2}$ = a maximum.

Again, (Euclid, b. ii. p. 12.) $a^2 = b^2 + x^2 + 2xy$; therefore, $y = \frac{a^2 - b^2 - x^2}{2x} = \frac{m^2 - x^2}{2x}$ (by making $m^2 = a^2 - b^2$).

Hence, the quantity of light varies as

$$\frac{b}{x^2} - \frac{m^2 - x^2}{2x^3} = \frac{2bx - m^2 + x^2}{2x^3} = \text{a maximum};$$

hence its fluxion

$$\frac{(2b\dot{x} + 2x\dot{x})\,2x^3 - 6x^2\dot{x}\,(2bx - m^2 + x^2)}{4x^6} = 0,$$

or, $(2b + 2x)\,2x^3 - 6x^2(2bx - m^2 + x^2) = 0$,

whence by reduction, &c.

$$-x^2 - 4bx + 3m^2 = 0,$$

therefore, $x^2 + 4bx = 3m^2$,

and hence, $x = -2b \pm \sqrt{(4b^2 + 3m^2)}$

Since then, we know the three sides of the triangle E S V, the angle E of elongation is readily found = $39^\circ\ 44'$.

We might have extended these kinds of problems to a much greater length, had the limits of our article admitted of it; but it is presumed that the above will throw considerable light on the subject; and render the application of these principles easy and familiar in most other cases. The reader who is desirous of farther information relating to the method of maxima et minima, as applicable to mechanical and astronomical subjects, may consult Dealtry's Principles of Fluxions, or Vince's Treatise on the same subject: see also Simpson's and Maclaurin's Treatises on Fluxions, to the former of which works we are indebted for the following article.

Application of Maxima et Minima to curve Lines.—Having already considered this subject at considerable length under the article ISOPERIMETRICAL *Problems*, we shall, therefore, be very brief in our observations with regard to them in this place; but as there are certain problems of this kind, which easily yield to the ordinary method of maxima et minima, we thought it right to touch slightly on this subject in the present article.

To find the nature of curves, in which some conditions being invariable, others become the greatest or the least possible.

1. Given the length of a curve to find the area a maximum.

It is evident, that by merely putting the fluent $y\dot{x}$ a maximum,

maximum, no solution can be obtained; for no limitation is expressed, and the fluent will admit of increase or decrease without limit. But as the length is given, the $f.\dot{z}$, so far as concerns the $f y \dot{x}$, is a given quantity; therefore, the

$$f.y\dot{x} \pm f.\dot{z} \text{ must be a maximum:}$$

or, rendering the terms homogeneous, in order that they may admit of comparison,

$$f.y\dot{x} \pm f.a\dot{z} = \text{a maximum.}$$

Now if for every individual value of y, this flowing quantity be always a maximum, the whole fluent will be so likewise; but for every such value of y, the flowing quantity is $y\dot{x} \pm a\dot{z}$. Hence the nature of the curve will be determined by ascertaining what relations of $\dot{x}$ and $\dot{z}$ will render $y\dot{x} \pm a\dot{z}$ a maximum for any given value of y; or the fluxion of $y\dot{x} \pm a\dot{z} = 0$, whilst y is constant; and this must be the case for every successive value of y throughout; so that in each limiting portion of the area, for every value of y, the ratio of $\dot{x}:\dot{z}$ must be such as to make $y\dot{x} \pm a\dot{z}$ a maximum,

therefore $\quad y\ddot{x} \pm a\ddot{z} = 0$; but $\dot{z}^2 = \dot{y}^2 + \dot{x}^2$;

whence $\quad \dot{z}\ddot{z} = \dot{x}\ddot{x}$, and $\ddot{z} = \dfrac{\dot{x}\ddot{x}}{\dot{z}}$;

consequently, $\quad y\ddot{x} = \mp\dfrac{a\dot{x}\ddot{x}}{\dot{z}}$, and $y\dot{z} = \mp a\dot{x}$.

But from the nature of the problem $y\dot{z}$ must be positive, and, therefore, the true result is $y\dot{z} = a\dot{x}$.

Now, in the circle $a : y :: \dot{z} : \dot{x}$; whence $a\dot{x} = y\dot{z}$. Hence the curve required is a circle; in which the length being given, the area is a maximum.

Therefore, if A and B denote any functions of x and y, and $\dot{x} = \sqrt{(c^2 + \dot{y}^2)}$, where c is constant, the expression $A\dot{x} \mp B\dot{y}$ is a maximum, or a minimum, when $A\dot{y} = \mp B\dot{x}$, or the functions of x and y are reciprocal.

2. To determine the nature of a curve, which generates a surface, so that the surface being given, the solid may be a maximum.

Here $f.2py\dot{z}$, or $f.y\dot{z}$ is given; and $f.y^2\dot{x}$ is a maximum: hence the fluent of $ay\dot{z} \pm$ fluent of $y^2\dot{x}$ a maximum;

or, $\quad f.ay\dot{z} \pm f.y^2\dot{x} = \text{a maximum};$

therefore, $\quad ay\dot{x} = y^2\dot{z}$, or $a\dot{x} = y\dot{z}$,

which is a property of the circle, and the body is a sphere.

3. To determine the nature of the generating curve, that the solidity being given, the surface may be a minimum.

Here $f.y^2\dot{x}$ is given, and $f.ay\dot{z}$ is a minimum; therefore, $y^2\dot{z} = ay\dot{x}$, and $y\dot{z} = a\dot{x}$: the required curve, therefore, is a circle, and the body a sphere.

The same principles are employed in the work above quoted, to the finding of the solid of least resistance, and a few other problems of the same kind; but as we have already considered these under a more general form in the article Isoperimetry, we shall not pursue the subject any farther in this place.

To ascertain the number of maxima or minima that appertain to any variable function.

In the preceding problems it has generally happened, that the equations from which we have derived our maximum or minimum have been of the first degree; and, therefore, admitted of only one rational value; but it may happen that the final equation is of a higher dimension, and, consequently, admitting of several roots, each of which may be employed, at least so far as we have considered the subject at present: also, as our operation is precisely the same, whether we are seeking a maximum or a minimum, it is necessary to have some means of determining, *à priori*, which root gives the maximum, and which the minimum, as well as to ascertain the number of each.

In our former definition, we stated a maximum, or minimum, to be the greatest or least state of a variable function; which was done in order to simplify the idea, being in fact the real import of the word; and in any question of a physical nature, the term must be still understood in this light. That is, if the fluxional equation be of such a degree as to admit of several roots, that one must be found which makes the result the greatest, or least possible; but analytically, we must understand this term to signify that state of a variable function, which, if the variable upon which it depends be either increased or decreased, the whole function will decrease or increase, according as it is in its maximum or minimum state; but this increase or decrease is frequently limited, and being carried beyond a certain point, the whole function will again increase or decrease. This will be more obvious, from (*fig.* 2. *Plate* XIII. *Analysis.*) where the several ordinates A B, E F, I K, are maxima, and C D, G H, are minima, any one of which, as for example E F, will be observed to recede from its maximum towards a minimum, as it approaches towards C or D; but beyond those points, it again approaches towards its other maximum value. The object, therefore, of our present enquiry, is to ascertain the number of maxima or minima that a function may have, and which root of the final equation gives the one, and which the other.

In order to this, let y be any function of x, and suppose that x has attained that particular value which renders the function y a maximum or a minimum; it follows then, if x be either increased or diminished by any quantity h, that we ought to obtain for the whole function a result less or greater than the preceding, according as it was in its maximum or minimum state. Now, if we represent by y'' the function answering to $x + h$, and by y' the function answering to $x - h$, we shall have from Taylor's theorem

$$y' = y - \frac{h\dot{y}}{1.\dot{x}} + \frac{h^2\ddot{y}}{1.2\dot{x}^2} - \frac{h^3\dddot{y}}{1.2.3\dot{x}^3} + \&c.$$

$$y'' = y + \frac{h\dot{y}}{1.\dot{x}} + \frac{h^2\ddot{y}}{1.2\dot{x}^2} + \frac{h^3\dddot{y}}{1.2.3\dot{x}^3} + \&c.$$

And since the powers of a quantity which is less than unity become less and less as the exponent is greater, it may be readily conceived, that h may be taken so small, that each of the terms of the preceding series may be greater than the sum of all the following ones; and, consequently, the sign of the whole series, beginning at any term, will always be the same as that of the first term, as to positive or negative.

Therefore, if $\dfrac{h\dot{y}}{\dot{x}}$ be any thing but zero, y will be greater than y', and less than y''; and, consequently, is neither a maximum nor minimum; therefore, when it is either the one or the other, $\dfrac{h\dot{y}}{\dot{x}} = 0$. In this case, we have

$$y' = y + \frac{h^2\ddot{y}}{1.2\dot{x}^2} - \frac{h^3\dddot{y}}{1.2.3\dot{x}^3} + \&c.$$

$$y'' = y + \frac{h^2\ddot{y}}{1.2\dot{x}^2} + \frac{h^3\dddot{y}}{1.2.3\dot{x}^3} + \&c.$$

where it is obvious that $y > y'$, and $> y''$; or $y < y'$, $< y''$, according as $\dfrac{h^2\ddot{y}}{1.2\dot{x}^2}$ is negative or positive; and

is,

is, therefore, neceffarily a maximum or a minimum.

But if $\frac{h^2 \ddot{y}}{1 \cdot 2 \dot{x}^2} = 0$, then again y is neither a maximum nor a minimum; for in this cafe, y is $> y'$, and $< y''$. We have, therefore, the following rule for afcertaining the maxima et minima of any propofed function. Find the value of x in the equation $\frac{\dot{y}}{\dot{x}} = 0$, and fubftitute it for x in the expreffion $\frac{\ddot{y}}{\dot{x}^2}$; then if the refult is negative, y is a maximum, if pofitive, a minimum; and if it be zero, then y is neither a maximum nor a minimum, unlefs alfo $\frac{\dddot{y}}{\dot{x}^3}$ be equal to zero; and then it will depend upon the fign of $\frac{\ddddot{y}}{\dot{x}^4}$; and fo on, and the fame procefs being obferved, with regard to each of the roots of the fluxional equation, the number of maxima et minima will be obtained.

Let us illuftrate the preceding rule by an example.

1. Find $y = x^4 - 8x^3 + 22x^2 - 24x + 10$, a maximum or minimum. Here

$$\frac{\dot{y}}{\dot{x}} = 4x^3 - 24x^2 + 44x - 24 = 0;$$

where $x = 1, 2$, and 3.

And it is required to find which of thefe roots anfwers to the maxima, and which to the minima. Now

$$\frac{\ddot{y}}{\dot{x}^2} = 12x^2 - 48x + 44.$$

And here, making $x = 1, 2, 3$, the refults are refpectively $+, -, +$; therefore the root 2 anfwers to the maximum, and the other two to the minima.

2. Let there now be propofed the function

$$y = x^5 - 7x^4 + 19x^3 - 25x^2 + 16x + 10.$$

Here $\frac{\dot{y}}{\dot{x}} = 5x^4 - 28x^3 + 57x^2 - 50x + 16 = 0$.

And the roots of this equation are $1, 1, 2, 1\frac{3}{5}$. Now

$$\frac{\ddot{y}}{\dot{x}^2} = 20x^3 - 84x^2 + 114x - 50,$$

which $= 0$, when $x = 1$; therefore the root 1 gives neither a maximum nor a minimum, unlefs $\frac{\dddot{y}}{\dot{x}^3} = 0$; which upon trial does not obtain.

But by affuming $x = 2$ in this equation, the refult is -4; and, confequently, this value of x anfwers to a maximum.

And by fubmitting the other root $1\frac{3}{5}$ to the fame teft, a fimilar refult will be obtained.

We will add another example, with which we muft conclude this article.

3. To find when the function

$$y = x^3 - 18x^2 + 96x - 20$$

becomes a maximum or a minimum.

Here $\frac{\dot{y}}{\dot{x}} = 3x^2 - 36x + 96 = 0$,

in which equation the roots are $x = 4$, $x = 8$.

Now $\frac{\ddot{y}}{\dot{x}^2} = 6x - 36$.

Here the root 8 gives $\frac{\ddot{y}}{\dot{x}^2}$ *pofitive.*

And the root 4 gives $\frac{\ddot{y}}{\dot{x}^2}$ *negative.*

Therefore the former anfwers to the minimum, and the latter to the maximum.

If the fluxional equation has no real root, then it follows that the propofed function admits of neither a maximum nor a minimum; but increafes or decreafes *ad infinitum.*

MAXIMENE, in *Geography*, a town of Walachia; 18 miles N. of Galacz.

MAXIMIANOPOLI, a town of European Turkey, in Romania, founded by the emperor Maximian; formerly the fee of a bifhop, in the province of Rhodope, but now a fmall place 60 miles S.W. of Adrianople.

MAXIMIANOPOLIS, in *Ancient Geography*, a town of Paleftine, the fame as Hadad-Rimmon, in the valley of Jezreel, and in the plain of Megiddo. An ancient traveller places it 17 miles from Cæfarea, and 10 from Jezreel.—Alfo, a town of Thrace, in Media, upon the northern bank of the Marfh Buton; called alfo Myxæ. See MAXIMIANOPOLI.

MAXIMIANUS, HERCULIUS MARCUS AURELIUS VALERIUS, in *Biography*, a native of Sirmium, in Pannonia, was the fon of parents who gained their daily fubfiftence by the labour of their hands. Brought up in ruftic manners, and deftitute of every advantage of education, he early embraced that way of life which alone prefented the profpect of advancement, and enlifted as a common foldier in the Roman armies. Afpiring to fomething better than the fervile character which he then held, he gradually rofe through the feveral ftages of command, diftinguifhed by ftrength and hardinefs of body, and the military virtues of courage and obedience. He fought under the emperors Aurelian and Probus on the banks of the Danube, Rhine, Euphrates, and borders of the ocean, acquiring the talents of an experienced foldier, if not of a great general. His manners were not changed in his progrefs, but he remained rude and ferocious, with a propenfity to the groffeft debauchery. In the courfe of his fervice, he contracted an intimacy with his fellow-foldier Dioclefian, who, when elevated to the imperial dignity, remembered the valour, courage, and hardihood of Maximianus, and rewarded his fidelity by making him his colleague in the empire, and by ceding to him the command of the provinces of Italy, Africa, and Spain, and the reft of the weftern territories of Rome. The perfonal fuperiority of Dioclefian was, however, recognized in the affumed epithet of *Jovius*, while Maximian took that of *Herculius*. Maximianus fhewed the juftnefs of the choice of Dioclefian by his victories over the Barbarian tribes with whom he was called to contend. As foon as Dioclefian entered into the twentieth year of his reign, he celebrated, in conjunction with Maximian, that memorable era, as well as his own great fucceffes, by the pomp of a Roman triumph. (See DIOCLESIAN.) This triumph was dignified by feveral circumftances of fuperior celebrity and good fortune. Africa and Britain, the Rhine, the Danube, and the Nile, furnifhed their refpective trophies; but the moft diftinguifhed ornament was of a more fingular nature, a Perfian victory, followed by an important conqueft. The reprefentation of rivers, mountains, and provinces were carried before the Imperial car. The images of captive wives, the fifters and the children of the great king, afforded a new and grateful fpectacle to the vanity of the people. Not long after this, a fevere illnefs infpired Dioclefian with the defign of abdicating his power, which refolution he carried into

into effect in the month of April or May, 305. Maximian was induced by his authority to follow his example, and on the same day divested himself of the purple at Milan, and retired to a delightful villa in Lucania. In the course of a few months, as we have seen in the article MAXENTIUS, he, at the desire of his son, re-assumed the imperial dignity, and was now anxious that this son should yield all authority into his hands. This singular contest for empire between father and son, and its decision, have already been noticed. Maximian retired in confusion into Illyricum, and endeavoured to engage Galerius in his cause. Disappointed in his expectations, he returned to the court of his son-in-law, Constantine, apparently contented with his lot, but in truth watching an opportunity for recovering his power; and while Constantine, in 309, was engaged on the banks of the Rhine in repelling an invasion of the Franks, he spread the report of Maxentius' death, and hastily resumed once more the ensigns of office. The intelligence of this event caused Constantine to return speedily into Gaul, who seized upon Maximian, and confined him to the palace under strict watch; but without intending to inflict a severer punishment. The clemency of Constantine inspired Maximian with the dark design of murdering him; and he had the wickedness and temerity to solicit his daughter Fausta to join him in the conspiracy. She informed her husband of the plot, and through their contrivance, a slave, who was an eunuch, was placed in the emperor's bed, whom Maximian stabbed to the heart, on the supposition that it was his master. Upon this detection he was judged unworthy to live, and being permitted to choose his death, he strangled himself. Such is the generally accredited account; but Gibbon represents the matter differently: he says, that Maximian was delivered into the hands of his son-in-law by the treachery of his army, in consequence of which, a secret and irrevocable sentence of death was pronounced against the usurper, and he obtained the same favour which he granted to Severus, and it was published to the world, that, oppressed by the remorse of his repeated crimes, he strangled himself with his own hands. "After he had lost the assistance, and disdained the moderate counsels of Dioclesian, the second period of his active life was a series of public calamities and personal mortifications, which were terminated in about three years by an ignominious death. He deserved his fate; but we should find more reason to applaud the humanity of Constantine, if he had spared an old man, the benefactor of his father, and the father of his wife. During the whole of this melancholy transaction, it appears that Fausta sacrificed the sentiments of nature to her conjugal duties." Gibbon. Univer. Hist.

MAXIMILLIAN I., emperor of Germany, born in 1459, was son of the emperor Frederic IV. In early life he was so dull and apparently deficient, that he was for several years considered rather in the light of an ideot. About ten years of age he became remarkably addicted to learning, and acquired, with surprising quickness, the Latin, French, and Italian languages. In his twentieth year his father effected a marriage between him and Mary, the heiress of the great house of Burgundy. Lewis XI. of France having seized part of her inheritance in the Low Countries, Maximillian made war against him, defeated his troops, and recovered great part of the usurped territories. He also suppressed the revolts which broke out in various parts of the Low Countries. As he was proceeding in a career of success, he had the misfortune to lose his wife, a circumstance that gave a shock to his authority, and the guardianship of his children was immediately contested by the states. A civil war ensued, which at length was accommodated on the condition that he should continue tutor to his son Philip, under restrictions. In 1486, Maximillian was elected king of the Romans, and crowned at Aix-la-Chapelle: upon his arrival at Bruges to meet the states-general in 1488, the inhabitants ran to arms to secure his person, being suspicious that he was inimical to their rights and liberties; at the same time they imprisoned some of his counsellors, four of whom they beheaded. The people of Ghent followed their example; but, after suffering a kind of imprisonment for ten months, he was liberated. In 1493, he succeeded, by the death of his father, without opposition, to the imperial dignity. He marched at the head of an army against the Turks, who had invaded Croatia, but they retreated before he could reach them. In 1494, he took for his second wife Blanche, the sister of John Galeazzo, duke of Milan, an alliance which engaged him in the affairs of Italy; and when Charles VIII. of France had made himself master of the kingdom of Naples, Maximillian joined in the confederacy of the pope, the king of Spain, and several Italian powers to oppose his arms. He also effected a marriage between his son Philip and the infanta Jane, daughter of Ferdinand and Isabella, by which the Low Countries eventually fell under the dominion of Spain. After the retreat of Charles from Italy, Maximillian, in 1496, engaged in an expedition into that country, and laid siege to Leghorn; but, failing in his attempts, he returned with disgrace. He next attempted to reduce the Swiss; but seven defeats, within six months, made him glad to terminate the war in 1500 by a treaty. After the death of his son Philip, in 1507, he obtained the regency of the Low Countries, of which he constituted his daughter Margaret gouvernante. The famous league of Cambray against the Venetians took place in 1509, to which Maximillian was one of the contracting parties. His troops took possession of Friuli and Istria, and he, at the head of a great army, laid siege to Padua, but was obliged to abandon the enterprize. When pope Julius deserted the league and declared war against the French, Maximillian endeavoured to get him deposed, in order that he himself might succeed to the papacy; but his scheme entirely failed. For a large subsidy he engaged to assist Henry VIII. in his invasion of France; but failing in his engagement, he came in person with a few German troops, and flattered the vanity of the English monarch, as well as gratified his own avarice, by serving under him for the pay of a hundred crowns a day. On the accession of Francis I. he made peace with that monarch, who thereby regained the Milanese. He took little or no part on the subject of the Reformation at its commencement; but at the solicitation of the monks he applied to Leo X. to terminate the religious disputes by his own decision, and he summoned Luther to appear, with the promise of a safe conduct, before the diet of Augsburg. He was particularly anxious to secure the succession to the imperial crown for his grandson Charles; but in the midst of his cares on this subject he died in January, 1519. In his private character he was amiable and respectable; but as a public man he wanted that decision which constitutes true dignity in a prince. He was beneficent and humane, and his memory is still cherished in Germany for abolishing the famous secret tribunal of Westphalia. He was author of some poems, and composed memoirs of his life. Univer. Hist.

MAXIMILLIAN II., emperor of Germany, son of Ferdinand, was born at Vienna in 1527. He was educated in Spain under his uncle, Charles V., whose daughter he married, and he governed that country three years in the name of his father-in-law. After his father had ascended the imperial

imperial throne, he conferred on Maximillian, in 1562, the crowns of Hungary and Bohemia, and caused him to be elected king of the Romans; and upon the death of Ferdinand, in 1564, he succeeded to the empire without any opposition. He was already distinguished for prudence and moderation, and well acquainted with the languages and dispositions of the various people under his sway. The spirit of his administration was pacific, and his reign, for the most part, tranquil. The Protestants of Austria, who had been very useful to the emperor in lending him money to carry on the Turkish war, and afterwards cancelled the debt, requested to be indulged in the free exercise of their religion, which he readily granted. He was not contented to do good himself, but endeavoured, by all the means in his power, and by strong remonstrances to his cousin, Philip king of Spain, to put a stop to the cruelties exercised by Alva in the Low Countries; but that bigot refused to listen to his advice, or to follow his example. Actuated by the same principles, he forbad Charles IX. to make levies in Germany for the purpose of exterminating the French Hugonots, though he could not prevent the Protestant princes of Germany from sending succours to their persecuted brethren in France. Twice he solicited the crown of Poland, with the intention of conveying it to his second son, but want of activity prevented him from attaining his object: he had, however, been successful in securing to his eldest son Rodolph the reversion of the empire, and of the kingdoms of Bohemia and Hungary, and avowed his intention of supporting his claim to the kingdom of Poland by force of arms; but this purpose, if real, was defeated by his death, which happened in 1576. He had, it was said, for some time previously to the event, devoted many of his leisure hours to the contemplation of a future state; and had been accustomed to discourse, in his familiar parties, upon the immortality of the soul, which he looked to not only without terror and dismay, but with hope and Christian confidence. Maximillian II., says the historian, "appears to have been one of the most amiable princes that ever swayed the imperial sceptre. No individual ever complained of having heard a harsh expression from his lips, none ever departed dissatisfied from his audience. So regular were his economical arrangements, that to every act of his life its appropriate hour was allotted; and every day after dinner the meanest of his subjects was at liberty to approach him. A faithful husband, an affectionate parent, and a passionate lover of truth, his example had considerable influence on the manners of his people, and the empire flourished in a peculiar manner under his administration." Univer. Hist.

Maximillian, duke of Bavaria in the 17th century, was called, on account of his courage and success, the Defender of Germany; and, for his singular prudence, he acquired the name of Solomon. He zealously opposed the Protestants, and was considered as one of the principal supporters of the Catholic religion. In 1620, he gained the battle of Prague against Frederic, prince palatine, who had been elected king of Bohemia. For these services Maximillian was named an elector of the empire. He died in 1651, aged 70. Moreri.

MAXIMIN, St., in *Geography*, a town of France, in the department of the Var, and chief place of a canton, in the district of Brignolles; 20 miles N. of Toulon. The place contains 3717, and the canton 9778 inhabitants, on a territory of $412\frac{1}{2}$ kiliometres, in nine communes. N. lat. 43° 28'. E. long. 5° 55'.

MAXIMINUS, Caius Julius Verus, in *Biography*, a Roman emperor, raised to this high rank from almost the lowest class of society, was born in Thrace, A.D. 183. His father was a barbarian of the Gothic nation, his mother an Alan, and he himself was brought up to attend the herds and flocks. In this station he had frequent opportunities of exhibiting his prowess in combating the bands of robbers who overran the country. He is said to have attained to a gigantic stature, and a correspondent strength of body, which produced, in an uncultivated mind, a savage and ferocious character. He was both the pride and the dread of his district, at the time when the emperor Severus, returning from the East, halted in Thrace, to celebrate the birthday of his son Geta. "The country," says Gibbon, "flocked in crowds to behold their sovereign, and a young barbarian of gigantic stature earnestly solicited, in his rude dialect, that he might be allowed to contend for the prize of wrestling. As the pride of discipline would have been disgraced in the overthrow of a Roman soldier by a Thracian peasant, he was matched by the stoutest followers of the camp, sixteen of whom he successively laid on the ground. His victory was rewarded by some trifling gifts, and a permission to enlist in the troops. The next day, the happy barbarian was distinguished above a crowd of recruits, dancing and exulting after the fashion of his country. As soon as he perceived that he attracted the emperor's notice, he instantly ran up to his horse, and followed him on foot, without the least appearance of fatigue, in a long and rapid career. "Thracian," said Severus, with astonishment, "art thou disposed to wrestle after thy race?" Most willingly, sir, replied the unwearied youth; and, almost in a breath, overthrew seven of the strongest soldiers in the army. A gold collar was the prize of his matchless activity, and he was immediately appointed to serve in the horse-guards who always attended on the person of the sovereign." As a soldier he distinguished himself no less by his attention to military discipline than by his valour, and his ferocity bent to the spirit of obedience and subordination. Under Caracalla he rose to the rank of centurion, but he nobly refused to serve under the assassin of that prince, and retiring to his native place he purchased property, and carried on a commerce with the barbarous tribes from which he derived his origin. During the reign of the monster Heliogabalus he kept at a distance from the court, notwithstanding the solicitations of his friends to take a military tribuneship. Alexander Severus knew the worth of Maximinus, and committed to his care a legion of new recruits; the duties of which station he fulfilled with the utmost assiduity, bestowing the minutest attention upon their exercise, arms, health, and apparel. When he was told by a person of considerable rank, that in such a career of promotion he need not trouble himself, he indignantly replied, "I am of a different opinion, the higher I rise the more I shall labour." Though, as an officer, he was a strict disciplinarian, his manners, and the figure of his person, rendered him extremely popular among the soldiery, who gave him the appellations of Ajax and Hercules. His elevation began to inspire him with ambitious views, which effaced the sentiments of affection, gratitude, and duty: he aspired to the throne, and was proclaimed, by the army, emperor, in the year 235. The decree of the soldiery was confirmed by an always complying senate, and one of his first acts was to confer on his son, a youth of fine talents, the title of Cæsar. His heart now became callous to the feelings of honour and humanity; he not only removed from his presence the friends and advisers of the late emperor, but put many of them to death upon the slightest and most frivolous grounds. A conspiracy against his person afforded him a better pretext for the most sanguinary cruelty, and a vast number of persons of rank lost their lives on the occasion, with various circumstances

circumstances of barbarity. He now became the object of universal dread and detestation, and was, in a short time, such is the progress of vice and cruelty, grounded on ambition, ranked among the most bloody tyrants that ever disgraced the Roman purple. He still had the art to retain the attachment of his army, in whom he confided, and crossing the Rhine into Germany with numerous and well disciplined battalions, he laid waste a wide tract of country with fire and sword, and destroyed a great number of natives who opposed him. In these actions he displayed the skill of a general, with the bravery of a private soldier, and made it sufficiently evident that war was the true theatre of his glory. After two campaigns, he passed the winter of the year 236 at Sirmium, occupied in raising money by the severest exactions, which, by means of his officers, were extended to all the provinces of the empire. The procurator of Africa carried his extortions to such an intolerable excess that a conspiracy was formed against him, to which his life fell a sacrifice; and in the year 238, Maximinus and his son were dispatched by an indignant and suffering people, who, fixing their heads upon spears, displayed them as trophies through the army, who received the intelligence with joy, and united in declarations of fidelity to the senate and its decisions. Maximinus has been reckoned, by ecclesiastical writers, among the persecutors of the Christians, but the candid historian does not readily admit the title of "the sixth persecution" to be justly applied to the reign of this emperor. He is described, by Gibbon, as a brutal savage, destitute of every sentiment that distinguishes a civilized, or even a human being. "The body," says he, "was suited to the soul." The stature of Maximinus exceeded the measure of eight feet, and circumstances almost incredible are related of his matchless strength and appetite. Had he lived in a less enlightened age, tradition and poetry might well have described him as one of those monstrous giants, whose supernatural power was constantly exerted for the destruction of mankind. Gibbon. Univer. Hist.

Maximinus, C. Galerius Valerius, a Roman emperor, son of the sister of the emperor Galerius, was in the year 305, upon the abdication of Dioclesian and Maximinian, raised, by the influence of his uncle, to the rank of Cæsar, and, in the division of the empire, the provinces of Egypt and Syria were placed under his government. When Licinius, in 307, was raised by Galerius to the rank of Augustus, Maximinus, disdaining an inferior title, insisted on the same elevation, and upon some reluctance on the part of Galerius to grant it, he caused himself to be nominated to that dignity by his assembled troops: thus at one and the same time, the Roman world, in the year 308, witnessed six Augusti or emperors. On the death of Galerius, in 311, Maximinus shared his dominions with Licinius, and added Asiatic provinces to his former possessions. In the contest between Maxentius and Constantine, Maximinus secretly allied himself with the former, though he took no open part in the war. When Galerius issued his edict in favour of the Christians, Maximinus, though an enemy to them, thought proper to concur. Still he had a great desire to re-establish the Pagan worship, with all its impostures of magic and divination. He was preparing to renew the persecution, and, in the mean time, he not only gave to the ancient religion a system of church government copied from the Christians, and threw about it all the lustre of the state, but employed every art to discourage and vilify Christianity. He is also charged with having published and carefully disseminated a false narrative of the death of Jesus Christ, filled with the most injurious representations. The principal cities of his dominions, as Nicomedia, Antioch, and Tyre, were instigated to send addresses to him, expressing their abhorrence of the Christians, and imploring that they might be expelled. These, however obtained, led to the infliction of cruel and ignominious punishments and to the destruction of some lives. The dangers that menaced Christianity in Asia were averted by the war, which, in 313, took place between Maximinus and Licinius. The latter had made an alliance with Constantine, and the apprehension of its consequences seems to have been the chief motive of Maximinus, who begun the attack. He was entirely defeated, and was obliged to seek his safety in a rapid flight; and it is said he reached Nicomedia, a distance of 160 miles, in the space of twenty-four hours from the conclusion of the battle. He retreated to Tarsus, where, in a few months, death put an end to his disgrace. His whole family was sacrificed to the vindictive rage of the conqueror. Gibbon. Univer. Hist.

MAXIMUS, M. Claudius Pupienus, a Roman emperor, was the son of a mechanic, but having a desire to enrol himself in the army, he enlisted at an early age, and became distinguished first as a soldier, and afterwards in some of the public offices of state. In 227 he obtained the consulate, and was afterwards proconsul of Bithynia, Greece, and Narbonnensian Gaul, and was appointed to military commands in various parts of the Roman empire. As prefect of Rome, he displayed intelligence, firmness, and severity, so that he acquired a general respect, accompanied with an awe, approaching almost to terror. In 237, when the murder of the Gordians deprived Rome of the emperors it had chosen in the place of the tyrant Maximinus, the merit of Maximus caused him to be invested with the purple together with Balbinus. Some opposition was first made to his accession, and it was resolved to add the younger Gordian, then a child, to the emperors already chosen. At length Maximus was received with joyful acclamations as the deliverer of his country, and the conduct of the three emperors seemed to promise the restoration of an equitable and wise government to the Roman world. The various nature of their talents seemed to appropriate to each his peculiar department of peace and war, without leaving room for a jealous emulation. Justice was regularly administered, wholesome laws were enacted, and oppressive taxes were repealed or moderated. Discipline was revived, and with the advice of the senate many excellent regulations were introduced into the several departments of government. The pretorian bands, accustomed to depose and to make emperors at their pleasure, soon shewed symptoms of discontent under a sovereignty which they had not established, and apprehended that the reign of law and order would be destructive of their power. They accordingly seized upon the opportunity when the citizens were occupied in the Capitoline games, rose in mutiny, and marched towards the palace: laid hold of the two emperors, treated them with every mark of insult, and, to prevent the possibility of a rescue, took away their lives, leaving their bodies, mangled with a thousand wounds, exposed to the insults or the pity of the populace. Gibbon. Univer. Hist.

Maximus, Petronius, an emperor of the West in the fifth century, was a Roman of noble birth. Possessed of an ample patrimony, and adorned with liberal arts and elegant manners, he obtained the favour of the prince and the senate, and of course rose to high and important offices in the state. In March 455, Maximus was elected emperor, in the room of Valentinian, who had, on account of his vices and tyranny, been assassinated. In a few hours he was convinced that happiness and sovereignty were generally at variance, and he was heard to exclaim, "Happy Damocles, whose reign began and ended with a dinner!" His own power was very short-lived; when attacked by Genseric, king of the Vandals, in Africa, he was deprived of all courage and presence of mind, and thought of nothing but how to make his escape. Cowardice in a prince is always hateful and contemptible, and as soon as his intentions were known, the people, who would probably have rallied round him, had he been inclined to defend his country, rose upon him, and a soldier gave him a fatal blow. His body was ignominiously dragged through the streets and thrown into the Tiber. Such was his end, after a reign of less than three months. Gibbon. Univer. Hist.

Maximus Magnus, an imperial usurper of the fourth century, a native of Spain, and probably of low origin, served in Britain with Theodosius, afterwards emperor, and established a character for valour and abilities, though it does not appear that he rose to any important rank, either civil or military. He was invested with the imperial purple in the year 383, by the army among whom he had excited discontent and disaffection against Gratian, emperor of the West. This took place while he was in Britain, but he determined to carry his arms to the continent, and contend with the lawful emperor upon his own ground. He transported into Gaul so great a number of Britons, that the emigration at that period weakened the population of the island, and they afterwards settled in Bretagne. As he advanced he was joined by the Gallic armies, and even the houshold troops deserted Gratian, then resident at Paris. He fled before the usurper, and was put to death at Lyons. Maximus was now acknowledged as emperor by all the provinces of the West, and he declared his infant son Victor his colleague, and proposed an alliance to Theodosius, emperor of the East, which was accepted, on condition that he should not pass the Alps, beyond which Valentinian, the brother of Gratian, reigned over Italy, Illyrium, and Africa. The ambition of Maximus, however, would not permit him to rest; in 387 he invaded Italy, and took possession of Milan, without opposition. Valentinian fled to implore the assistance of Theodosius, who, while the usurper was employed in reducing the towns of Italy, levied an army to oppose him. A battle decided the fate of Maximus; as soon as he was defeated, his own soldiers rose upon him, dragged him away and struck off his head. His son Victor met with a similar fate in Gaul. These events took place in the year 388. Maximus is stigmatized as the first Christian prince who shed the blood of his Christian subjects, on account of their religious opinions. Gibbon. Univer. Hist.

Maximus Tyrius, a celebrated philosopher, and elegant writer in the second century, was a native of Tyre in Phœnicia, whence he derived his name. He probably came to Rome in the year 146, where he received from the emperor Marcus Aurelius many tokens of esteem and regard. This emperor is said to have placed himself under the instructions of the philosopher, though some writers imagine that this high honour belonged to another Maximus of the Stoical sect. Maximus adopted the principles of Plato, but with an evident leaning to scepticism. There are forty-one of his "Dissertations," on philosophical topics, still extant, which display much sound argument, and real eloquence. These have been very frequently printed. The first Latin version was published at Basil in 1519, and the original Greek was printed for the first time by Henry Stevens, in 1557. In 1607, Daniel Heinsius published an edition of them at Leyden, in Greek and Latin, illustrated with notes. A new impression of this edition was printed at Cambridge in 1703, with corrections, additional notes and indexes, by Dr. John Davies. Enfield. Hist. Phil. Harwood.

Maximus, named "The Cynic," a native of Ephesus, who studied under Œdesius of Cappadocia, a philosopher of the Eclectic school, and immediate successor of Jamblichus. He was probably appointed by the emperor Constantius preceptor to Julian, surnamed afterwards "The Apostate." Some writers, however, maintain that he introduced himself to that emperor at Nicomedia, either while he was pursuing his studies, or during his expedition into the East. Whichever account be true, it is certain he was a great favourite with Julian, and had such an influence over his mind, as to excite in him the most determined hatred to Christianity, while he inspired him with an ardent attachment and enthusiasm in favour of Heathen superstitions, and the practice of pretended magical arts. Such, at length, was the folly of the deluded emperor, that he seemed to place an entire confidence in the predictions of Maximus. When the emperor intended to make war against Persia, he had recourse to his divinations, which flattered him with the idea, that he was born to rival Alexander in the glory of conquest. The event shewed the vanity of the prophet, and the emperor fell a sacrifice to his credulity. During the reign of Jovian, Maximus was treated with respect; but under the government of Valentinian and Valens he was seized and prosecuted for the crime of magic, of which he was convicted and sentenced to a long imprisonment. In 373, he was put to death by the proconsul Festus, the distinguished minister of the emperor Valens' cruelties. Enfield. Hist. Phil.

MAXINO, in *Geography*, a town of Sweden, in the government of Wasa; 12 miles N.N.E. of Wasa.

MAXULA, Mo-raisah, in *Ancient Geography*, an ancient town of Africa, situated on the sea-coast, S.E. of Carthage. It is mentioned by Ptolemy, Pliny, and Antonine in his Itinerary.

MAXY, in *Mineralogy*, a name given by some to mundic, a sulphureous mineral, common in the tin-mines of Cornwall, and elsewhere.

MAXYES, in *Ancient Geography*, a people of Africa, in Libya, W. of the river Triton. According to Herodotus, they permitted their hair to grow on the right side of the head, shaved the left side, and painted their bodies with vermilion. They are said to have been descended from the Trojans, and to have inhabited a very mountainous country, covered with wood and full of wild beasts.

MAY, Maius, the fifth month in the year, reckoning from our first, or January; and the third, counting the year to begin with March, as the Romans anciently did. It was called *Maius* by Romulus, in respect to the senators and nobles of his city, who were named *majores*, as the following month was called *Junius*, in honour of the youth of Rome, *in honorem juniorum*, who served him in the war; though some will have it to have been thus called from *Maia*, the mother of Mercury, to whom they offered sacrifice on the first day of it; and Papias derives it from *Madius*, *eo quod tunc terra madeat*.

In this month the sun enters Gemini, and the plants o the earth in general begin to flower.

The month of May was under the protection of Apollo; and in it also they kept the festival of Bona Dea, that of the goblins, called *lemuria*; and the ceremony of *regifugium*, or the expulsion of the kings.

The vulgar have a great opinion of the virtues of May-dew, and May-butter.

The month of May has ever been esteemed favourable to love; and yet the ancients, as well as many of the moderns, look on it as an unhappy month for marriage. The original reason may perhaps be referred to the feast of the Lemures,

mures, which was held in it. Ovid alludes to this in the fifth of his Fasti, when he says,

"Nec viduæ tædis eadem, nec virginis apta
Tempora; quæ nupsit, non diuturna fuit:
Hac quoque de causa, si te proverbia tangunt,
Mense malum Maio nubere vulgus ait."

MAY-*apple*, in *Botany*. See PODOPHYLLUM.

MAY-*bush*. See CRATÆGUS.

MAY-*dew*. See DEW.

MAY-*duke*, a species of cherry.

MAY-*lily*. See CONVALLARIA.

MAY-*weed*. See ANTHEMIS and MATRICARIA.

MAY-*weed*, in *Agriculture*, the common name of a troublesome kind of field weed, which resembles wild chamomile, and is a trailing perennial plant, which puts out roots from its branches as they lie on the ground. By these means, and by scattering its seeds long before the corn is ripe, it spreads and multiplies greatly. It flowers in May, whence its name . With regard to the best means of extirpating it, they are those of summer fallowing, repeated good harrowing, and burning the collected roots. What escapes these clearings should be very carefully pulled up by hand; for the common weeding-hook will not go deep enough to take out the whole of the long slender tap root of this plant, of which every remaining bit that has a knot in it will produce new shoots. The farmer should not regret this small additional expence, to get rid of one of the most fatal enemies his corn can have. Mr. Lisle observes, that a "good crop of wheat in the winter time, was so destroyed by the coming up of May-weed and poppies in the spring and summer, that it did not at last yield so much as the seed." Where proper tillage is practised, this can never be the case.

MAY-*wort*, in *Botany*. See ARTEMISIA.

MAY, THOMAS, in *Biography*, eldest son of sir Thomas May, knight, of Mayfield in Sussex, was born in 1595. He pursued his studies in Sidney college, Cambridge, where he took his degree of B.A.; after which he entered himself a member of Gray's Inn, with the view of studying the law, though he probably never pursued it as a profession. He was much attached to literature, and became acquainted with the poets and men of wit who flourished in that period. Owing to the extravagance of his father, he had only a small annuity to depend upon. Some of his first compositions were of the dramatic class, and three tragedies and two comedies are extant in his name. He translated "Virgil's Georgics," "Selected Epigrams of Martial," and "Lucan's Pharsalia," with a continuation of the poem to the death of Julius Cæsar, in seven books, of his own composition; which have been so much admired, as to be given with several of the best editions of Lucan. This has rendered his name famous among classical scholars. He was author of many original poems, such as "The Reign of Henry II.," "The victorious Reign of Edward III.," "The Description of Henry II. with a short Survey of the Changes of his Reign," and "The single and comparative Character of Henry and Richard his Sons." He was in high estimation with king Charles I., who designated him as his poet; but the monarch was not sufficiently liberal to secure the poet's attachment. He even quitted the royal party, upon the breaking out of the civil wars, and entered into the service of the parliament. He was appointed secretary to the parliament, and wrote a history of its transactions; which work became famous, and was extremely obnoxious to the royal party. Clarendon speaks with great contempt of his performance, but Granger affirms that it is a very respectable work. It was his last literary labour. He died in November 1650. His consideration with his party was shewn by a splendid public funeral in Westminster Abbey, with a marble monument and a laudatory epitaph. After the restoration, the royalists took their revenge, dug up his body, which they treated with ignominy, and tore down the monument intended to perpetuate his fame. Biog. Brit.

MAY, in *Geography*, a river of America, in South Carolina, which runs into the Atlantic, N. lat. 32° 15′. W. long. 80° 55′.—Also, a river of Chiampa, which runs into the Chinese sea, N. lat. 10° 42′. E. long. 107° 14′.—Also, a town of Persia, in the province of Farsistan; 120 miles S. of Schiras.—Also, a small island of Scotland, at the entrance of the Frith of Forth, formerly dedicated to St. Adrian, who was murdered by the Danes. On it is a lighthouse; five miles S. of Fifeness. N. lat. 56° 10′. W. long. 2° 38′.

MAY. See MAYO.

MAY, *Cape*, the most southerly point of land of New Jersey, and the N. point of the entrance into Delaware bay and river in N. lat. 39°. W. long. 74° 51′.

MAY, *Cape*, *County*, extends northward round the forementioned cape, and is a healthy, sandy tract of country, 34 miles long, and 19 broad. This county is divided into Upper, Middle, and Lower precincts. The number of inhabitants is 3066, of whom 98 are slaves.

MAY *Point*, a point of the peninsula, between Fortune and Placentia bays, on the S. side of Newfoundland island.

MAYA, a town of Spain, in Navarre; 21 miles N. of Pamplona.

MAYA, in *Metaphysics*, is a term of vague import among the Brahmans and other Hindoo philosophers. It means *illusion* or *deception*, and is variously applied in cases beyond the reach of demonstration or comprehension. For instance, although their most sacred books give the title of god to the sun, and they confess generally that the sun is an emblem or image of their three great deities, jointly and individually, that is of Brahm, or the Supreme Being, who alone exists really and absolutely, yet the *three forms*, or *trimurti*, are considered as maya, or delusion, as well as the body of the sun; but since the latter is the most glorious and active emblem of God, that luminary is respected as an object of high veneration. This is sufficiently mysterious; but it flows from the principal tenet of the Vedanti school (see VEDANTA): "That the only being which has absolute and real existence is the Divine Spirit, infinitely wise, infinitely benign, and infinitely powerful, expanded through the universe; not merely as the *soul of the world*, but as the ruler of it, sending forth rays or emanations from his own essence, which are the pure vital souls of all animated creatures, whether *moveable* or *immoveable*; or, as we should express it, both *animals* and *vegetables*, and which he calls back to himself, according to certain laws established by his unlimited wisdom." Brahm, as the Most High One, is neuter; in the character of Supreme Ruler he is named Parameswara; but, through the infinite veneration to which he is entitled, the Hindoos meditate on him with silent adoration, and offer prayers and sacrifices only to the higher emanations from him. This silent adoration is by some called Jap, (see that article,) in which description of worship the holy gayatri and the sacred monosyllable O'M is mentally recited. (See O'M.) In a mode, incomprehensible to inferior creatures, they are involved at first in the gloom of maya, and subject to various taints from attachment to worldly affections; but they can never be reunited to their source, until they dispel the illusion by self-denial, renunciation of the world, and intellectual abstraction, and have removed the impurities of their nature

by

by repentance, mortification, and successive transmigratory passages through the forms of animals or vegetables, according to their demerits. In such a reünion consists their final beatitude; and to effect it by the best possible means is the object of their supreme ruler, who, in order to reclaim the vicious, to punish the incorrigible, to protect the oppressed, to destroy the oppressor, to encourage and reward the good, and to shew all spirits the path to their ultimate happiness, has been pleased (say the Brahmans) to manifest himself in a variety of ways, from age to age, in all parts of the habitable world. When he acts immediately without assuming a shape, or sending forth a new emanation; or when a divine sound is heard from the sky, that manifestation of himself is called *Akasavani*, or an ethereal voice: when the sound proceeds from a meteor, or a flame, it is said to be *Agnipuri*, or formed of fire: a descent of the deity in the shape of a mortal, is an avatara. Of this last description there have been many; but the chief of them as detailed in the Puranas, and to which the word is generally applied, are the ten, or *dasavatara*, of Vishnu; as enumerated under the article VISHNU, and described briefly under the references therefrom. A similar incarnation of an inferior kind, intended to answer some purpose of less moment, is called *Avantara*. Of this description is that noticed under KANDEH RAO; though in common language called also *avatara*. The supreme being, and the celestial emanations from him, are *nirakara*, or bodiless, in which state they must be invisible to mortals; but when they are *pratyaksha*, or visible, they become *sakara*, or embodied, and expressive of the divine attributes; thus Krishna revealed himself to Arjun, as described in an extract from the Gita under the article KRISHNA, or in a human form, which Krishna usually bore. And in that mode of appearing, the deities are generally supposed to be born of a woman, but without any carnal intercourse. The excessive libertinism of Krishna, his sectaries declare to be apparent only; he was chaste and pure in reality; such appearances were maya, or delusion.

These doctrines, however, are by no means received by all Hindoos, though they be very popular with certain sects. A reformation of the above, called Purva mimansa, was introduced by Jaimini, who denies the incarnations of deities. See JAIMINI.

Although not particularly in its place, we will here insert four verses translated by sir William Jones from the Bhagavat, one of the Hindoo Puranas, as connecting some of their philosophical tenets. The translation we are assured is "most scrupulously literal."

"Even I was at first, not any other thing; that which exists unperceived, supreme; afterwards *I am that which is*; and he who must remain, am I.

"Except the *First Cause*, whatever may appear, and may not appear, in the mind, know that to be the mind's *maya*, or delusion, as light, as darkness.

"As the great elements are in various beings, entering, yet not entering, (that is, pervading, not destroying,) thus am I in them, yet not in them.

"Even thus far may enquiry be made by him who seeks to know the principle of mind, in union and separation, which must be *every where always*." Asiatic Ref. vol. i.

The above verses are stated to have been spoken by the supreme being to Brahma, and wild and obscure as they are, the learned translator doubts if the poetry or mythology of Greece and Italy afford conceptions more awfully magnificent; the brevity and simplicity of the Mosaic diction is, however, unrivalled.

The first of the four verses above quoted will strongly remind the reader of the inscription in a temple at Sais in Lower Egypt; see the article EGYPT; where farther traces of resemblance will be found between the theogony and philosophy of that country and of India, as exhibited in this, and the other articles connected with Hindoo mythology.

"As the soul of the world, or the pervading mind, so finely described by Virgil, we see Jove represented by several Roman poets; and with great sublimity by Lucan, in the speech of Cato concerning the Ammonian oracle: "Jupiter is wherever we look, wherever we move." This is precisely the Indian idea of Vishnu, according to the four verses above exhibited—not that the Brahmans imagine their male divinity to be the *divine essence* of the Great One, which they declare to be wholly incomprehensible; but, since the power of *pervading* created things, by a superintending providence, belongs eminently to the Godhead, they hold that power to exist transcendently in the preserving member of the Triad, whom they suppose to be *every where always*, not in substance, but in spirit and energy. Here, however I speak of the Vaishnavas, for the Saivas ascribe a sort, of pre-eminence to Siva." Jones, ib. See VAISHNAVA and SAIVA.

The accomplished writer above quoted addressed a spirited hymn to Narayana, and in the argument prefixed says, "that a complete introduction to it would be no less than a full comment on the Vedas and Puranas of the Hindoos, the remains of Egyptian and Persian theology, and the tenets of the Ionic and Italic schools: but this is not the place for so vast a disquisition. It will be sufficient here to notice, that the inextricable difficulties attending the *vulgar notion of material substances*, concerning which 'we know this only, that we nothing know,' induced many of the wisest among the ancients, and some of the most intelligent among the moderns, to believe that the whole creation was rather an *energy* than a *work*, by which the infinite Being, who is present at all times in all places, exhibits to the minds of his creatures a set of perceptions like a wonderful picture, or piece of music, always varied, yet always uniform; so that all bodies and their qualities exist, indeed, to every wise and useful purpose, but exist only as they are *perceived*: a theory no less pious than sublime, and as different from any principle of atheism as the brightest sunshine differs from the blackest night. This *illusive operation* of the Deity the Hindoo phisophers call *maya*, or *deception*." The Berkelyan theory of immaterialism seems to coincide with these doctrines. See BERKELEY.

Maya, in a more mythological view, is described as the mother of Kama, the god of love. Under this personification she represents the general *attracting* power; and some Hindoo scholars explain the word to mean the 'first inclination of the Godhead to diversify himself,' such is their phrase, 'by creating worlds.' She is thus feigned to be the mother of universal nature and of all the inferior gods. Lakshmi, the bounteous giver of all good, is also represented to be the mother of Kama, and one of her appellations is Maya, or Ada-maya, as noticed under LAKSHMI.

MAYA, in *Ornithology*, a name given by the people of the Philippine islands to a small species of sparrow, much less than our's, and very common among them. It feeds on rice, and is very destructive of it.

MAYACA, in *Botany*, a name of which no explanation is given. Aubl. Guian. 42. t. 15. Juss. 45. Lamarck Illustr. t. 36. Michaux Boreal-Amer. v. 1. 26. See SYENA; Schreb. 36. Willd. Sp. Pl. v. 1. 254.

MAYACARI, in *Geography*, a river of Guiana, which runs into the Atlantic, N. lat. 2° 11′. W. long. 51° 46′.

MAYAGUANA, one of the Bahama islands; 24 miles in length. N. lat. 22° 32′ to 22° 44′. W. long. 72° 15′ to 72° 30′.

MAYAHOUN, a town of the Birman empire, on the Irawaddy, which formerly belonged to Pegu, and was called "Loonzey" or "Lundsey." It is large, and contains many temples and convents, besides granaries filled with rice, produced in the environs, and belonging to the king; 120 miles N.N.W. of Rangoon.

MAYALS, a town of Spain, in Catalonia; 16 miles S. of Lerida.

MAYAMBA, a town of Africa, and capital of a province of the same name, in the kingdom of Loango, near the Atlantic ocean. Within its territory, which extends far eastward, is a salt lake, above 15 miles in compass, which empties itself by some rivulets into the sea, about half a league N. of cape Negro. The town stretches along the coast, but lies so low that the inhabitants are frequently under a necessity of removing at high water to some of the neighbouring high lands. The river Banna, which runs near the town, is saltish, and has at its mouth a good fishery for oysters. By means of this river, logwood is brought to the port in canoes from the province of Sette, where it abounds; the river extends 150 miles within land. The soil of Mayamba is dry and sandy, and produces little or no grain, but furnishes plenty of bananas and palm-trees, and of the latter a wine is made, and also roots of maxondo, which they use instead of bread. The lakes and rivers supply abundance of fish, on which the inhabitants chiefly subsist. The oysters are opened and smoked, and are thus preserved in an eatable state for several months. The country abounds with game, which is caught by dogs, with wooden clappers to their necks, by the noise of which they follow them, as they are not able to bark. The government of this province is commonly conferred on a counsellor of state, who is also prince of Loangiri, and gives no account to the king of Loango of any commodities, except of the logwood, which pays a duty of 10 *per cent.* The people are rude and savage, and their governor is an absolute tyrant. The commerce of elephants was formerly considerable and lucrative, but has lately been almost annihilated. S. lat. 3° 20′. E. long. 13° 4′.

MAYAPARA, the proper name of Point Palmiras; which see.

MAYAPIL, a town of Mexico, in New Biscay; 75 miles S.S.E. of Parral.

MAYAPOUR, a town of Bengal; eight miles S.W. of Palamow.—Also, a town of Bengal; 12 miles S.W. of Calcutta.

MAYAR, a town of Persia, in the province of Irak, containing about 300 houses, and a caravansera; 24 miles S. of Ispahan.

MAYASQUER, a town of South America, in the audience of Quito; 70 miles N. of Quito.

MAYBACA, a river of Guiana, which runs into the Atlantic, N. lat. 6° 40′. W. long. 58° 26′.

MAYBOLE, or MINNEBOIL, a town of Scotland, in the county of Ayr, which has manufactures of woollen and cotton. The population returned to parliament in 1791 was 3162, of whom 1626 were employed in manufactures, chiefly of blankets. At this time here were ten persons, whose ages amounted together to upwards of 900 years; 18 miles S. of Ayr.

MAYCAWINI, a river of Guiana, which runs into the Atlantic, N. lat. 6° 35′. W. long. 58° 26′.

MAYCOCK BAY, a bay on the W. coast of Barbadoes; three miles N. of Speight's town.

MAYDOOH, a town of the Birman empire; 42 miles S.W. of Monchaboo.

MAYEM, a town of Hindoostan, in Baglana; 20 miles N. of Basseen.

MAYEN, a town of France, in the department of the Rhine and Moselle, and chief place of a canton, in the district of Coblentz; 15 miles W. of Coblentz. The place contains 2200, and the canton 5358 inhabitants, in 15 communes. N. lat. 50° 26′. E. long. 7° 8′.

MAYEN'S *Island*, an island lying S.W. of Spitzbergen; formerly resorted to for the whales which frequented its coast, but now forsaken, as these fishes have removed farther north. A very high mountain, called Beerenbergen, or Bear mountain, extends quite across the island, which may be seen from the sea, at the distance of 30 miles. This island has many good bays, and the land abounding with deer, and the coast with fish, render it habitable; but the floats of ice, towards the E. especially, make it inaccessible in spring. N. lat. 71° 13′.

MAYENCE. See MENTZ.

MAYENNE, CHARLES *of Lorraine, Duke of*, in *Biography*, second son of Francis of Lorraine, duke of Guise, was born in 1554. He displayed great courage at the sieges of Poictiers and Rochelle, and at the battle of Montcontour. He also defeated the Protestants in Guienne, Dauphiny, and Saintonge. When his brothers were killed at the meeting of the states at Blois, he declared himself head of the league, and assumed the title of lieutenant-general of France. He proclaimed the cardinal of Bourbon king, by the name of Charles X.; but was defeated by Henry IV. at the battle of Arques, and again at Ivry. In 1599 he was reconciled to the king, who made him governor of the Isle of France. He died in 1611. Moreri.

MAYENNE, in *Geography*, a town of France, and capital of a department of the same name, and principal place of a district, near the river Mayenne, defended by a castle on a rock: the river rises near Linieres in the department of the Charente, and passing by Ambrieres, Mayenne, Laval, &c. joins the Sarthe, about three miles N. from Angers, and forms the Mayne, which joins the Loire, about four miles below. The town contains 7575 inhabitants; one of its cantons contains 14,834, on a territory of 162½ kiliometres, in eight communes, and the other contains 14,946 inhabitants, on a territory of 200 kiliometres, in twelve communes.

MAYENNE, one of the nine departments of the N.W. region of France, formerly Lower Maine, lies in N. lat. 48° 15′, and is bounded on the N. by the departments of the Channel and the Orne, on the E. by the department of the Sarthe, on the S. by the Mayne and Loire, and on the W. by that of the Ille and Vilaine. Its length is about 22 French leagues, and breadth 16; its extent is 5452½ kiliometres, or about 266 square leagues, and the number of its inhabitants is computed at 328,397. It is divided into three circles, 27 cantons, and 288 communes. Its circles are Mayenne, including 157,256 inhabitants in 116 communes; Laval, containing 106,141 inhabitants in 93 communes; and Chateau-Gontheir, having 65,000 inhabitants in 79 communes. According to M. Hassenfratz, this department comprehends seven circles, 68 cantons, and 323,607 inhabitants. Its contributions in the 11th year of the French era amounted to 3,111,618 fr., and its expences for administration, justice, and public instruction, were 234,804 fr. Its capital is Laval. A great proportion of this department is hilly and covered with forests; it has many sandy tracts, and few cultivated plains. The borders of the rivers Sarthe and Mayenne yield some grain, fruits, and pastures in abundance.

Here

Here are mines of iron, quarries of marble and ſtone, mineral ſprings, &c.

MAYENNE, or MAYNE, *and Loire*, ſo called from the union of two rivers, formerly Anjou, is one of the nine departments of the weſtern region of France, lying in N. lat. 47° 20′, and bounded on the N. by the departments of the Mayenne and Sarthe; on the E. by the department of the Indre and Loire; on the S. by the departments of the Vendée, the Two Sevres, and the Vienne; and on the W. by the department of the Lower Loire. Its length is 26 French leagues, and breadth 21 leagues; and its territorial extent is 7637½ kiliometres, or about 370 ſquare leagues; and its number of inhabitants is 376,033. It is divided into five circles or diſtricts, 34 cantons, and 385 communes. The circles are Segré, comprehending 58,176 inhabitants in 77 communes; Baugé, including 60,669 in 61 communes; Saumur, having 90,104 in 115 communes; Beaupreau, with 74,650 in 73 communes; and Angers, having 92,434 in 59 communes. According to M. Haſſenfratz, the circles are eight, the cantons 99, and the number of inhabitants 445,500. Its contributions in the 11th year of the French era amounted to 4,182,024 fr. and its expences for adminiſtration, juſtice, and public inſtruction, were 348,331 fr. 99 cents. Its capital is Angers. This department, diverſified with hills and plains, yields grain, flax, hemp, fruits, abundant paſtures, conſiderable foreſts, mines of coal, &c. and quarries of marble, ſtone, and ſlate.

MAYEPEA, in *Botany*. See CERANTHUS, and CHIONANTHUS *Incraſſata*. Notwithſtanding the doubts of our learned predeceſſor in the place laſt cited, we are convinced that this genus of Aublet and Schreber is rightly referred by Swartz and Vahl to *Chionanthus*, and that Juſſieu was widely miſtaken in ranking it among his *Rhamni*.

MAYER, JOHN FREDERIC, in *Biography*, a learned German divine in the ſeventeenth century, was born at Leipſic in 1650; he acquired a profound knowledge of the ancient languages, and became profeſſor at ſeveral of the univerſities of his country. He died in 1712 with a high character for learning. He was author of "Bibliotheca Biblica," which treats of the moſt celebrated commentators of the ſcriptures; a treatiſe "On the beſt Method of ſtudying the Sacred Scriptures;" "The Hiſtory of Martin Luther's German Verſion of the Bible, with a ſhort Account of the Tranſlations of the Sacred Books before his Time;" and other pieces. Moreri.

MAYER, TOBIAS, a German aſtronomer and mechanician, was born at Marpach, in Wirtemburg, in the year 1723. At the very early age of four years he ſhewed a ſtrong attachment to the mechanical arts, and actually began to deſign and conſtruct little machines with dexterity and accuracy. His father was a civil engineer, and encouraged him in his purſuits; but upon his death the ſon was left almoſt deſtitute, and was obliged to depend on his own energies for future ſupport. By theſe he made himſelf acquainted with mathematical learning, and qualified himſelf in a ſhort period to be an able inſtructor of others. He acquired, at the ſame time, a conſiderable ſhare of claſſical knowledge, ſo as to be able to write the Latin tongue with elegance. At the age of twenty-eight, he was nominated mathematical profeſſor at the univerſity of Gottingen, and ſoon after was admitted a member of the Royal Society in that town. From this time every year of his life was diſtinguiſhed by diſcoveries in geometry or aſtronomy. He invented many uſeful inſtruments for the meaſurement of angles: he applied himſelf to ſtudy the theory of the moon: he extended his obſervations to the planet Mars, and the fixed ſtars, determining the places of the latter, and aſcertaining that they poſſeſs a certain degree of motion relative to their reſpective ſyſtems. Towards the cloſe of his ſhort life the magnetic needle engaged his attention, to which he aſſigned more certain laws than thoſe before received. To all his purſuits he applied with ſuch indefatigable aſſiduity, that he died literally worn out with labour in 1762, at the age of thirty-nine. The principal works which he gave to the public were, "A New and General Method of reſolving all geometrical Problems, by means of geometrical Lines;" "A mathematical Atlas, in which all the mathematical Sciences are compriſed in ſixty Tables;" "A Deſcription of a Lunar Globe, conſtructed by the Coſmographical Society of Nuremberg, from New Obſervations;" "Maps;" and ſeveral valuable papers in the Memoirs of the Royal Society of Gottingen. His table of refractions, deduced from aſtronomical obſervations, agrees with that of Dr. Bradley; and his theory of the moon, and aſtronomical tables and precepts, were ſo well received, that they were rewarded by the Engliſh Board of Longitude with the premium of three thouſand pounds, which ſum was paid to his widow after his deceaſe. Theſe tables and precepts were publiſhed in 1770.

MAYERGA, in *Geography*, a town of Spain, in the province of Leon; 23 miles S S.E. of Leon.

MAYERNE, *Sir* THEODORE TURQUET DE, BARON D'AUBONNE, in *Biography*, an eminent phyſician, was born at Geneva in the year 1573. His father, Lewis de Mayerne, author of "A General Hiſtory of Spain," and of "The Monarchie ariſto-democratique," and a Calviniſt, had removed thither the preceding year, on account of religious perſecution, from Lyons. After being inſtructed in the rudiments of literature in his native city, Theodore was ſent to the univerſity of Heidelberg, where he remained ſome years; after which, as he had made choice of the profeſſion of medicine, he removed to Montpellier, where he received the degree of doctor in 1597. He then went to Paris, where he became acquainted with Riverius, firſt phyſician to king Henry IV., through whoſe influence he was, in the year 1600, appointed to attend the duke de Rohan, as phyſician, in his embaſſy to the diet at Spire; and alſo nominated one of the phyſicians in ordinary to the king. On his return, he availed himſelf of the privilege which the latter office afforded him, and practiſed in the metropolis, where he alſo gave public lectures in anatomy and in pharmacy to the young ſurgeons and apothecaries. The latter of theſe ſubjects led him to treat of chemiſtry, to the practice of which he had paid peculiar attention; and his recommendation of chemical remedies drew upon him a conſiderable degree of enmity from the faculty of Paris, who manifeſted their attachment to Galen, by an indiſcriminate abuſe of all who ventured to employ any mode of treatment not mentioned in his works. Quercetanus was joined with Mayerne in this attack; and one of the faculty, in 1603, publiſhed a book againſt theſe heterodox brethren, entitled "Apologia pro Hippocratis et Galeni Medicina, contra Mayernium et Quercetanum." To this Mayerne replied immediately in another "Apologia, in qua videre eſt, inviolatis Hippocratis et Galeni legibus, Remedia chemicè præparata tutò uſurpari poſſe," in which he made ſome ſevere ſtrictures on the Pariſian phyſicians. The Galeniſts, however, not only replied, but proceeded to iſſue a decree of the faculty againſt conſulting with him, conceived in very bitter and abuſive terms. But the eſteem of Henry IV., which he had fully obtained, ſo far ſupported him, that he continued to practiſe in Paris, and would have been appointed firſt phyſician to the king, provided he would have embraced the Catholic religion. Even in ſpite of his unyielding adherence to Proteſtantiſm, the king would have given him that appointment, had not the Jeſuits influenced queen Mary de Medicis to interpoſe and prevent it. In 1607, an Engliſhman of rank, who had been his patient, carried him over to England, and introduced him to the royal family. He returned to Paris, and remained there till after the aſſaſſination of Henry IV., which took place in May, 1610. In the following year, he received an expreſs invitation from king James I. to come and take the office of his firſt phyſician, which he accepted, and paſſed the reſt of his life in England, where he appears to have been conſidered as the firſt perſon in the profeſſion. He was admitted to the degree of doctor in both univerſities, and into the College of Phyſicians, and treated with the greateſt reſpect by theſe learned bodies. He incurred ſome obloquy on account of the fatal ſickneſs of Henry prince of Wales, in October 1612; in the treatment of which he differed in opinion from the other phyſicians, with reſpect to the uſe of blood-letting. But his conduct obtained the approbation of the king and council, of which certificates, couched in the moſt ſatisfactory terms, were given him. He received the honour of knighthood from James, in 1624; and on the acceſſion of Charles I. he was appointed firſt phyſician to him and his queen, and roſe to high favour, particularly with the latter. During the civil commotions he ſtill adhered to the royal party, for he was appointed firſt phyſician to Charles II. after the death of his father, although the office was now merely nominal. Thus he enjoyed the extraordinary honour of ſerving four kings ſucceſſively in his medical capacity; and during all this period he was moſt extenſively employed by perſons of the firſt rank in this kingdom, by which he accumulated a large fortune. He died at Chelſea, March 15, 1655, in the eighty-ſecond year of his age, and was buried in the church of St. Martin's-in-the-Fields. Sir Theodore was twice married; but left only one daughter, who was married to the marquis de Cugnac, grandſon of marſhal de la Force. He bequeathed his library to the College of Phyſicians.

The only work which ſir Theodore Mayerne publiſhed himſelf, was the "Apologia," before-mentioned. But in Germany a letter of his was printed in 1619, "De Gonorrheæ inveteratæ, et Carunculæ et Ulceris in meatu urinario curatione ad Geo. Mat. Koningium." After his death were publiſhed "Medical Counſels and Advices," and "A Treatiſe on the Gout," which had been written in French, tranſlated into Latin by Theoph. Bonetus, and thence into Engliſh by Dr. Thomas Sherley, in 1676. Alſo, "Praxeos Mayernianæ in Morbis internis gravioribus et chronicis Syntagma," publiſhed in 1690, by his godſon, ſir Theodore de Vaux, who alſo communicated to the Royal Society, in 1687, "Mayerne's Account of the Diſeaſes of Dogs, with ſeveral Receipts for Canine Madneſs," printed in the Philoſophical Tranſactions for that year. "Tractatus de cura Gravidarum," added to an edition of the "Praxis." Moſt of theſe were included in Dr. Joſeph Browne's publication, entitled "Mayernii Opera Medica, complectentia Conſilia, Epiſtolas, et Obſervationes, Pharmacopeiam variaſque Medicamentorum formulas," folio, 1701. The firſt book in this volume conſiſts of medical caſes treated by the author, to moſt of which the names of the patients are prefixed, who are in general perſons of the firſt quality in France and England. They comprehend a ſeries from 1605 to 1640. The deſcriptions are generally diſtinct, minute, and judicious, and the reaſonings, though commonly founded upon the erroneous doctrines of that time, are yet acute and learned. His preſcriptions are moſtly of the compound form of the Galenical ſchool; yet his Pharmacopeia exhibits a number of chemical preparations, and he, doubtleſs, contributed much to their introduction. Nor did he confine his chemical knowledge to medicinal ſubjects; for he is ſaid to have diſcovered, by a courſe of experiments, the principal colours to be uſed in enamelling, and to have communicated them to Petitot, the famous painter in that branch. He was, likewiſe, converſant with natural hiſtory, and edited Mouffet's poſthumous "Theatrum Inſectorum." Aikin's Biog. Memoirs of Med. Gen. Biog.

MAYET, in *Geography*, a town of France, in the department of the Sarthe, and chief place of a canton, in the diſtrict of La Flèche; 15 miles S. of Le Mans. The place contains 3165, and the canton 10,049 inhabitants, on a territory of 210 kiliometres, in ſeven communes.

MAYET-*de-Montagne, Le*, a town of France, in the department of the Allier, and chief place of a canton, in the diſtrict of La Paliſſe; 10 miles S.E. of Cuſſet. The place contains 3945, and the canton 14,443 inhabitants, on a territory of 180 kiliometres, in 12 communes.

MAYETA, in *Botany*, Aubl. Guian. 443. t. 176. Juſſ. 330; is *Melaſtoma Maieta*, Lamarck Dict. v. 4. 34. Willd. Sp. Pl. v. 2. 589. See MELASTOMA.

MAYFIELD, in *Geography*, a townſhip of America, in Montgomery county, New York, incorporated in 1793, and containing 876 inhabitants.

MAYHEM. See MAHIM.

MAYHEM, *Appeal of*. See APPEAL.

MAYL, in *Falconry*, ſignifies to pinion the wings of a hawk.

MAYLLO, in *Geography*, a town of Spain, in the province of Leon; 14 miles E.S.E. of Ciudad Rodrigo.

MAYNA, in *Botany*, (why ſo called does not appear,) Aubl. Guian. 921. t. 352, a diœcious ſhrub, of which the male only was obſerved in Cayenne by Aublet. He deſcribes it by the name of *M. odorata*, as having ſeveral upright, ſimple, flexible, brittle *ſtems*, about ſix feet high. *Leaves* alternate, ſtalked, ten inches long, and three wide, lanceolate inclining to obovate, pointed, entire, ſomewhat wavy, of a fine ſhining green, and a firm texture, with a prominent rib and numerous veins beneath. *Stipulas* lanceolate, deciduous. *Flowers* axillary, ſeveral together, on ſhort ſtalks, white, and very agreeably ſcented, produced in the month of December. The *calyx* is in three deep concave ſegments, externally hairy. *Petals* eight, roundiſh, with ſhort erect claws. *Stamens* 28 or 30, diſpoſed upon a conical receptacle; their filaments ſhort, anthers long and quadrangular, opening at the top. Aublet could find no traces of a piſtil, nor could he diſcover the female plant, though he carefully ſought for it. Juſſieu has juſtly referred this genus to his order of *Magnoliæ;* ſee that article.

MAYNARD, FRANCIS, in *Biography*, a French poet, born in 1582, was ſon of a counſellor in the parliament of Toulouſe. He was introduced, while very young, to court, and was appointed ſecretary to queen Margaret. In 1634, the duke de Noailles, being appointed ambaſſador to the court of Rome, took Maynard with him. He was member of the French Academy from its firſt inſtitution, and endeavoured to ingratiate himſelf with the cardinal Richelieu, but failing in his object, he gave him the appellation of tyrant, and wrote ſatires upon him. At length, weary in the purſuit of fortune, he retired to his native province, where he died in 1646, at the age of ſixty-four. His works conſiſt of Songs, Epigrams, Odes, Miſcellaneous Poems, and Letters in proſe. They muſt be read with caution, for though eſteemed as a man of honour and a ſincere friend, his principles were very licentious. Moreri.

MAYNARD,

MAYNARD, *Sir* JOHN, an eminent English lawyer, who diftinguifhed himfelf by his patriotifm, as well as his knowledge of jurifprudence, and integrity in his profeffion. When the prince of Orange was declared king after the abdication of James II., fir John waited upon the new monarch with an addrefs; and William having obferved to him that from his age he muft have outlived moft of the judges and eminent lawyers of his ftanding; he replied, "and I fhould have outlived the law too had it not been for the arrival of your majefty." He died in 1690, aged 88. Biog. Brit.

MAYNAS, in *Geography*, a government of South America, in the eaftern limit of the audience of Quito, lying contiguous to thofe of Quixos and Jaen de Bracamoros towards the eaft. In the territories of this jurifdiction are the fources of thofe rivers, which form by their conflux the Maranon. The ftreams of thefe rivers environ and pervade the government of Maynas. Its limits, both towards the N. and S., are little known. Eaftward it joins the poffeffions of the Portuguefe, from which it is feparated by the line of demarcation that forms a boundary between the Spanifh and Portuguefe poffeffions. Santiago de la Laguna, which is the refidence of the governor, is properly the capital of Maynas; though San Francifco de Borja has been ufually confidered as fuch. (See COCAMA.) The miffionary villages of this jurifdiction are numerous; and they trade with each other, and alfo with Quito and Lamas, in falted fifh, chocolate, of which the arroba (25 lbs.) is fold for two rials, wax, yuca, and vegetable candles, called by the natives "paltas," being the fruit of a tree, which, when lighted, prefents at once wax and wick. Whether this tree be the "croton febifera" of Linnæus has not been afcertained. There are alfo fome poor manufactures, chiefly cloaks and hats, made of the rich plumage of the birds, with which they are formed after any pattern. The manners and cuftoms of the inhabitants of Maynas differ little from the other nations of the Pampas del Sacramento, except where they are tinged with a faint dye of Chriftianity.

MAYNBERNHEIM, a town of Germany, in the margraviate of Anfpach, near the Maine; 12 miles S.E. of Wurzburg.

MAYNE. See MAYENNE.

MAYNE, a river of Ireland, in the county of Antrim, which, rifing towards the centre of the county, flows into lough Neagh, a little below Randalftown.

MAYNOOTH, a poft-town of Ireland, in the county of Kildare, and province of Leinfter. In this town is the Royal College of St. Patrick, for the education of perfons profeffing the Roman Catholic religion, inftituted by act of parliament in the year 1795. The building confifts of lodging-rooms, fchools, a church, library, hall, and different offices fuitable to the accommodation of 200 ecclefiaftical ftudents, befides profeffors, officers, and fervants. There is alfo a Lay College, eftablifhed by private fubfcription in 1802. When the evils attendant on a foreign education, efpecially under the circumftances in which the Roman Catholic clergy of Ireland were educated, at the expence of foreign powers, are confidered, it muft be admitted to have been a wife ftep in the parliament of Ireland to provide a place of education for them at home; and it is furprifing that the expence thus incurred fhould ever be objected to by Proteftants. The queftion is not, whether the tenets of popery are deferving of fupport? but whether the population of Ireland is to be fupplied with priefts educated at the expence, and of courfe attached to the intereft, of foreign powers, or fupplied with them from a college fupported at the national expence? Maynooth had formerly a college, founded in 1518 by an earl of Kildare, whofe defcendent, the duke of Leinfter, has a princely refidence in the neighbourhood. It has alfo a charter-fchool for fifty girls. Maynooth is 12 miles W. by N. from Dublin.

MAYO, a county of Ireland, in the province of Connaught, the third in fize, but one of the leaft populous in proportion to its extent. It is bounded on the N. and W. by the Atlantic ocean, on the E. by Sligo and Rofcommon, and on the S. by Galway. Its length, from N. to S., is 49 Irifh or 62 Englifh miles; and its breadth 45 Irifh or 57 Englifh miles. It contains 790,600 acres, or 1235 fquare miles Irifh, equal to 1,270,144 acres, or 1984 fquare miles Englifh. Its population was eftimated, when Dr. Beaufort wrote, at 140 000, but there muft have been fince that time a confiderable increafe in this as well as every other county. There are 68 parifhes, but thefe are combined into eighteen benefices, having about as many churches, which would be a dreadful grievance, if the great mafs of the people were not Roman Catholics. The foil of the county of Mayo varies prodigioufly, from the bleak and rugged mountain to the fertile and chearful plain. The eaftern and fouthern parts are arable and champaign, and though not arrived at a high degree of cultivation, they produce a fufficiency of corn and flax for home confumption, and fupply other counties with abundance of fat and ftore cattle. In the mountainous diftrict of Burrifhoole there are fome fruitful grounds along the coaft and in the vallies. But a large extent in the N.W. is overfpread with an immenfe mafs of uninhabited mountains, and tractlefs bogs without roads, and very difficult of accefs to the few farmers and fifhermen who dwell upon the coaft, and to the inhabitants of the Mullet; a peninfula, which is faid to be fertile, pleafant, and well inhabited. Among the mountains in the S.W. Croagh-Patrick claims the pre-eminence, the conic fummit of which is diftinguifhed at a vaft diftance rifing 2666 feet above the level of the fea, and being by fome efteemed the higheft mountain in Ireland, but others confider the Recks in Kerry to furpafs it. On the top of Croagh-Patrick is a very large and remarkable cairn. M'Nephin, though little inferior to it in height and fublimity, being 2640 feet high, is of a very different character, for it ftands almoft infulated, and appears rounded on all fides, and at top like a huge rath or barrow. There are, in the flat country that borders upon the lakes of Mafk and Carrah, many miles of rocky ground, which, at a diftance, appear like one immenfe fheet of white ftone. But upon a nearer infpection of thefe fingular rocks, they are perceived to ftand in parallel lines, from one to three feet above the furface, like flag-ftones pitched in the ground upon their edges; and however they may vary in fhape, fize, and diftance, they are all calcareous, and have all the fame direction. Fiffures of a great depth are found in fome of the narroweft interftices; but, in general, the verdure between them is beautiful, and the pafture excellent for fheep. Large caverns and fubterraneous waters are alfo frequent in this part of the country, efpecially near Cong. At the back of that fmall village, a very broad river rufhes at once from beneath a gently-floping bank, and after a rapid courfe of about a mile, lofes itfelf in lough Corrib. It is fuppofed to be the outlet of a fubterraneous channel, through which the fuperfluous waters of lough Mafk and lough Carra are difcharged into Corrib. This rocky part of Mayo abounds alfo with *turlachs*, as they are called in Irifh. Thefe are plains, fome of them very extenfive, which having no vifible communication with any brooks or rivers, in the winter are covered with water, and become in the fummer a rich and firm pafture, the waters rifing and retiring through

rocky

rocky clefts in the bottoms. There are many fine lakes in this county. Lough Conn, at the foot of M'Nephin, is nine miles long; lough Mask is longer by two miles, and considerably broader. There are some fine harbours, and many islands, the most remarkable of which are noticed in distinct articles. Castlebar is the county town. The only members of parliament returned from this county are the two knights of the shire. Beaufort's Memoir.

MAYO, or *May*, one of the Cape de Verd islands, about 21 miles in circumference, of an oval form, with a variety of rocks and points projecting into the sea. Its elevation above the sea is considerable; nevertheless its surface is level and plain, if we except two mountains of considerable height. The shore, according to the description of Dampier, presents sandy bays between the promontories, which afford good anchorage. On the W. side of the island, are a bay of this kind, where ships drop anchor, and a sand bank, forty paces wide, and extending nearly three miles along the shore, within which is a large salt pond, two miles long, and half a mile broad, from the N. end of which salt is obtained in the whole dry season, that is, from November to the month of May. The soil of the island is dry, with little moisture from rivulets or springs, its humidity being occasioned by the nightly dews, or the showers that fall in the wet season. In the whole island there is only one spring, near its centre, the water of which runs off in a small stream through a valley confined by the hills. The island of course must be in a very considerable degree barren and unproductive. It has three small towns, which contain all the inhabitants of the island. The chief fruits are figs, water-melons, citrons and oranges of a very indifferent quality, and pumpions, which, together with calwanas, a sort of bean, furnish the natives with their ordinary diet. The sea supplies great variety and plenty of fish. The number of inhabitants is estimated at 7000. N. lat 15° 10′. W. long. 23° 8′.

MAYO, a river of New Mexico, which runs into the gulf of California, N. lat. 27° 40′.—Also, a town of South America, in the government of Caraccas; 35 miles W. of Caraccas.—Also, a province of New Mexico, bounded on the N. by the province of Hisqui, on the E. by New Biscay, on the S. by Cinaloa, and on the W. by the gulf of California.

MAYOBAMBA, a town of Peru, in the diocese of Truxillo. S. lat. 6° 58′.

MAYOMBA, or JAMBO, a town of Africa, in Loango, on the coast. S. lat. 3° 45′. E. long. 10° 24′.

MAYOMBO, a town of Congo; eight miles S.S.W. of Bombi.

MAYOR, a small island in the South Pacific ocean, near the coast of New Zealand. S. lat. 36° 57′. E. long. 183° 31′. Near this is a cluster of small islands and rocks, to which Cook gave the name of "The Court of Aldermen."

MAYOR, *Cape*, a cape on the N. coast of Spain. N. lat. 43° 29′. W. long. 3° 46′.

MAYOR, or *Maior*, the chief magistrate or governor in the cities, and most corporation towns of England; chosen annually by his peers out of the number of the aldermen. See ALDERMAN.

The word, according to Verstegan, comes from the ancient English *maier, able, potent*, of the verb *may*, or *can*. The mayor of the place is the king's lieutenant, and, with the aldermen and common-council, can make laws, called *bye-laws*, for the government of the place. He has also the authority of a kind of judge, to determine matters, and to mitigate the rigour of the law.

King Richard I., A.D. 1189, first changed the bailiffs of London into mayors; by whose example others were afterwards appointed. See LONDON.

Mayors of corporations are justices of peace *pro tempore*, and they are mentioned in several statutes; but no person shall bear any office of magistracy concerning the government of any town, corporation, &c. that hath not received the sacrament, according to the church of England, within one year before his election; and who shall not take the oaths of supremacy, &c. stat. 13 Car. II. cap. i.

MAYOR'*s-Court*. See COURT.

MAYORGA, in *Geography*, a town of Portugal, in Estramadura, on the W. coast, near the Atlantic; 50 miles N. of Lisbon.—Also, a cluster of small islands in the South Pacific ocean, discovered in 1780 by don Francisco Antonio Maurelle. S. lat. 18° 38′. E. long. 179° 52′.

MAYORGA *Island*. See MAJORCA.

MAYOTTA, the most southerly of the Comorra islands, about 240 miles from the coast of Africa, and 150 from the island of Madagascar. Although this island is cold, low, and damp, and not inhabited near the coast, it abounds with provisions and fruits. S. lat. 13°. E. long. 45° 16′.

MAYOW, JOHN, in *Biography*, an ingenious physician and physiologist, was born in Cornwall in 1645. He was educated at Oxford, where he became a probationer fellow of All-Souls' college, having first been entered a student of Wadham. He took a degree in civil law, but afterwards studied medicine, and entered upon the practice of that profession. He seems to have resided chiefly at Bath; but died at the house of an apothecary in York-street, Covent-garden, in the year 1679.

These are all the brief memoirs that are recorded of a man, who went before his age in his views of chemical physiology, and in some measure anticipated, darkly and imperfectly it is true, some of the most remarkable discoveries in pneumatic chemistry, which the present age has produced. He published at Oxford, in 1699, "Tractatus duo, quorum prior agit de Respiratione, alter de Rachitide." These were afterwards reprinted, in 1674, with three additional dissertations, under the title of "Tractatus quinque Physico-Medici, quorum primus agit de Sale Nitro, et Spiritu Nitro-äereo, secundus de Respiratione, tertius de Respiratione fœtûs in utero et ovo, quartus de motu musculari et spiritibus animalibus, ultimus de Rachitide." It is from the first of these treatises, on nitre and nitro-aërial spirit, that Mayow derives his claim to the originality of discovery just alluded to. His nitro-aërial or igneo-aërial spirit, the existence of which he proves by many ingenious and decisive experiments, is a constituent part of the atmospherical air, and the food of life and flame, and is the same with the oxygen, or vital air, of the modern chemists, which has become so important an object in chemical philosophy. His speculations about it are indeed mixed with much of the absurd hypothesis of the times; but some of his ideas relative to its agency nearly accord with the more recent doctrines; especially that of its absorption by the blood in the lungs, during respiration, and the production of animal heat by its means. He also anticipated the mode of operating with aërial fluids, in vessels inverted over water, and the method of transferring them from one vessel to another, under this fluid. In a word, had he lived at a later period, and possessed the lights of his successors, he would in all probability have been a distinguished improver of his science and profession. His theory of the nitro-aërial spirit runs through all his hypotheses, and he regards it as the cause of muscular motion and of the nervous energy; in which respect, he still more nearly approached some of our own contemporaries in his views of this spirit,

ſpirit. Dr. Beddoes republiſhed his chemical tracts in 1790, with a view of ſhewing his claim to ſome ſhare of the credit which has been awarded to modern diſcoverers. Gen. Biog. Eloy.

MAYPO, in *Geography*, a river of Chili, which runs into the Pacific ocean, N. lat. 33° 26′.

MAYRI, a town of Cuba; 25 miles S. of Havanna.

MAYS, in *Botany*. See ZEA. This name, which we uſually write Maize, ſeems to be an Indian word, and was introduced along with the plant which bears it, otherwiſe called Indian wheat, at the very earlieſt period of the introduction of exotic plants into Europe. Maize appears, by Turner's herbal, to have been cultivated here in 1562, and was probably brought much earlier from the eaſt.

MAYSVILLE, in *Geography*, a poſt-town of America, in Maſon county, Kentucky; 484 miles from Waſhington.

MAYTENUS, in *Botany*, a barbarous word, formed of the Chili name *Maiten*. Molin. Chil. 152. Vahl. Enum. v. 1. 304. Juſſ. 449.—Claſs and order, *Diandria Monogynia*. Nat. Ord. *Jaſmineæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, very ſmall, of one leaf, five-lobed. *Cor.* of one petal, bell-ſhaped, undivided. *Stam.* Filaments two, inſerted into the corolla; anthers .... *Piſt.* Germen ſuperior, roundiſh; ſtyle undivided; ſtigma ſimple. *Peric.* Capſule ſmall, ovate, compreſſed, of two cells and two valves, burſting at the edges, the partitions continued half way along the middle of the valves, which are at length reflexed. *Seeds* ſolitary, ovate-oblong, attached to the bottom of each cell; embryo flat, in a fleſhy albumen.

Eff. Ch. Calyx five-lobed. Corolla bell-ſhaped, undivided. Capſule ſuperior, compreſſed, of two cells and two valves. Seeds ſolitary.

1. M. *boaria*. (Maiten; Feuill. Chil. v. 3. 39. t. 27.) Native of Chili. A *ſhrub* or ſmall *tree*, with the habit of a *Phillyrea*. About twenty feet high, much branched. *Leaves* ſometimes oppoſite, ſometimes alternate, evergreen, nearly ſeſſile, elliptical, acute, ſerrated, ſmooth; dark green above, brighter beneath; with a prominent rib, and ſeveral veins. The *flowers*, which Feuillée did not meet with, are deſcribed by Juſſieu as ſcattered. The laſt-mentioned author ſays one cell of the fruit, with its ſeed, is frequently abortive. He errs in ſuppoſing the genus akin to Forſter's *Bankſia*, which is the *Pimelea* of later writers, and belongs to the order of *Thymelææ*.

"The *Maiten*," ſays Feuillée, "is the counter-poiſon of the *Llithi*," (Feuill. Chil. v. 3. 33. t. 23, a plant whoſe claſs and genus are unknown to us), "the meer ſhade of which cauſes ſuch ſwellings as to deform the human body. In caſe of ſimilar accidents, a decoction of the branches of the *Maiten*, uſed as a fomentation to the parts afflicted, is the moſt ſpeedy cure."

MAYTO, in *Geography*, a town of Mexico, in the province of Xaliſco; 50 miles W.N.W. of Purification.

MAYTZ, a town of Pruſſia, in the province of Bartenland; 18 miles S. of Raſtenburg.

MAYZE, CAPE, or *Cape Maizo*, the eaſtern point of the iſland of Cuba. N. lat. 20° 18′. W. long. 74° 10′.

MAZA, a name given by the ancients to a ſort of food, in common uſe among the poorer ſort of people. It is made of the meal of parched barley, ſprinkled with ſome liquid, and was eaten with honey, or with defrutum.

Hippocrates every where ſpeaks of this as of a coarſe kind of bread, and adviſes the changing the common finer bread, in the ſpring ſeaſon, for this coarſer kind, as a thing very conducive to health. He ſeems every where to conſider bread as the drier, and maza the moiſter diet.

MAZA, Μάζα, among the Athenians, a ſort of cake, which was the common fare of ſuch as were entertained at the public expence in the common-hall, or *prytaneum*.

Theſe cakes were made with flour boiled with water and oil. Pitiſc. Lex. Ant. in voc.

MAZACA, in *Ancient Geography*, a town of Cappadocia, in the prefecture of Cilicia, called alſo Maza, and ſurnamed Cæſarea. Strabo gives it the title of metropolis of Cappadocia, ſurnamed Euſebia, and places it on mount Argæus.

MAZAGAN, in *Geography*, a town of Africa, in the empire of Morocco; 4 leagues S. Azamore, built by the Portugueſe in 1506, and named by them "Caſtillo Real." Under the walls of this town a dock has been made, which will admit ſmall veſſels; but large ſhips are obliged to anchor two leagues out at ſea, on account of the cape of Azamore, which ſtretches to the W., and which it would be difficult to double, if a S.W. wind ſhould drive them from their anchors. This town remained in the poſſeſſion of the Portugueſe till the year 1769, when the emperor of Morocco laid ſiege to it juſt as it was about to be abandoned by its former maſters. It is at preſent entirely ruined, and almoſt uninhabited. At a little diſtance to the S.W. of Mazagan is an old tower, called Boriſha, whence is derived the name of Bridja, which the Moors confound with that of Mazagan; 61 miles N. of Morocco. N. lat. 32° 54′. W. long. 8° 46′. Chenier's State of Morocco, vol. i.

MAZALIG, a town of Africa, in the country of Sugulmeſſa; 50 miles N.E. of Sugulmeſſa.

MAZAMET, a town of France, in the department of the Tarn, and chief place of a canton, in the diſtrict of Caſtres; 9 miles S.E. of Caſtres. The place contains 5474, and the canton 12,410 inhabitants, on a territory of $257\frac{1}{2}$ kiliometres, in 11 communes.

MAZANDERAN, or MAZENDRAN, a province of Perſia, ſituated along the ſouthern coaſt of the Caſpian ſea, and bounded on the E. by Khoraſan, encircled on the S. by a lofty branch of the Caucaſian chain, which was the ſeat of the Mardi of antiquity, and on the W. by Ghilan. The ſouthern part is mountainous, and nearly deſert, interſperſed with ſome pleaſant vallies, and enjoying a ſalubrious air: this part is called Taberiſtan. Towards the north this province is extremely fertile, inſomuch that it is called the "Garden of Perſia," and from September to April, the whole country appears like a vaſt parterre of flowers. The chief productions are ſilk, far inferior to that of Ghilan, rice and cotton, of which articles there is a large exportation. The cotton the inhabitants dye and manufacture. The province alſo affords ſugar, excellent fruit, eſpecially raiſins, of ſome of which they make wine, but the greateſt part is dried for ſale, corn, and ſalt. Among the animals are tygers, deer, ſheep, goats, &c. Mazanderan is well ſituated for trade on the Caſpian ſea; but the coaſts are much infeſted by pirates. The capital is Fahrabad, or *Farabat*, which ſee. This province, and alſo thoſe of Shirvan, Ghilan, and *Aſtrabad*, (which ſee,) are much affected by the unſettled ſtate of Perſia, and the civil wars which continue to haraſs that divided empire. On the death of Kerim Khan, the ſucceſſor of Nadir Shah, in 1779, Perſia became expoſed to all the horrors of a diſputed ſucceſſion, and was divided between the two principal competitors. Akau Mahomed Khan, a Perſian of high diſtinction, was caſtrated in his infancy by order of Nadir Shah, but poſſeſſing great civil and military talents, he became maſter, in 1788, of Mazanderan and Ghilan, as well

as

as the cities of Iſpahan and Tauris. Jaafar Khan, nephew of Kerim Khan, was at that period ſovereign of Shirauz, the capital, and of the ſouthern provinces. In general, however, theſe provinces are governed by their own khans, who, though tributary to the ſophy, render themſelves occaſionally independent; and as they are continually at war with each other, their governments are almoſt always the ſeat of hoſtility, rapine, and devaſtation; and the trade flouriſhes or declines in proportion as the exactions of the ſovereigns are more or leſs frequent and exorbitant.

MAZANO, a town of Italy, in the Veroneſe; 8 miles N. of Verona.

MAZARA, a ſea-port town of Sicily, in the valley of Mazara, ſituated on the S.W. coaſt, near a river of the ſame name, near or upon the ruins of Selinuntium. At a diſtance its appearance is not unpromiſing, as it preſents to view ſeveral convents and chapels richly ornamented; but its ſtreets are narrow and winding, and it has only one ſquare before the cathedral. Mazaran was of ſome note in the time of the Romans, and many of their tombs and inſcriptions are found in it. In the cathedral are ſome valuable ſarcophagi, and one in particular, which, on account of the ſtyle of its compoſition, as well as its deſign and workmanſhip, is attributed to the Greeks. Mazaran was laid waſte by the Saracens, and was taken from them by earl Roger, who vowed to build a church if he obtained a victory. The church does not now exiſt. At Mazara have been found ſome Punic, and many Roman coins, and thoſe of the Saracens in their tombs. It has not now more than 7000 inhabitants, without trade or manufacture. The chief cultivation is that of cotton. Here is no harbour, but the ſea enters by a channel above half a mile into the country, which would form an excellent ſhelter for ſhipping, if merchants had any inducement to come hither. Mazara is the ſee of a biſhop; 50 miles S.W. from Palermo. N. lat. 37° 46′. E. long. 12° 28′.

MAZARELLI, a town of Sicily, in the valley of Noto; 15 miles S.W. of Noto.

MAZARIN, Julius, in *Biography*, cardinal, and a celebrated miniſter of ſtate, was born in 1602, at Piſcina, in Italy, of a noble family named "Mazarini." In the courſe of his education he was diſtinguiſhed for his talents, and was introduced into the houſhold of Jerome Colonna, afterwards cardinal. He followed that nobleman into Spain, where he ſtudied the law, and on his return he took the degree of doctor. He frequented the court of Rome, and attached himſelf to Sachetti, as he did afterwards to cardinal Barberini, to whom he afforded much aſſiſtance in his attempts to effect an accommodation between the different powers. When the French were juſt preparing to attack the Spaniſh lines before Caſal, Mazarin rode out of them, exclaiming "Peace, Peace," and brought propoſals to the French general, which cauſed a ſuſpenſion of arms, which was followed by the treaty in 1631. His ſervice was rewarded by the pope with a place, and in 1634 he was ſent as vice-legate to Avignon, and nuncio to the court of France. He there acquired the eſteem of Richelieu, and of the king, Lewis XIII., who procured for him a cardinal's hat: and after the death of Richelieu, the monarch created him counſellor of ſtate, and one of the executors of his will. At the death of Lewis, in 1643, Mazarin was immediately placed at the head of the government by the regent queen Anne of Auſtria, who had the moſt unbounded confidence in him: he was a very different man from Richelieu; he was ſimple and modeſt in his appearance and equipage; inſinuating in his manners and he ever affected to carry his points rather by gentle means than by the force of authority. The rapacity of his diſpoſition ſoon raiſed a powerful party againſt him, while his foreign manners threw a ridicule over him which rendered him contemptible. Some edicts of taxation being refuſed verification by the parliament of Paris, Mazarin cauſed the preſident Blancmeſnil, and the counſellor Brouſſel to be impriſoned. This was the ſignal for the civil wars which commenced in 1648, in which the Pariſians were excited to revolt by De Retz, with ſeveral princes of the blood and nobles. The queen, the young king, and the miniſter, were obliged to take refuge at St. Germain. Mazarin was proſcribed as a public diſturber of the peace: Condé, then on the ſide of the court, beſieged Paris, and the "war of the Fronde" enſued, which was more fertile in ſatirical ſongs and epigrams, than in important events. An accommodation was effected in 1649; by which the parliament preſerved its right of aſſembling, and the queen kept her miniſter. In the following year, freſh diſturbances led the parliament to iſſue a decree, baniſhing Mazarin from the kingdom. He made his retreat to Cologne, whence he continued to govern the kingdom by his counſels. In 1652 Mazarin returned to France with 7000 men whom he had raiſed, but being regarded by parliament as a public enemy, he was obliged a ſecond time to retire. In 1653 he entered Paris amidſt the acclamations of the inconſtant people, and even the parliament, from which a more ſteady line of conduct might have been expected, received him with diſtinguiſhed honours. Henceforward his powers were unlimited: in 1655 he made a treaty with Cromwell, of which one of the conditions was the refuſing Charles II. an aſylum in France. The war with Spain was terminated in 1659, by the peace of the Pyrenées, negotiated in perſon between Mazarin and the Spaniſh prime miniſter. The ceſſion of Alſace to France was one of its conditions, and the marriage of the young king to the infanta of Spain was another. After this the cardinal aſſumed a greater ſtate, and ruled with a more abſolute ſway; while the queen-mother loſt all her influence, and was reduced to inſignificance. Hiſtory has handed down a variety of heavy charges againſt him; ſuch as having purpoſely brought up the young king in ignorance, not having ſignalized his adminiſtration by a ſingle grand or uſeful national eſtabliſhment; and having amaſſed ſuch a fortune as no other miniſter ever had, amounting, it was ſaid, to two hundred millions of livres, or eight millions ſterling. His proſperity was of no long duration: he was attacked by a diſeaſe which his conſtitution could not reſiſt. When ſenſible of his danger he began to feel ſcruples concerning the wealth which he had heaped together, and his confeſſor plainly told him that reſtitution was neceſſary for his ſalvation. He gave the whole to the king, in the hope that, as was the caſe, his majeſty would reſtore it to him. He died in 1661, at the age of fifty-nine. The letters of cardinal Mazarin, containing his negociations at the peace of the Pyrenées, were publiſhed in two volumes 12mo. in 1745. The tracts on the controverſy reſpecting the war of Fronde were ſo numerous, that a complete collection of them amounted to forty-ſix volumes 4to. The adminiſtration and talents of Mazarin have been compared with thoſe of Richelieu, but the commanding features which diſtinguiſhed the latter are in vain ſought for in the former. Prudent, ſubtle, and avaricious, he endeavoured to ſoothe rather than command; to deceive than to vanquiſh; and the love of glory either did not exiſt in his boſom, or was loſt in his inſatiable thirſt of money. Moreri. Hiſt. of France. 1790.

MAZARINA, in *Geography*, a town of Sicily, in the valley of Noto; 20 miles N.E. of Alicata.

MAZATLAN, a town of Mexico, in the province of Chiametlan, on a river of the fame name, which runs into the Pacific ocean; 40 miles N.W. of Chiametlan. N. lat. 23° 15′. W. long. 106° 46′.

MAZE, in *Gardening*. See Labyrinth.

MAZEAS, John-Mathuirin, in *Biography*, a mathematician, was born at Landernau, in Brittany, in 1713, and died in 1802. He wrote Elements of Arithmetic, Algebra, and Geometry, with an Introduction to Conic Sections; he was alfo the author of "Inftitutiones Philofophicæ," three vols. 12mo. He was an ecclefiaftic, and held a canonry in the church of Notre Dame, at Paris, before the Revolution. Nouv. Dict. Hift.

MAZERAY, in *Geography*, a town of Perfia, in Khorafan; 100 miles W.S.W. of Naffapour.

MAZEUTOXERON, in *Botany*, Billard. Voy. (Englifh edition), v. 2. 8, and 65. t. 17 and 19. See Corræa.

MAZIERA, or Medjare, in *Geography*, an ifland in the Indian fea, near the E. coaft of Arabia, 60 miles long and 8 wide. N. lat. 20°. E. long. 74°.

MAZIERES, a town of France, in the department of the Two Sevres, and chief place of a canton, in the diftrict of Parthenay. The place contains 605, and the canton 8447 inhabitants, on a territory of 257½ kiliometres, in 12 communes.

MAZIL, a town of the ifland of Cuba; 20 miles W.S.W. of Bayamo.

MAZOCHI, Alexio Symmacho, in *Biography*, an Italian antiquary, was born near Capua in 1684. He acquired in early life an attachment to literature, and became diftinguifhed for his acquirements. He went through a regular courfe of philofophy and theology at Naples, and he afterwards became profeffor of the Greek and Hebrew languages, and obtained fome preferment in the church. He was author of feveral ingenious works, of which the principal was the refult of the difcovery of the ruins of an amphitheatre at Capua: it was entitled "Campani Amphitheatri Titulum, aliafque nonnullas Campanas Infcriptiones Commentarius," 1727. This he afterwards very much enlarged. In 1739 he publifhed an epiftle "De dedicatione fub Afcia," on which he employed much erudition. He publifhed many other antiquarian pieces: as "A Hiftory of the Cathedral of Naples:" "Commentarium in Regii Herculanenfis Mufæi Æneas Tabulas Heraclienfes:" "Spicelegium Biblicum," three vols., of which the two firft relate to the Old Teftament, the laft to the New. He died at Naples in 1771, at the age of 86. He was a man void of ambition, and attached to a fober, ftudious, and retired life. He bequeathed to the poor his library and the little property which he had accumulated. Gen. Biog.

MAZONOMUS, among the *Ancients*, a very large difh, commonly of wood, in which the maza was ferved.

MAZORBO, in *Geography*, one of the iflands in the dogado of Venice, and podeftaria of Torcello, compofed of three fmall iflands, united by bridges. It has two churches.

MAZORMO, a town of the ftate of Venice, on the N. bank of the Po; 22 miles S. of Venice.

MAZOUNAH, a town of Algiers, nearly furrounded by the river Shelliff, and celebrated for its woollen manufacture; 30 miles S. of Muftygannim.

MAZULA, in *Ancient Geography*, the name of two towns in Africa propria, according to Ptolemy. He places one on the coaft, and gives it the title of a colony, and the other a little inland.

Mazulà, in *Geography*, a town of Africa, in Congo, on the coaft; 50 miles S.S.W. of Bombi.—Alfo, a fmall ifland in the Atlantic, near the coaft of Africa. S. lat. 8° 5′.

MAZUR, a fpecies of birds which the Arabian failors efteem very lucky, becaufe it lays its eggs clofe by the feafhore before good weather; fo that when thefe are obferved, they promife themfelves a fafe voyage. They alfo pretend that this bird gives notice to failors, when the fhip approaches any danger, by flying and fluttering up and down.

MAZUS, in *Botany*, fo denominated by Loureiro, from μαζος, *a nipple*, on account of the little ftalked tubercles, which fill up the mouth of the corolla. Loureir. Cochinch. 385. Brown Prod. Nov. Holl. v. 1. 439.—Clafs and order, *Didynamia Angiofpermia*. Nat. Ord. *Perfonatæ*, Linn. *Scrophulariæ*, Juff.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, large, bell-fhaped, five-fided, permanent, with five lanceolate, fpreading, nearly equal fegments. *Cor.* ringent; its upper lip pointed, in two lobes, reflexed at their fides; lower longer, in three rounded, inflexed, undivided lobes, and two prominences at its bafe; the throat marked externally with two furrows, and lined with ftalked glands. *Stam.* Filaments four, two of them longer, approaching each other in pairs; anthers oblong, combined. *Pift.* Germen fuperior, roundifh; ftyle thread-fhaped, equal in length to the longer ftamens; ftigma fpatulate, of two fpreading plates. *Peric.* Capfule roundifh, enclofed in the calyx, compreffed, of two cells, and two undivided valves, with partitions from their centre. *Seeds* numerous, ovate, fmall.

Eff. Ch. Calyx bell-fhaped, in five equal fegments. Corolla ringent; upper lip cloven, reflexed at the fides; lower three-lobed, with two fwellings at the bafe. Capfule of two cells, with many feeds. Anthers combined.

1. M. *rugofus*. Lour. (Lindernia japonica; Thunb. Jap. 253? Brown.)—Flowers numerous, in a long clufter.—Native of fields in Cochinchina, where it is called *Rau dáng lóng lá*. An annual *herb*, about fix inches high, branched, and nearly erect. *Leaves* oppofite, ovate, ferrated, rugofe. *Flowers* pale violet, in long loofe clufters.

2. M. *Pumilio*. Brown. Stalks bearing from one to four flowers, fmooth as well as the calyx. Gathered by Mr. Brown in Van Diemen's land. A fmall *herb*. *Leaves* cluftered at the root. *Flower-ftalks* radical, either fimple or racemofe.

We cannot perceive any clear diftinction between this genus and *Mimulus*, to which Mr. Brown allows it is nearly allied. See Mimulus.

MAZZAFERRATA, Gio. Bat., in *Biography*, a mufical compofer, who publifhed at Bologna, in 1677, "Cantate," or "Canzonette da Camera a Voce fola," not very good mufic indeed; but the author feems to have been one of the firft compofers who ufed the technical terms *vivoce*, *largo*, and *ardito*, to indicate the time of the feveral movements. Before that it was done by *moods* at the fide of the clef.

MAZZANTI, Ferdinando, an opera finger in foprano, of great eminence in the bravura ftyle of the middle of the laft century. He fung, when we heard him at Rome in 1770, not only with an exquifite tafte, but was a good mufician, and not a mean performer on the violin. He was not only a reader, but a writer of mufic, having himfelf compofed operas and motets for voices; but trios, quartets, and quintets for violins. He had a great collection of Paleftrina's compofitions, of which he was truly fenfible of the fuperiority to thofe of all other ecclefiaftical compofers of his country, *a capella*, and had made, by way of ftudy, an abridgment of the modulation of that venerable father of facred mufic of the moft pure and reverential ftyle, which he he had digested with great judgment and intelligence. He came to England as a singing-master about the year 1773, and remained here till the time of his death. During the last years of his existence, oppressed with age, infirmities, and poverty, he was reduced to the utmost misery and wretchedness. His temper was not amiable: he was naturally peevish, impatient, and disputatious, so that his sufferings were not diminished by philosophy or resignation. He seems not to have made a friend in this country during more than thirty years residence, except La Blancherie, who solicited those who had been long laid under contributions for himself, to extend their benevolence to Mazzanti, and for a certain time procured him succour; but subscriptions and collections at length failing, and having no possessions left that were convertible to money or food, except his favourite violin, which he brought from Italy, he reluctantly permitted his sole friend, Blancherie, to negociate a raffle for it, at half a guinea a ticket, and in a short time the requisite number being disposed of, chiefly to musical professors, on Saturday, May 11th, 1805, the raffle took place at Menzani's music shop, when the blind and capricious goddess, Fortune, for once, seems to have had a glimmering of light and reason, in throwing her handkerchief at François Cramer, who so well knew the use of the lot with which he was crowned. But, alas! during the conflict of the adventurers for Fortune's favour, the poor mortal who furnished the prize expired!

MAZZARUNI, in *Geography*, a river of Sicily, which runs into the sea, on the S. coast; three miles S.E. of Terranova.

MAZZO, a town of Italy, in the Valteline; nine miles W. of Sondrio.

MAZZOCCHI, DOMENICO and VIRGILIO, in *Biography*, two brothers, the most eminent musicians in Rome during the early part of the seventeenth century. Domenico was a voluminous and excellent composer. He is much celebrated by Kircher, and was almost the last successful madrigalist in Italy, after Luca Marenzio. He seems to have penetrated deeper into latent effects and refinements than his contemporaries. In 1638 he dedicated a set of madrigals, which he published at Rome, to cardinal Barberini. In his dedication, he pronounces madrigals to be "the most ingenious species of composition that music could boast. And yet," he says, "that few were then composed, and still fewer sung; as they were nearly banished from all *academie*, or concerts."

As secular melody was improved by the cultivation of dramatic music, so choral harmony was meliorated by the new combinations that were hazarded in madrigals. And the two Mazzocchi, during this period, contributed greatly, by their numerous works for the church, to improve the more solemn and grave manner of writing for sacred purposes, by extending the bounds of harmony, without which ecclesiastical music could not sustain its dignity, or be suitable to the purposes of its destination. A clear, picturesque, and graceful melody seems infinitely more necessary for the stage than the church; as it is there the voice of passion, and medium through which lyric and narrative poetry can alone be rendered intelligible. In the church, where new poetry, prayers, or sentiments of piety seldom have admission, and where nothing is sung that has not often been previously read and heard by every member of the congregation, the clothing such portions of scripture, or of the liturgy as are appointed to be sung, in rich and complicated harmony, adds greatly to their solemnity, by precluding all such frivolous and fantastical strains as remind the hearer of secular amusements.

Domenico Mazzocchi, besides several new combinations, and a more bold and masterly use of discords in ligature than can be found in the works of his predecessors, if we except Monteverde, first proposed several refinements in the execution of his madrigals, and invented characters of *crescendo*, *diminuendo*, *piano*, *forte*, and the enharmonic sharp. In his eighth madrigal he has made the most frequent use of these new indications. Page 73, there are, indeed, misapplications of the enharmonic diesis to E and B sharp, which is at present rightly appropriated, by the most accurate contrapuntists, to notes that have been already sharp, as a sign of their being still raised a semitone minor. Enharmonic, similar to that of the ancients, we have none, nor is it practicable in modern counterpoint, where, having no fundamental base for quarter tones, their use in harmony would produce no other effect to the hearer than that of singing or playing out of tune.

The only madrigalists after Mazzocchi, who much distinguished themselves, were Stradella, Alessandro Scarlatti, Bononcini, Lotti, Perti, and Caldara, of whom we shall have occasion to speak among the most eminent composers of operas and cantatas.

It seems an indispensable duty to inform the curious reader, that there is a madrigal (*Cor mio*) by this composer, for four sopranos and a contralto voice, inserted in the second part of P. Martini's "Saggio di Contrap," which surpasses in art and ingenuity all the compositions of that kind which we have seen. The expression of the words, and passages of imitation, are still elegant and new. The learned editor has pointed out all its beauties in an excellent commentary.

MAZZOCCHI, VIRGILIO, brother to Domenico, first maestro di cappella to the pope, and master to Bontempi, the musical historian.

MAZZONO, in *Geography*, a town of Naples, in the province of Lavora; seven miles S.W. of Capua.

MAZZUCHELLI, GIAMMARIA, *Count*, in *Biography*, who flourished in the eighteenth century, was distinguished for his acquaintance with Italian literature. He was author of several works, of which we may notice "Notizie Historiche e Critiche intorno alla Vita, alle Inventione, ed agli Scritti di Archimede Siracusano:" "La Vita di Pietro Aretino:" he began a biographical work on the writers of Italy, entitled "Gli Scrittori d'Italia, &c." of which he only finished the two first letters in the alphabet.

MAZZUOLI, FRANCESCO. See PARMEGGIANO.

MAZZUOLI, GIROLAMO, the cousin and pupil of Francesco, is little known as a painter beyond Parma and its districts, though for "impasto," and the whole mystery of colour, he has few equals. There is reason to believe that several pictures painted by this artist, especially those of a higher and gayer tone, are constantly ascribed to Parmeggiano. He was more attached to the style of Corregio than Francesco, and seized its character with great avidity in the nuptials of Santa Catherina in the church del Carmine. He excelled in perspective, and in the Last Supper, in the refectory of Santa Giovanni, placed and painted a colonnade with all the illusions of Pozzo. To the most harmonious chiaroscuro, he added grandeur, variety, and vivacity in fresco. He had a son, Alessandro Mazzuoli, who painted in the dome of Parma 1571. He is a feeble imitator of the family style. Fuseli's Pilkington.

MBACQUA, in *Geography*, a town of South America, in Buenos Ayres; 120 miles E. of Corrientes.

MBOMBOY, a river of Paraguay, which runs into the Parana.

MBOTELEY,

MBOTELEY, a river of Paraguay, which runs into the Parana.

MEACO, or MIACO, called alfo *Kio*, a city of Japan, in the ifland of Niphon, the ancient metropolis of the whole empire, and now the fpiritual capital, being the refidence of the Dairis, and fecond city of the empire, is fituated near the middle of the fouthern coaft, on a fpacious and fertile plain, about 160 miles S.W. from Jedo, the reputed capital. Neverthelefs this is the firft commercial city, and is celebrated for the principal manufactures. It is alfo the feat of the imperial mint, and as the Dairi's court is literary, all books are printed here. It is furrounded at fome diftance by high mountains, much covered with ftately temples, monafteries, burying-places, and pleafure houfes, all of which are adorned with gardens and orchards, and a great variety of verdure, as they are watered by a great number of rivulets which flow from thofe mountains. Thefe ftreams unite in the centre of the city, and there divide it into the Upper and Lower Towns. The whole city, when in its greateft fplendour, appears by its high and ftately walls to have been about 20 miles in length and nine or ten in breadth; to which we may add its fpacious fuburbs, and the imperial palace, which of itfelf is a kind of city, feparated from the reft. The ftreets are narrow, but long and ftraight; and we learn from Kæmpfer, that by an enumeration of the inhabitants in 1674, they amounted to 405,642, of whom 182,070 were males, and 223,572 females, without including the numerous attendants of the Dairi, and probably the children, together with an immenfe number of ftrangers, who refort hither from all parts of the empire. Its temples are numerous, and beyond conception magnificent and fplendid. Although Meaco has fuffered much from pillage, maffacre, and conflagration, it is ftill the grand ftorehoufe of all the manufactures of Japan, and of all foreign as well as domeftic merchandize, and the principal feat of commerce. Here they refine their metals, coin their money, print their books, and carry on all forts of manufactures: here they weave and dye the richeft filks and ftuffs, make and fell the moft beautiful Japan work, porcelain, mufical inftruments, paintings, carvings, all forts of gold, filver, and copper articles, and particularly fteel of the moft excellent quality, and moft curious workmanfhip: they alfo prepare in this place dreffes of all forts for both fexes, which are fit for ufe, and they manufacture a variety of toys and trinkets. In a word, there is no kind of commodity which may not be procured at Meaco, nor any kind of workmanfhip which its artifts will not imitate. N. lat. 35° 24′. E. long. 153° 30′.

MEAD, RICHARD, in *Biography*, a very eminent phyfician, was born at Stepney, "a fmall village near London," as it is called by his biographer, in Auguft, 1673, of which parifh his father, the Rev. Matthew Mead, a Prefbyterian, was one of the two minifters; but had been ejected, for non-conformity, in the year 1662. As he had a handfome patrimony, being defcended from a confiderable family in Buckinghamfhire, he continued to refide in the parifh, (preaching to a numerous congregation of diffenters,) and beftowed a liberal education on his large family, under a private tutor, at home. This little domeftic fchool, however, was broken up in 1683, when Mr. Mead, having been accufed of participating in a plot againft government, thought proper to retire to Holland, leaving Richard, his eleventh child, under the care of Mr. Singleton, an able claffical fcholar, who had been ejected from the office of fecond mafter of Eton fchool as a non-conformift. Richard made great progrefs in his claffical ftudies, which he proceeded to finifh at Utrecht, under the learned Grævius, in 1689. After a refidence of three years at that place, he determined upon the ftudy of phyfic, and went to Leyden, where he attended the lectures of Herman on botany, and of Pitcairn on the theory and practice of medicine. He received much friendly attention from the latter, from whom he imbibed the mathematical principles of that fcience, which were prevalent in his early writings. He then commenced his travels, and vifited the principal cities of Italy, where he graduated in philofophy and phyfic, at Padua, in Auguft 1695. On his return to England, in 1696, he fettled in the very houfe in which he was born, and practifed his profeffion for feveral years with confiderable fuccefs: and, in 1699, he married the daughter of a merchant in London. His firft publication, entitled "A Mechanical Account of Poifons," which contained the refult of many experiments, made with the poifon of the viper, &c. appeared in 1702, and gained him confiderable credit. In fubfequent editions, however, he candidly retracted fome points of his mechanical theory, which more mature obfervation convinced him was inadequate to explain the functions of a living body. Soon after the publication of this treatife, he was elected a member of the Royal Society, of which he was afterwards appointed one of the vice-prefidents by fir Ifaac Newton. In 1703, he was chofen phyfician to St. Thomas's hofpital, when he took up his refidence in Crutched Friars. In 1704, he publifhed his treatife, "De Imperio Solis et Lunæ in Corpore humano, et Morbis inde oriundis," 8vo. Phyficians have always been prone to apply the fafhionable philofophy of their day to the explanation of the phenomena of the animal economy; and in this effay, Mead built his reafoning on the theory of attraction, which Newton had promulgated, attempting to fhew that periodical influences were produced on the living body, as upon the tides of the fea and the atmofphere. In 1707, he received the diploma of doctor of phyfic from the univerfity of Oxford, through the intereft, as is fuppofed, of Dr. Radcliffe, who was not averfe to patronifing a junior of rifing reputation, when he was himfelf declining. In 1711, he removed to Auftin Friars, into the houfe which had been inhabited by Dr. Howe, then deceafed. About the fame time he was appointed by the company of furgeons to read the anatomical lectures in their hall, which he continued to do during fix or feven years with great applaufe. In 1714, his friend and patron, Dr. Radcliffe, died, and Dr. Mead took his houfe, in Bloomfbury-fquare. He was now a fellow of the College of Phyficians, and he had been called into confultation in the laft illnefs of queen Anne, a few days before her death, and pronounced more decifively on her danger than the court phyficians. From this time he feems to have ftood among the firft of the profeffion; and in the beginning of 1715 refigned his office at St. Thomas's hofpital, partly in confequence of his full employment, and partly of the diftance of the hofpital from his refidence.

The occurrence of the plague at Marfeilles, in 1719, occafioned great alarm in London, where the dreadful mortality of 1665 was not forgotten; and by the direction of the lords of the regency, the fecretary of ftate applied to Dr. Mead for his opinion of the nature of the malady, and of the beft means of preventing its introduction into this country. In confequence of this application, he publifhed, in the following year, "A fhort Difcourfe concerning peftilential Contagion, and the Methods to be ufed to prevent it," dedicated to Mr. Craggs, the fecretary of ftate. In this work he decidedly maintained the contagious nature of the plague, which had been queftioned in France, and laid down a plan for the purpofe of cutting off all communication of the

the infection, by quarantine, lazarettoes, and other means of seclusion. This tract passed through no less than seven editions in one year: to the eighth, in 1723, was added a new chapter on the method of cure; and the last, published in 1744, was still farther enlarged: it was translated into Latin by Mattaire, and afterwards by professor Ward.

In the year 1721, Dr. Mead was directed by the prince of Wales (afterwards George II.) to superintend the experiment of inoculating the small-pox in the persons of some criminals, which had been recommended by Mr. and lady M. W. Montague, in consequence of their knowledge of the salubrity of the practice, as performed at Constantinople, and other eastern countries. His report was favourable; so that the example of the practice was immediately set by the royal family, and its general introduction thus accelerated.

As Dr. Mead was ever anxious to support the honour of his profession by his liberal conduct, and by associating with it the character of a friend and patron of learning, so he asserted its dignity in his "Harveian Oration," read before the College in October, 1723, and afterwards published. In this oration he endeavoured to shew, that the profession was exercised by several families of distinction among the Romans; and he annexed to it a dissertation on some coins, which had been struck at Smyrna, in honour of physicians. This publication was the origin of a controversy, which was begun by Dr. Conyers Middleton, and in which Mead was supported by his friend professor Ward, of the Gresham college. Dr. Middleton, perhaps with the greater weight of erudition on his side, undertook to prove the servile condition of the Roman physicians. The controversy was carried on in a manner honourable to both parties; and Dr. Middleton, in a subsequent work on Greek and Egyptian antiquities, spoke of Dr. Mead in terms of great respect. In the same year, Dr. Mead gave an example of the honourable conduct that is due between the members of a liberal profession, in the services which he performed towards Dr. Freind, when the latter physician was committed a prisoner to the Tower, upon the suspicion of being concerned in Atterbury's plot, in consequence of some free observations which had fallen from him in the house of commons. (See the article Freind.) Dr. Mead obtained his liberation in a spirited manner, and paid over to him a considerable sum, received from his patients during his imprisonment.

In 1727, Dr. Mead was appointed physician in ordinary to George II. His professional occupations were now so extensive, that for many years he had no leisure for writing. He had, so early as the year 1712, communicated to Dr. Freind his opinions respecting the importance of purgatives in the secondary fever of small-pox, upon which subject Dr. Freind published a letter in 1719. But it was not till the year 1747, that Dr. Mead printed his treatise "De Variolis et Morbilis," which contains many valuable observations on both these diseases, and also strong recommendations of the practice of inoculation. Both this work and the Letter of Dr. Freind were made the subject of animadversion by Dr. Woodward, (whose skill in pathology appears to have been much inferior to his knowledge of natural history,) in a work entitled "The State of Physic and Diseases, &c." which gave rise to a controversy that engendered considerable acrimony in the two learned advocates for the practice. Dr. Mead subjoined to his treatise, which was written in a pure Latin style, a translation of Rhazes's commentary on the small-pox, into the same language, a copy of which he had obtained from Leyden, through the assistance of his fellow-student, Boerhaave, with whom he had maintained a constant correspondence. It was chiefly through the patronage and interposition of Dr. Mead, that Mr. Sutton's ventilator, for the purpose of cleaning the foul air from ships, was received into the service of the navy, by an order from the admiralty, after a delay of ten years: and he still farther recommended it, by adding to a publication of several tracts that had been written on the subject, in 1749, "A Treatise on the Scurvy," in which he ascribed that fatal disease to moisture combined with putridity.

About this time, as he began to retire in some degree from the fatigues of practice, he employed his leisure in revising his former publications, and in composing others. He published in the year 1749 his "Medicina sacra, seu de Morbis insignioribus qui in Bibliis memorantur," 8vo. The object of this work was to reconcile men's minds to the sacred writings, by shewing that the diseases, mentioned in them, were explicable on natural grounds; and he supported the doctrine of some divines, who maintained especially that the dæmoniacs mentioned in the gospel were only insane, or epileptic persons. His last work was a summary of the experience of his active professional life, which might be deemed a bequest to his medical brethren, and was published in 1751, under the title of "Monita et Præcepta Medica," 8vo. This little volume was almost purely practical, consisting of detached observations on a variety of diseases and medicines, many of which have stood the test of subsequent experience: it was frequently reprinted, and was translated into English.

Soon after this period, the infirmities of age rendered him incapable of exertion, either as a practitioner or an author, and he gradually sunk under increasing debility, until the 16th of February 1754, when he expired, without any visible signs of suffering, in the eighty-first year of his age. He was interred in the Temple church, near his brother Samuel, an eminent counsellor, who died twenty years before him; and a monument was erected to his memory, in Westminster Abbey, by his son. He was twice married, but had issue only by his first wife, of whom four survived him; namely, a son and three daughters. Two of the daughters were married to eminent physicians, sir Edward Wilmot and Dr. Frank Nichols, who were, with himself, physicians to the king. His second wife, who was daughter to sir Rowland Alston, survived him.

The medical character has rarely obtained more respectability than in the person of Dr. Mead. He was not only in high and universal esteem on account of his professional skill, but was the greatest patron of science and polite literature of his time. He maintained a correspondence with the principal literati of Europe; all men of talents found a ready assistance from him in every undertaking; and no foreigner of any learning or taste visited London, without being introduced to Dr. Mead. His ample income was spent in a noble and hospitable way of living, in gratuities to men of science, and the encouragement of learned publications, and in the collection of scarce and valuable books, manuscripts, and literary curiosities, of which no individual of his time, in this kingdom, possessed so choice and ample a collection. Of all his treasures he made the most liberal use; for he not only freely admitted learned men of all countries to see and examine them, but he likewise entertained them at his table, and treated them with singular urbanity; uniting, as his biographer observes, "the magnificence of princes with the pleasures of philosophers."

The whole works of Dr. Mead have frequently been collected and published in various countries of Europe. A French translation of them by Coste, 1774, in two vols. 8vo.

8vo. is efteemed for its numerous notes. See "Authentic Memoirs of the Life of Richard Mead, M. D." 1755. Gen. Biog.

Mead, a wholefome agreeable liquor, prepared of honey and water.

One of the beft methods of preparing mead is as follows: Into twelve gallons of water flip the whites of fix eggs; mixing thefe well together, and to the mixture adding twenty pounds of honey. Let the liquor boil an hour, and when boiled, add cinnamon, ginger, cloves, mace, and a little rofemary. As foon as it is cold, put a fpoonful of yeaft to it, and tun it up, keeping the veffel filled as it works; when it has done working, ftop it up clofe; and when fine, bottle it off for ufe.

Thorley fays that mead, not inferior to the beft of foreign wines, may be made in the following manner: Put three pounds of the fineft honey to one gallon of water, and two lemon-peels to each gallon; boil it half an hour, well fcummed; then put in, while boiling, lemon-peel: work it with yeaft; then put it in your veffel with the peel, to ftand five or fix months, and bottle it off for ufe. If it is to be kept for feveral years, put four pounds to a gallon of water.

Macquer, in his "Dictionary of Chemiftry," directs to choofe the whiteft, pureft, and beft-tafted honey, and to put it into a kettle with more than its weight of water: a part of this liquor muft be evaporated by boiling, and the liquor fcummed till its confiftence is fuch, that a frefh egg fhall be fupported on its furface, without finking more than half its thicknefs into the liquor; then the liquor is to be ftrained, and poured through a funnel into a barrel; this barrel, which ought not to be nearly full, muft be expofed to heat as equable as poffible, from twenty to twenty-feven or twenty-eight degrees of Reaumur's thermometer, taking care that the bung-hole be flightly covered, but not clofed. The phenomena of the fpirituous fermentation will appear in this liquor, and will fubfift during two or three months, according to the degree of heat; after which they will diminifh and ceafe. During this fermentation, the barrel muft be filled up occafionally with more of the fame kind of liquor of honey, fome of which ought to be kept apart, on purpofe to replace the liquor which flows out of the barrel in froth. When the fermentation ceafes, and the liquor has become very vinous, the barrel is then to be put into a cellar, and well clofed; a year afterwards the mead will be fit to be put into bottles.

Every maker of metheglin or mead for fale fhall take out a licence, for which he fhall pay 1*l.*, and fhall renew the fame annually, on pain of 10*l.* (42 Geo. III. c. 38.) If any maker of metheglin or mead for fale fhall conceal any of it from the view of the guager, he fhall forfeit for every gallon 5*s.* 15 Car. II. c. 11.

MEADIA, in *Botany*, fo called by Catefby, in compliment to Dr. Richard Mead, the celebrated phyfician, who, whatever might be his merit in his profeffion, was not judged by his contemporaries to deferve this botanical honour; and Linnæus therefore did not confirm it. The only work of Dr. Mead's ever mentioned as giving him a claim to fuch diftinction, is his "Mechanical Account of Poifons," in which however there is nothing botanical. Crantz, a petulant critic of Linnæus, affected to oppofe him in this trifling point, faying that "Mead was perhaps more deferving than many others who had obtained fuch honours." If this be all that can be faid for him, the matter may remain at reft. See Dodecatheon.

Meadia, in *Geography*, a town of Hungary, in the bannat of Temefvar, on a fmall river which runs into the Danube; 52 miles S.E. of Temefvar. N. lat. 45° 10'. E. long. 21° 59'.

MEADOW, in *Agriculture*, a name generally applied to fuch natural grafs lands as are annually mown for hay; but more particularly to thofe which are fo low in their fituations as to be too moift for cattle to graze upon in winter, without breaking the fward, or poaching the furface, which would be highly injurious.

Meadows, from their being generally enriched with the fine mould wafhed down from the adjacent rifing grounds, are ufually of a good foil, and feldom require much other improvement than the removing of temporary imperfections, and the fuperabundant moifture by proper draining. But they may be of fuch a nature as to ftand in need of a more particular treatment; as is the cafe when their furfaces are of a moffy, loofe earthy, or a binding clayey quality, where harrowing or fcarifying, and the application of top-dreffings will be neceffary.

They are alfo farther diftinguifhed into natural and artificial, or common and watered meadows.

The former, from their being fituated in the hollows and floping fides of the vallies, where the depth of the foil has been conftantly increafing by the depofition of various forts of vegetable and other matters brought down from the higher grounds, are, it is fuppofed by a late writer, in a confiderably greater ftate of fertility, and evidently better fitted for the permanent production of grafs, than thofe from which they have derived their richnefs. And it has been well obferved, in the report of Staffordfhire, that this, of all others, is "the moft productive of grafs and hay, yielding fuftenance for cattle through the fummer and the winter, and producing an everlafting fource of manure for the improvement of the adjoining lands. Alfo, that in all cafes of extenfive inclofures, the improvement of the vale land, or that formed by nature for meadow and pafture, fhould be firft attended to. In this view, the low lands in all fituations come under the head of natural meadows."

And the latter are thofe which lie contiguous to rivers or brooks, whence the water can be eafily carried or conveyed fo as to overflow the grafs at pleafure. Of thefe there are large tracts in feveral parts of the kingdom, which, where fkilfully managed, become highly profitable to their owners, affording not only immenfe crops of hay, but yielding an abundant early grafs for the ufe of ewes and lambs, in the beginning of the fpring long before the pafture or other grounds are ready to receive them.

However, as the former fort of meadow lands, from their retention of moifture in confequence of their fituation, and the great depth of vegetable matter which they contain, are fuggefted by a late writer to be liable to throw up much more coarfe herbage, of the aquatic or other kind; in many cafes more drainage as well as other management will be neceffary to bring them into the proper condition for the growth of good herbage than is requifite in the hay grounds in more elevated places. And that, "by a more particular attention in thefe refpects they would, in many inftances, be rendered a vaft deal more productive than they are at prefent, and, at the fame time, afford a much better and lefs coarfe herbage. They would alfo admit ftock upon them a much greater length of time, both in the autumn and fpring feafon."

It may be noticed, that "the moft proper feafon for furface draining grafs lands is in the autumn, when they are firm and dry, as in the early fpring months fuch lands are too full of moifture. The grips, or fmall open drains, fhould ſhould be cut obliquely in the moſt ſuitable directions for conveying off the ſuperficial ſtagnant water. It is a practice, in ſome caſes, to ſuffer the ſods or grippings that are taken out of the trenches to remain on their ſides; but it is much better, and a leſs ſlovenly mode, to have them conveyed from the land and laid up in heaps, in order to their being acted upon by the winter froſts and other cauſes, ſo as to be brought into a ſtate proper for being formed into compoſts with well rotted farm-yard dung. Much of this ſort of draining may be performed at a ſmall expence, and the beneficial effects be very conſiderable, eſpecially where the lands are very much loaded with moiſture, in the quantity of produce." Beſides, ſuch meadow lands "demand much more attention in their management in other reſpects, as thoſe of their being fed by cattle, and the performing of the different operations that are proper for rendering them productive of good herbage. In theſe caſes, ſtock ſhould be turned upon the lands, and manures be applied with much care, and only when the land is in ſuch a ſtate of dryneſs as not to be injured by the poaching or breaking of the ſward. The higher ſorts of graſs lands, in moſt inſtances, admit of conſiderably more latitude in performing theſe different operations, as they are capable of admitting the ſtock as well as the dung-cart more early in the ſpring months, and of ſuffering them to remain or be applied at later periods in the autumn without inconvenience. The advantage of this attention is rendered ſufficiently plain by the effects which the contrary practice produces in ſuch meadow and other hay lands as are in a ſtate of commonage, where the ſtock is admitted at all ſeaſons, and under all circumſtances."

It is evident that "theſe ſorts of graſs lands muſt be applied to different purpoſes, according to their nature, ſituation, and other circumſtances. Thoſe which are of the more moiſt and wet kinds, whether from the nature of the ſoil, or the peculiarity of ſituation, and which have been a long time in the ſtate of ſward, are for the moſt part kept under the ſcythe; while thoſe of the contrary deſcriptions, that are ſituated at a greater height, and of courſe, in moſt caſes, poſſeſs a greater degree of firmneſs, are, in general, appropriated to the purpoſe of paſturage; though, in particular ſituations, where graſs land is ſcarce, and conſequently of great value, they are occaſionally likewiſe converted to the purpoſe of hay. And as graſs plants grow to the greateſt height in ſituations where a conſiderable degree of moiſture is conſtantly preſerved, and, of courſe, afford the largeſt produce, it would ſeem that the practice of keeping them under the ſcythe is right on this account; as well as that of their being leſs firm and ſolid in their texture, and their moſtly producing a coarſer herbage. The more elevated grounds, as they bear the ſtock generally with leſs injury, and often afford both a more fine and ſweet feed, are with propriety converted to the uſe of being fed down by animals. By a ſuitable management in the feeding and uſe of manure, the latter ſort of lands may even be brought to afford a conſiderable produce in hay in numerous inſtances.

And "as it muſt be evident to the moſt ſuperficial obſervation, that the breaking of the ſurface texture or ſward of graſs lands muſt, in all caſes, be prejudicial, not only by the deſtruction of plants which is thereby immediately produced, but alſo by the retention and ſtagnation of water upon them in the holes, and depreſſions from ſmall portions of the turf being forced in, the neceſſity and utility of clearing and removing all ſorts of live ſtock, and eſpecially thoſe of the heavy kinds, on both theſe deſcriptions of meadow land when mown, becomes ſtrikingly obvious."

There is a ſtriking fact of this ſort ſtated in the Agricultural Report of Middleſex. "In a piece of clayey meadow land expoſed to the treading of cattle during the wet ſeaſon of winter, with a view of fully aſcertaining the effects of the practice of ſuffering cattle to remain too long upon graſs hay lands, it was found that after three years, notwithſtanding every poſſible care and attention in rolling, manuring, and ſowing graſs ſeeds was employed, it was not reſtored to its former ſtate of ſward." And it has been remarked, that on the deep tough yellow clayey graſs lands in the ſame diſtrict, every care is taken to prevent the leaſt degree of poaching, as "it is well known that wherever a bullock makes a hole with his foot in this kind of ſoil, it holds water, and totally deſtroys every veſtige of herbage, which is not quite replaced till ſeveral years after the hole is grown up."

In regard to the exact period of continuing the feeding down of graſs lands of the hay kind, it cannot be eaſily regulated by any fixed rules, as it muſt depend much on ſeaſons; but it ſhould never, on any account, be continued after the grounds have become ſo much impregnated with moiſture as to eaſily give way to the tread of animals. In the autumn ſeaſon the heavy cattle ſhould ſeldom be ſuffered to remain on the ſofter ſorts of lands longer than the beginning of November, but in thoſe of the more dry kinds, they may be let remain to the end of that month. Sheep ſtock may, in drier caſes, be continued till February, or later; and in the ſpring ſeaſon, if paſtured at all, they ſhould not be admitted upon ſuch lands till they begin to poſſeſs a proper degree of firmneſs, which will depend on the various circumſtances of the preceding ſeaſon. On the more low and moiſt ſorts of meadow land, it can probably ſeldom be ventured earlier than the middle of March.

It is, however, obviouſly a much better practice, eſpecially where hay is the main object, not to eat them down at all, or very little, with cattle in the ſpring, and not ſo much as is the uſual cuſtom with ſheep; as it is plain, that by this means the cultivation will not only enſure a more abundant produce, but a much earlier one, and, of courſe, have more advantage in the making it into hay and ſecuring it.

Beſides, where the lands are fertile and the graſs ſprings quickly, as is often the caſe near large towns where manure is plentiful, it may be advantageous in the view of having a ſecond crop, as by that means the after-graſs may be cut more early, and be leſs in danger of being well ſecured; and, in all events, the after-graſs will be in a more forward ſtate, and, of courſe, ready at a more early period for the admiſſion of ſtock of different kinds, which, in many caſes, is a circumſtance of great importance to the farmer where grazing is the main object.

With reſpect to the moſt proper periods of ſhutting up ſuch graſs lands as are deſigned for hay, they muſt, like thoſe of eating them down by ſtock, depend on various circumſtances that can only ſuit the particular caſes. In general, however, it is the beſt practice not to delay it too long. When the lands are not eaten at all in the ſpring by cattle, after the ſheep have been removed about the middle of February; nothing farther is allowed, according to the writer of the Middleſex Report, to enter the meadows, by which means a quick vegetation is promoted, as well as a more plentiful crop and more early harveſt. And in other caſes it ſhould probably ſeldom much exceed the beginning of April, as when eaten much later, eſpecially in the ſouthern diſtricts, there is not time for the graſs to produce a full crop before the commencement of the hay ſeaſon, of courſe the farmer ſuſtains more loſs than can be repaid by any advantage in the additional feeding he may obtain. This

is

is therefore the beſt practice where the view of the farmer is hay: and it ſhould be particularly adopted and attended to in cow-farms, where it is of much importance to cut early and at different times, in order to ſecure hay of a fine graſſy quality, for the purpoſe of producing large ſupplies of milk. In theſe caſes it is cut two, three, or more weeks before the uſual period, as it is better not to let the ſeed ſtems riſe much.

Immediately after the meadows or other graſs-lands have had the cattle and other ſorts of live ſtock removed from them, in the early ſpring months, and been ſhut up for hay, they ſhould be prepared for the ſcythe, by having all ſorts of obſtructions picked up and removed from the ſurface. This work ſhould always be executed as ſoon as poſſible, before the graſs begins to ſpring up too much and conceal them, as it is difficult to perform the buſineſs effectually afterwards. And it has been obſerved, that "it is an excellent practice, but one that is too much neglected by graſs-farmers in general, to have all ſorts of coarſe plants of the aquatic and other kinds, ſuch as ruſhes, fern, docks, thiſtles, and various others, effectually drawn up and eradicated both from the hedge-rows and other parts of the fields, in order to prevent their running up to ſeed and diſſeminating themſelves over the lands, and thus not only fill them progreſſively with all ſorts of trumpery, but greatly injure the herbage. In a field on an extenſive hay-farm in Middleſex, on perceiving the whole ſurface thickly ſtudded with thiſtle-plants, it was found that this ſort of weed had been ſuffered to flower and perfect its ſeed annually, until the lands on every ſide had become fully ſtocked, to the vaſt injury of the hay-crops. The ſame thing takes place with the dock, and ſeveral other noxious plants, which ſtrongly enforces the utility of the practice juſt recommended. The annual expence of performing the buſineſs is but a mere trifle, while the advantage will be real and permanent. The ſaving to the farmer would be conſiderable, by having the work regularly done as ſoon as the weeds ſhew themſelves, and at the ſame time his young hedge-plants be prevented from being deſtroyed, by being ſhaded and choaked up by ſo many weeds. In order to take them up in a perfect manner, a narrow implement of the ſpade kind, ſuch as is made uſe of in forming narrow drains, may be employed with advantage, as cutting or breaking them off is by no means effectual. After ſuch plants have been removed, and the ground well cleared, ſowing the banks and hedge-rows with the beſt graſs-ſeeds, ſuch as white clover and other ſimilar plants, might be an excellent practice, as in this way the lands may be improved rather than injured."

In regard to plants of the ruſh kind, they may be eaſily removed by preventing the ſtagnation of moiſture near the ſurface, by judicious under or ſurface draining, and the application of ſubſtances of the ſaline or calcareous kinds, ſuch as aſhes, lime, drift from the roads, and other ſimilar materials. Theſe are the beſt made uſe of in a dry ſeaſon, in either the autumn or ſpring; but the latter is probably the beſt, as theſe abſorbent matters will thereby be made uſe of at the time ſuch plants begin to ſhoot and eſtabliſh themſelves, and when there will be the leaſt danger of their operation being leſſened or prevented by too great a degree of moiſture. It has been obſerved, that in natural coarſe meadows, or ſuch as become ſo in conſequence of ruſhes growing upon them, before they have been rendered ſufficiently dry by draining, it forms a great improvement to apply a thin coat of ſand evenly over the ſurface of them, in the proportion of from twenty to thirty common loads. By this means the ſward is rendered much finer, and a much better ſort of herbage brought up; white clover being predominant in moſt caſes where this is practiſed.

But there is another method that, in particular ſituations, may be more eaſy and convenient, and which has been found to quickly deſtroy plants of this coarſe kind, by bringing up thoſe of a finer deſcription. This may appear extraordinary at firſt ſight to thoſe who have not ſeen its ſudden and aſtoniſhing effects in this way. It is that of conducting water over the ſurface of ſuch grounds; but, in this intention, it ſhould not be ſuffered to have the leaſt degree of ſtagnation, but be conveyed off with as much expedition as poſſible, by ſuitable drainage or other means.

M. de Chateauvieux many years ago invented a machine, called a cutting-plough, with three ſharp coulters for cutting the land about ſix or ſeven inches deep, that the manure laid upon it might be waſhed into the inciſions made by the coulters, and which alſo, by cutting the old roots of the graſs, many new roots were produced, and a very great improvement afforded, particularly where the meadows were hide-bound and overrun with moſs. And afterwards Mr. Wynn Baker, in Ireland, added two more coulters, and named it a *ſcarificator;* which is conſidered a very uſeful tool for the purpoſe of improving meadows, as well as paſtures. For it has been found in practice, that if the land is firſt ſcarified, and then manured, the improvement is greater than ſcarifying the land after laying on the manure. And this buſineſs is ſaid alſo to be well performed by a ſward-dreſſer, invented by Mr. Amos in Lincolnſhire. See SWARD-*Dreſſer*.

In caſes where meadow-lands are properly ſituated for the purpoſe of being watered, they may be formed properly for the purpoſe, probably with the moſt advantage, in the early autumn; but when that ſeaſon cannot be conveniently employed, the work may be performed early in the ſpring. The methods of cutting the gutters and trenches, and of managing the whole of the proceſs, as well as the vaſt utility which is the reſult of it, may be ſeen detailed under the heads IRRIGATION and WATERING *of Land*.

Where this practice is attempted, the farmer ſhould commence the watering of his meadow-lands early in November, which, in moſt inſtances, affords more improvement than a dreſſing of the beſt manure that can be provided. As they are commonly the lower parts of the ground that can be made uſe of in this way, much may often be effected by a proper attention to the ditches in the lands that lie at higher levels, as by keeping them in ſuch a ſtate that they may diſcharge themſelves freely into a large main ditch, a little above the lower parts of them, from which the water may be let off occaſionally, ſo as to float the meadow grounds below; care being taken that it does not ſtagnate upon them in any way. And in managing this ſort of operation afterwards, Mr. Wright adviſes that the floater ſhould take care to keep the land ſheltered by the water from the ſeverity of froſty nights. And in the winter, as about January, it is neceſſary, he conceives, every ten days or fortnight to give the land air, and to lay it as dry as poſſible, for the ſpace of a few days. "Whenever the froſt has given a complete ſheet of ice to the meadow, it is adviſable to diſcontinue floating; for the froſt will ſometimes take ſuch ſtrong hold of the land, as to draw it into heaps, and injure the evenneſs of the ſurface. Attention is alſo to be paid to prevent the equal diſtribution of the water being obſtructed, by the continual influx of weeds, leaves, ſticks, &c." And, as the ſeaſon advances, ſtill greater attention is required from the floater in the ſucceeding month: "if the water be ſuffered to flow over the meadow, for the ſpace of many days without intermiſſion, a white ſcum, it is obſerved, is generated, which is found

very

very deſtructive to graſs; and if the water be taken off, and the land expoſed in its wet ſtate to a ſevere froſty night, a great part of the tender graſs will be cut off. In Glouceſterſhire, two methods of avoiding theſe injuries are practiſed: one is, to take the water off by day, to prevent the ſcum, and to turn it on again at night, to guard againſt the froſt; the other method is to take the water off early in the morning, and if that day be dry, to ſuffer it to remain off for a few days and nights; for if the land experiences only one drying day, the froſt at night will do little injury. The former of theſe practices, where it is found not too troubleſome, is preferable to the latter." About the middle of February, the floater ſhould begin to uſe the water more ſparingly than in autumn or winter; for his chief object now is to encourage or force vegetation. It is moſtly found, that about the laſt week of this month, if the preceding management has been good, there will be a pretty full bite for ewes and lambs. Some adviſe rolling in the beginning of the year, as about January.

The ſame writer alſo ſtates, that "about the beginning of March, the graſs on the old floated meadows will generally be ſufficient to afford an abundant paſturage to any kind of farming ſtock; and the water muſt be taken off for nearly a week, that the land may become dry and firm before heavy cattle are admitted. It is proper, in the firſt week of eating off the ſpring feed, if the ſeaſon be cold and rainy, to give the cattle a little hay in the evening to intermix with their moiſt food. But the grand application of the young meadow-graſs is for ewes and lambs; and attention ſhould always be paid to hurdling off the graſs, and giving ſtripes acroſs the meadow, exactly in the way turnips are hurdled for ſheep. The caution of Mr. Boſwell, never to feed on theſe meadows any heavier ſtock in ſpring than ſheep or calves, ſeems to be judicious, but muſt obviouſly depend much on ſoil; for, upon a ſound gravel, a practice may be admitted, which would be miſchievous on a peat meadow." But good rich meadows, whether watered or not, are moſtly ready to be cut about the middle of June.

Mr. Boſwell adviſes, that "as ſoon as the hay is cleared from theſe meadows, cattle of any ſort (no ſheep) ſhould be turned in for a week to eat the graſs out of the trenches, and what may be left by the mowers. Then the water ſhould be worked on them, care being taken to let it only dribble over every part as thinly as poſſible; this being the warmeſt ſeaſon of the year. The firſt watering ſhould not laſt longer than two or three days, before it is ſhifted to another meadow. There will ſoon be an after-graſs of ſuch a rich and beautiful verdure as will aſtoniſh a ſpectator not accuſtomed to it; and the quantity and quality will be beyond conception, compared with the ſtate the lands were in before they were watered. He alſo further cautions us to guard by all means againſt keeping the water too long upon the meadows, in warm weather. It will very ſoon produce a white ſubſtance like cream, which is prejudicial to the graſs, and ſhews it has been upon the ground too long already; but if permitted to remain a little longer, a thick ſcum will ſettle upon the graſs, of the conſiſtence of glue, and as tough as leather, which will quite deſtroy it."

Meadow-*Graſs*, in *Botany*. See Poa, Cynosurus, and Grass.

Meadow-*Fox-tail Graſs*, in *Agriculture*, a ſort of field graſs, that may be cultivated to advantage on the more moiſt ſorts of ſoil. It is ſaid to be early and productive, but rather coarſe. See Alopecurus *Pratenſis* and Grass.

Meadow *Rue*. See Thalictrum.

Meadow *Saffron*. See Colchicum.

Meadow *Saxifrage*. See Peucedanum and Seseli.

Meadow *Sweet*. See Spiræa.

Meadow *Trefoil*. See Trefoil.

Meadow *River*, in *Geography*, a river of America, which runs into lake Huron, N. lat. 45° 38'. W. long. 84° 30'.

MEADVILLE, a thriving poſt-town, ſeated on French creek, a branch of the Alleghany, in Crawford county, Pennſylvania (N. lat. 41° 36'), and the ſeat of juſtice for the counties of Warren and Crawford, to the latter of which it belongs. It contains about 100 houſes, and ſeveral ſtores, and is a place of conſiderable buſineſs.

MEAGOM, a town of Hindooſtan, in Guzerat; 20 miles N. of Baroach.

MEAHGURRY, a town of Hindooſtan, in Candeiſh; 30 miles S.E. of Chuprah.

MEAHMAO, a large town of the Birman empire, on the Irawaddy, ſhaded by groves of palmyra trees, and remarkable for a manufacture of coarſe cloth, ſuch as is worn by the lower claſs of people; 42 miles W. of Ava.

MEAKING, a town of the Birman empire, on the right bank of the Ava; 8 miles N. of Penongmew.

MEAL. The meal or flour of England is the fineſt and whiteſt in the world. The French is uſually browner, and the German browner than that. Our flour keeps well with us; but in carrying abroad, it often contracts damp, and becomes bad. All flour is ſubject to breed worms: theſe are white in the white flour, and brown in that which is brown; they are therefore not always diſtinguiſhable to the eye: but when the flour feels damp, and ſmells rank and muſty, it may be conjectured that they are there in abundance.

The colour and the weight are the two things which denote the value of meal or flour; the whiter and the heavier it is, other things being alike, the better it always is. Pliny mentions theſe two characters as the marks of good flour, and tells us, that Italy, in his time, produced the fineſt in the world. This country, indeed, was famous before his time for this produce; and the Greeks have celebrated it; and Sophocles, in particular, ſays, that no flour is ſo white or ſo good as that of Italy. The corn of this country has, however, loſt much of its reputation ſince that time; and the reaſon of this ſeems to be, that the whole country being full of ſulphur, alum, vitriol, marcaſites, and bitumens, the air may have, in time, affected them ſo far, as to make them diffuſe themſelves through the earth, and render it leſs fit for vegetation; and the taking fire of ſome of theſe inflammable minerals, as has ſometimes happened, is alone ſufficient to alter the nature of all the land about the places where they are. Deſland. Trait. Phyſ.

The flour of England, though it pleaſes by its whiteneſs, yet it wants ſome of the other qualities valuable in flour: the bread that is made of it is brittle, and does not hold together, but, after keeping a few days, becomes hard and dry, as if made of chalk, and is full of cracks in all parts; and this muſt be a great diſadvantage in it, when intended for the ſervice of an army, or the like occaſions, where there is no baking every day, but the bread of one baking muſt neceſſarily be kept a long time.

The flour of Picardy is very like that of England, and, after it has been kept ſome time, is found improper for making into paſte or dough. The French are forced either to uſe it immediately on the grinding, or elſe to mix it with an equal quantity of the flour of Brittany, which is coarſer, but more unctuous and fatty; but neither of theſe kinds of flour keeps well.

The flour of almoſt any country will do for the home conſumption of the place, as it may be always freſh ground; but

but the great care to be used in selecting it is in order to the sending it abroad, or furnishing ships for their own use. The saline humidity of the sea-air rusts metals, and fouls every thing on board, if great care be not taken in the preserving them. This also makes the flour damp and mouldy, and is often the occasion of its breeding insects, and being wholly spoiled.

The flour of some places is constantly found to keep better at sea than that of others; and when that is once found out, the whole caution needs only be to carry the flour of those places. Thus the French find, that the flour of Poitou, Normandy, and Guienne, all bear the sea-carriage extremely well, and they have formerly made a considerable advantage by carrying them to their American colonies.

The choice of flour for exportation being thus made, the next care is to preserve it in the ships: the keeping it dry is the grand consideration in regard to this; the barrels in which it is put up ought to be made of dry and well-seasoned oak, and not to be larger than to hold two hundred weight at the most. If the wood of the barrels have any sap remaining in it, it will moisten and spoil the flour; and no wood is so proper as oak for this purpose, or for making the bins and other vessels for keeping flour in at home, since, when once well dried and seasoned, it will not contract humidity afterwards. The beech-wood, of which some make their bins for flour, is never thoroughly dry, but always retains some sap. The fir will give the flour a taste of turpentine; and the ash is always subject to be eaten by worms. The oak is preferable, because of its being free from these faults; and when the several kinds of wood have been examined in a proper manner, there may be others found as fit, or possibly more so, than this for the purpose. The great test is their having more or less sap. See FLOUR and WOOD.

MEAL *Worm*. See WORM.

MEALY-*Tree*, in *Botany* and *Gardening*. See VIBURNUM.

MEAMBOLANGAM, in *Geography*, a town of the Birman empire, on the Ava; 36 miles N. of Prome.

MEAMOY, a town of the Birman empire, on the right bank of the Ava; 16 miles W. of Ava.

MEAN, the middle, between two extremes.

Thus we say, the mean motion of a planet; its mean distance, &c. meaning a motion or distance, which as far exceeds the least distance or motion, as it is exceeded by the greatest.

MEAN, middle, mean proportion, is the second of any three proportions; but in music, mean is more properly the title of the second violin in trios, as being the mean between the first violin and base. In madrigals of five and six parts, a third treble is generally termed the mean part.

MEAN, in *Law*, refers either to time or dignity. Thus, in the first sense we say, his action was mean betwixt the disseisin made to him, and his recovery; *i.e.* in the interim.

In the second sense, we say, there is lord *mean* or *mesne*.

MEAN, in *Logic*. See MEDIUM.

MEAN *Anomaly*, in *Astronomy*. See ANOMALY.

MEAN *Axis*, in *Optics*. See AXIS.

MEAN $\left\{\begin{array}{l}\textit{Conjunction,}\\ \textit{Opposition,}\end{array}\right\}$ in *Astronomy*, is when the mean place of the sun is in $\left\{\begin{array}{l}\text{conjunction}\\ \text{opposition}\end{array}\right\}$ with the mean place of the moon in the ecliptic. See CONJUNCTION and OPPOSITION.

MEAN *Diameter*, in *Gauging*. See GAUGING.

MEAN *Distance of a Planet from the Sun*, in *Astronomy*, is the right line drawn from the sun, to the extremity of the conjugate axis of the ellipsis in which the planet moves; and this is equal to the semitransverse axis, and is so called because it is a mean between the planet's greatest and least distance from the sun.

MEAN *Motion*, that whereby a planet is supposed to move equally in its orbit, and is always proportional to the time.

MEAN *Proportion*. See EXTREME *Proportion*.

MEAN *Time*. See TIME.

MEANA, in *Geography*, a town of Hindoostan, in Kitchwara; 10 miles N.E. of Budawar.—Also, a town of the island of Sardinia; 21 miles S.S.W. of Lode

MEANG, a town of Hindoostan, in Guzerat; 40 miles N.W. of Puttan-Sumnaut.

MEANGIS, a cluster of small islands in the North Pacific ocean. N. lat. 4° 58′. E long. 126° 55′.

MEANY, a town of Hindoostan, in Guzerat, near the coast; 40 miles S.W. of Junagur.

MEANY, *Choppa*, a town of Hindoostan, in Guzerat, on the coast; 55 miles W. of Junagur.

MEAO, one of the small Molucca islands. N. lat. 1° 12′. E. long. 127° 3′.

MEARIM, a river of Brazil, which runs into the bay of Baranhao, S. lat. 2° 40′. W. long. 45° 30′.

MEASLES, in *Medicine*, a contagious fever, accompanied by a rash or efflorescence on the skin, of a peculiar form or distribution, which mostly appears on the fourth day of the fever, and, after a continuance of four days, gradually declines together with the febrile symptoms.

This disease, like the small-pox and scarlet-fever, was not particularly described or named by the Greek and Roman physicians, but is first mentioned by the Arabians. The translators of the writings of the latter into Latin applied the term *morbilli* to the disease; as it were a *little plague*, the word *il morbo*, in Italy, signifying the plague, or *the disease*, by way of eminence. Subsequently, from the red colour of the rash, the terms *rubiolæ* and *rubeolæ* were given to this disease, and to scarlet-fever, which was confounded with it. The appellation of *rubeola* has been adopted for the measles by our best nosologists, Sauvages and Cullen. The English term *measles* seems to have been borrowed from an appearance, which was so denominated in the flesh of pork, to which the eruption of rubeola was supposed to bear some resemblance.

The disease in question is propagated solely by contagion; and it commences in children, or in adult persons of an irritable constitution, from ten to fourteen days after they have been exposed to the infection. Others, who are less susceptible, may have frequent communication with persons affected with the disease during several successive weeks, but the contagion does not act upon them, unless the body be brought into a feverish state by some incidental cause, as by taking cold, by watching, fatigue, or mental distress. Dr. Willan, in his valuable and elaborate treatise on cutaneous diseases, has described three varieties of measles, which it is important to attend to: these are the rubeola *vulgaris*, or common form of the disease; the rubeola *sine catarrho*, in which fever and catarrh do not accompany the eruption; and the rubeola *nigra*, or purple-measles.

1. The *rubeola vulgaris*, or usual form of measles, exhibits the following character. The symptoms which precede the efflorescence are, on the first and second days, irregular shiverings alternating with heat of the skin, general debility or listlessness, flushing of the cheeks, giddiness, a sensation of pain or weight across the forehead and eyes, with drowsiness; sometimes pain of the back and limbs, slight

ſlight ſoreneſs or roughneſs in the throat, loſs of appetite, frequent nauſea, thirſt, a white fur on the tongue, clear high-coloured urine, the pulſe much increaſed in frequency, and ſomewhat labouring or irregular. On the third and fourth days, the ſame ſymptoms continue, but with greater violence: the eyes become tender and inflamed; the eye-lids and tarſi appear a little turgid; at the ſame time a ſerous humour is copiouſly diſcharged both from the eyes and noſtrils, which occaſions repeated ſneezing. The diſeaſe during this period, and uſually for two or three days longer, is accompanied with a frequent dry cough, hoarſeneſs, difficulty of breathing, and a ſenſe of conſtriction acroſs the cheſt. In children, indeed, in whom all the ſymptoms of the firſt ſtage are more ſevere than in adults, the diſeaſe is often preceded by a harſh ſounding cough for a week, or even a fortnight, before it formally commences; and ſometimes, eſpecially during the period of dentition, is attended with frequent twitchings, or even with ſtrong convulſive fits.

We have ſaid that the efflorescence moſtly appears on the fourth day of the fever: this, however, is not invariably true. In perſons who have a very delicate ſkin, it ſometimes appears partially on the third day; while in others, of a dark and thick ſkin, or who have been expoſed much to cold, it may not be manifeſt till the fifth or ſixth day: and as the contagion is, in many perſons, only called into action by ſome incidental feveriſhneſs; ſo it is not eaſy, in theſe caſes, to aſcertain the commencement of the proper eruptive fever.

The raſh is firſt viſible on the face, eſpecially on the forehead and under the chin, and exhibits in other parts only a few ſcattered ſpecks, with a ſomewhat warmer colour of the ſkin than uſual. On the following (fifth) day, it is formed on the neck and breaſt in the morning, and is diffuſed, towards evening or in the night, round the trunk of the body, and along the extremities; during this day it is moſt full and vivid on the face. On the *ſixth* day of the diſeaſe, the raſh on the face begins to fade and ſubſide, while the patches on the body are moſt red and extended; but theſe gradually change their appearance the day after. The patches on the back of the hand and wriſt, which uſually appear lateſt (in ſome inſtances on the ſixth or ſeventh day), do not always decline till the *eighth* day. On the *ninth* day, there remain only veſtiges of the efflorescence, marked by a ſlight diſcolouration; this, however, diſappears before the end of the *tenth* day. When the raſh begins to decline on any part, the cuticle becomes dry and rough, and ſoon after ſeparates into ſcurf. Hence ariſes a very diſagreeable itching of the ſkin which continues from the ſeventh to the tenth day.

The progreſs of the eruption is ſometimes checked by expoſure to continued cold; and its retroceſſion occaſions delirium, reſtleſſneſs, difficulty of breathing, pain of the bowels, diarrhœa, &c. and endangers the life of the patient. The inflammation of the eyes, the diſcharge of tears, the ſneezing, and hoarſeneſs, generally ceaſe on the decline of the efflorescence, about the ſeventh day; at leaſt they are always much abated at that time, and the appetite for food returns. Between the fourth and ſixth days there is often a hæmorrhage from the noſe, and in females an appearance of the catamenia out of their courſe; but theſe circumſtances occur in other eruptive diſeaſes.

It is neceſſary, however, to attend to the form and mode of diſtribution of the efflorescence, as well as to its progreſs and periods, with a view to avoid miſtakes as to the nature of the diſeaſe; which has been frequently, and indeed for many centuries was conſtantly confounded with ſcarlet-fever, and other febrile raſhes. The colour of the raſh in the meaſles, Dr. Willan obſerves, is leſs bright than in ſome other diſeaſes of the exanthematous claſs. It verges towards the raſpberry tint, rather than the ſcarlet or roſe hue of ſome other raſhes. On the eighth day, when the efflorescence declines, it changes to ſomewhat of a yellowiſh hue. The raſh commences with diſtinct, red, and nearly circular dots, about the ſize of common flea-bites, to which moſt writers have compared them. Larger patches afterwards appear, or rather theſe dots, becoming more numerous, coaleſce into larger patches, which, although not exactly defined, approach neareſt in their form to the figure of a creſcent, or ſemicircle. Theſe patches are ſlightly raiſed, and give to the finger the ſenſation of an unequal ſurface. Many of the patches are interſperſed with the ſame ſmall circular dots; but there are, for the moſt part, large interſtices of cuticle retaining its uſual colour.

From theſe characteriſtic appearances of meaſles there are only partial variations: as, 1ſt. The fluſhed and tumefied ſtate of the cheeks, while the fever continues, may obliterate or obſcure the form of the raſh on thoſe parts. 2dly. In infants leſs than a year old the efflorescence is much ſcattered; and on the cheeks, noſe, backs of the hands, &c. it often conſiſts of diſtinct pimples (*papulæ*). The wriſts, hands, and fingers are alſo frequently papulated in adults. 3dly. In many perſons, at different ages, there are, during the height of the efflorescence, lymphatic or miliary veſicles on the neck, breaſt, and arms. Willan on Cutan. Diſeaſes, p. 217, & ſeq.

Dr. Heberden has noticed the following particularities of the meaſles: "One patient was ſeized with a ſpitting on the fourth day, which continued to teaſe him for forty-eight hours, without ſuffering him to reſt at all by day, or to ſleep at night: the cough in the mean time almoſt ceaſed, and all the other ſymptoms were as mild as in a favourable ſort of the meaſles.

"In one or two patients I have ſeen the eruption appear on the arms a few hours after its having been obſerved on the face and neck.

"Once or twice the diſtemper has been obſerved never to have reached the arms, which parts, through the whole of it, ſhewed none of the uſual ſpots.

"The eye-lids have been ſo ſwelled, on the ſecond day of the eruption, that for twenty-four hours they could not be opened.

"In ſeveral patients the marks on the face have been on the third and even fourth day of the eruption, of as bright a red as ever. In others, I have obſerved them to diſappear entirely on this day, and all other ſymptoms likewiſe to retreat.

"I have noted a very troubleſome and conſtant ſneezing, which firſt came on upon this day.

"A child, five years old, became comatoſe the third day of the eruption, and died the next.

"The longer the preparatory ſymptoms have continued and the worſe they were, ſo much the leſs mild the diſtemper proved.

"Thoſe who have ſhewn the leaſt remains of the eruption after the ſeventh day of the diſeaſe (and ſome have hardly ſhewn any) have appeared the beſt; and in thoſe where it was ſtill in undiminiſhed vigour, the cough and fever have been the worſt." See a Paper in the Med. Tranſ. of the Coll. of Phyſ. vol. iii. Alſo, Dr. Heberden's Comment. de Morb. cap. 63.

The eruptive ſtage of the meaſles is not attended with much danger, either to infants or adults. The fever, indeed, does not receive any immediate alleviation, but is often ſomewhat aggravated on the appearance of the raſh: yet the nauſea and

and vomiting feldom continue beyond the fourth day of the fever, as Sydenham has juftly remarked; and the diftreffing heat, panting, and reftleffnefs abate on the fixth day. The fubfequent period of the difeafe, however, may prove fatal to patients of any age. Between the ninth and twelfth day, fome children are unexpectedly attacked with great difficulty of breathing, or fuffocation, and die in a few hours. In others, the diarrhœa, which ufually fupervenes on the difappearance of the rafh, about the ninth or tenth day, continues, without intermiffion, for fo long a period that it exhaufts their ftrength, and they become pale and emaciated; under thefe circumftances aphthous ulcerations of the mouth are generally the fore-runners of death. Adults, as well as children, fall fometimes into a ftate of hectic fever, which returns twice in twenty-four hours, without any cough or diarrhœa; and during the intervals there is great reftleffnefs and a quick irregular pulfe. The patients thus affected, for two or three fucceffive weeks, gradually fink under the complaint; but in fome inftances a fatal termination feems to be averted by the appearance of boils, puftules, or fuppurating tubercles on the fkin, which operate very favourably with refpect to the internal diforder, both in this hectic ftate, and in cafes where the bowels or the lungs are feverely affected. Sometimes this alleviation is fpeedily produced by an eruption of inflamed watery veficles round the cheft, or more flowly by a difcharge from behind the ear, or from the ear itfelf, accompanied with fuppuration in fome of the lymphatic glands. When nothing of this kind appears externally, the inflammation of the lungs in adults is fometimes on a fudden greatly aggravated; the cough ceafes, refpiration becomes more and more laborious, with a fenfe of oppreffion and anxiety: the eyes are glaffy, the countenance livid, the extremities cold, and the pulfe fcarcely difcernible. After a ftruggle of three or four days, the difeafe has a fatal termination, the caufe of which diffections have afcertained, in feveral cafes, to be an effufion of lymph, mixed with blood or matter, into the cavity of the thorax. Willan.

Even when the meafles pafs through their courfe moderately and mildly, however, various diforders follow them, or a tendency to fome other difeafe is not unfrequently left behind; fo that the confequences of this fever are often more to be dreaded than the original difeafe itfelf. In many perfons the cough, foon after the difappearance of the rafh, recommences with violence, being attended with difficulty of breathing, fixed pain in the fides, flufhing of the cheeks, quick pulfe, and often with paroxyfms, as in a hectic. This ftate is protracted much longer than pneumonic inflammation produced by cold, and more frequently terminates by effufion into the cavity of the cheft, or by fpitting of blood, fuppuration, and confirmed pulmonary confumption. There are alfo fome other appearances which occafionally fucceed the meafles, efpecially difeafes of the fkin and glandular fyftem, which mark a cachectic ftate of the habit. Among thefe are fmall hard tumours, like boils, occurring on the back, loins, and lower extremities, which are very much inflamed in the beginning, and afterwards fuppurate with great pain, and a fanious difcharge; herpetic eruptions, in patches of watery veficles, with an inflamed bafe, about the cheft, mouth, &c. producing much heat, pain, and tingling of the fkin; foft puftules, containing a vifcid ftraw-coloured fluid on the head, face, breaft, and thighs, fucceeded by ulcerations at the corner of the mouth, with tumour of the upper lip, inflammation of the eyes, and ulcerations at the edges of the eye-lids, difcharges behind the ears, enlargement and tedious fuppuration of the lymphatic glands under the jaw, in the neck, arm-pits, and groin, fometimes with pain and fwelling of the joints, and every other form of fcrofulous difeafe.

Treatment of Common Meafles.—The rubeola vulgaris is ufually a mild difeafe in the fummer months, being attended with a moderate degree of fever, and but little cough; in January, February, and March, it is moft frequent, and likewife moft fevere and dangerous.

In the eruptive ftage of the difeafe, it is neceffary to enjoin a very light diet, with mild tepid drinks; and to keep the patient in a moderate temperature, carefully guarding againft any great or fudden changes. An emetic given on the fecond or third evening affords fome flight alleviation to the violence of the catarrhal fymptoms. During the eruption, however, no confiderable effect appears to be produced by antimonials, or other diaphoretics; and emulfions and mucilages afford but a very feeble palliation of the cough and difficulty of breathing. The firft of thefe objects, to wit, of foftening the fkin, feems to be more efficiently accomplifhed by the ufe of the warm pediluvium every evening; and the latter by the infpiration of the fteam of hot water. If a diarrhœa comes on during the continuance of the efflorefcence, it is generally favourable, relieving the cough, and allaying the inflammatory fymptoms: where this does not fupervene, therefore, it is advifable to adminifter occafional purgatives, which will be found to produce a fimilar relief, and often fuperfede the neceffity of more violent remedies.

Almoft all authors, down to our own time, have afferted the neceffity of blood-letting in this difeafe, differing only in regard to the period when it may be practifed with moft advantage. Morton deemed it requifite during the height of the eruption, when he thought the difeafe was moft inflammatory; and Sydenham recommended it after the difappearance of the eruption, when fymptoms of pulmonary inflammation enfue. Whilft Mead and Heberden confidered the period of the difeafe as of little moment in determining the propriety of the practice, which the degree of inflammatory affection in the cheft, they contended, ought alone to decide. Dr. Heberden, however, recommended the ufe of the lancet as a general remedy in the meafles. "Bleeding may be ufed at any time of the meafles," he fays, "and is always beneficial where the fymptoms are very diftreffing, particularly an oppreffion of the breath, to which every ftage of this diftemper is liable; and *bleeding*, together with fuch medicines as occafional fymptoms would require in any other fever, is the whole of the medical care requifite in the meafles." Med. Tranf. vol. iii. p. 404.

In cafe the breathing becomes fuddenly difficult, threatening to fuffocate the patient, at the conclufion of the difeafe, as Sydenham ftates, there cannot be a doubt that blood-letting, even in children, may be reforted to with great benefit, and ought not to be omitted: in infants the application of leeches to the cheft may be fufficient. With refpect to the treatment of the oppreffion, however, conjoined with anxiety, heaving of the cheft, and a labouring pulfe, which take place on the third, fourth, or fifth day of the difeafe, Dr. Willan juftly obferves, that this remedy may be difpenfed with, unlefs there are at the fame time pains in the cheft, and a hard dry cough. "Thofe who from doubt, or from fome collateral motive," he ftates, "are led to await the event, ufually find the pulfe become moderate, and the uneafy laborious refpiration terminate in twenty-four hours. This oppreffed breathing is, indeed," he adds, "common to other eruptive fevers, and if it were univerfally confidered to be an indication for bleeding, the practice would often be more fatal than the difeafe." Loc. cit. p. 232.

 He

He goes on to remark, that "when the efflorefcence in meafles has wholly difappeared, and the cough, difficulty of breathing, and pains in the cheft are very fevere, bleeding and cupping may perhaps be repeatedly neceffary. Yet, even in robuft habits, fome limitation is requifite to this mode of practice; fince it has not an effect in alleviating the fymptoms, equal to that which is experienced from it in pulmonic inflammations originating from cold. Hence we fhould employ as auxiliaries to bleeding, at the latter period of the difeafe, blifters, opium, and demulcent liquors. Sydenham prefcribed an opiate every night through the whole courfe of the meafles; but this plan feems not beneficial in the eruptive ftage; I have obferved, and myfelf felt, while labouring under the difeafe, that opium did not conciliate fleep, but produced an increafe of heat and reftleffnefs, and therefore feldom direct it till the efflorefcence has declined. A diarrhœa occurring at this period may be accounted a moft favourable circumftance, fince nothing fo effectually relieves the peripneumonic fymptoms, or contributes more to prevent the troublefome confequences of the difeafe formerly mentioned. The neceffity of bleeding, as a remedy for the diarrhœa, is infifted upon by Dr. Sydenham from theoretical reafoning. Experienced practitioners in London feem to have now decided, that we ought not much to interfere with this critical evacuation, but rather allow it a free courfe, at leaft for fome days. Where the diarrhœa does not thus take place, it is proper to imitate the ufual procefs of nature, by the occafional ufe of purgatives, which will always be found to relieve the cough, and by allaying the inflammatory fymptoms, often to fuperfede the neceffity of blood-letting."

2. The *Rubeola fine catarrho*, which is fo mild as to require no medicine, is particularly entitled to notice, in confequence of a circumftance pointed out by Dr. Willan, and not obferved by other writers who had mentioned its occurrence; namely, that when the eruption of meafles occurs without the accompanying fever and catarrhal fymptoms, it does not appear to fecure the conftitution from the future influence of the contagion, nor to prevent the acceffion of the ordinary form of the difeafe at a fubfequent period. In this way he fuppofes that the inftances of the recurrence of meafles in the fame individual, which have been recorded, are probably to be explained, unlefs where other difeafes, fcarlatina, rofeola, ftrophulus, &c., have been miftaken for meafles; for he never faw the *febrile* meafles occur more than once in the fame perfon. In fome cafes the non-febrile eruption has occurred at the interval of two years before the rubeola vulgaris; in other inftances, a very fhort time has intervened. "I have feen other inftances of the fame kind," Dr. Willan fays, "wherein the efflorefcence without fever or catarrhal fymptoms having declined, there appeared on the fourth day from its commencement a new efflorefcence, and violent diforder of the conftitution. Thefe inftances are perfectly analogous to fome cafes of fmall-pox, in which diftinct puftules arife without any material complaint, and when thefe decline, about the eighth or ninth day after their appearance, the variolous fever takes place, with an eruption of confluent pocks over the whole furface of the body." P. 236.

The appearance of the efflorefcence of meafles, when the ordinary febrile and catarrhal fymptoms are abfent, is to be diftinguifhed from other rafhes, as well as from lichen and ftrophulus, which are *papular*, by a careful examination of its form and diftribution, as above defcribed. In infants, Dr. Willan obferves, the eruption of meafles "is more papulated, and the patches often lefs extenfive, fo that to difcriminate with exactnefs, the patient being under two years of age, requires both minute attention, and fome previous habitude."

3. The *Rubeola nigra* is that variety of the meafles, which fometimes occurs, in which, about the feventh or eighth day, the rafh becomes fuddenly black, or of a dark purple colour, with a mixture of yellow. This appearance has continued ten days, and in fome cafes longer, without much diftrefs to the patient, and with no other fymptoms of fever than a quick pulfe, and a flight degree of languor. The mineral acids were adminiftered in thefe cafes with evident advantage. Sydenham afcribes the change of the appearance of the rafh to a black or purple colour, which he occafionally witneffed in adults, to the pernicious perfeverance in a heating regimen. To the influence of fuch a regimen, indeed, he affirms that the pulmonary inflammation, which is the moft fatal fymptom, as well as the diarrhœa, that continued many weeks, was generally to be imputed. See his excellent chapter on Meafles, which contains the prototype of the defcription of the difeafe, that has been given by the majority of fubfequent writers. Sect. iv. cap. 5.

Under the denomination of "putrid meafles," fir Will. Watfon defcribed a difeafe, which prevailed among the children of the Foundling Hofpital, in 1763 and 1768. (See Med. Obf. and Inquir. vol. iv.) On examining the fymptoms of this difeafe, however, as detailed by fir W. Watfon himfelf, as well as the varying appellations, which he gave to it, at different times, in his journal of the cafes, Dr. Willan has fhewn moft clearly, that the difeafe in queftion was not meafles, but fcarlet-fever. There were, indeed, a cough and watery eyes among the fymptoms of thefe "putrid meafles;" but "the eruption appeared over nearly the whole body on the fecond day;"—"the fauces were of a deep red colour;"—"the pulfe was very quick, but low;"—"the patients complained of extreme weaknefs, and could not bear bleeding;"—"their oppreffed and difficult breathing was attended with great reftleffnefs and anxiety, but with fcarce any expectoration throughout;"—"fome died under laborious refpiration, more from a dyfenteric purging;"—"fome cafes terminated in mortification of the rectum, pudenda, cheeks, gums, &c. others with caries of the jawbones." Now thefe circumftances obvioufly belong to fcarlatina, and not to meafles: indeed fir W. Watfon refers them to the morbilli maligni, or epidemii, defcribed by Morton. (De Morbillis et Febre Scarlatina.) But Morton, who calls the difeafe alfo morbilli *fpurii*, exprefsly maintains that the meafles and fcarlatina are the fame difeafe, with no more variation in their form, than there is between the diftinct and confluent fmall-pox: he has therefore conjoined the principal fymptoms (cap. iii.), and wifhes to banifh the diftinction, and the very name of fcarlatina, from medical language. Hence thofe readers who attend not to the names of things, but to the things themfelves as defcribed, will find that the morbilli maligni, epidemii, and fpurii, and the febris morbillofa peftilentialis, in his writings, have no relation to the meafles, but conftitute the difeafe, to which other writers have given the titles of angina maligna, fcarlatina anginofa, and maligna, &c. Willan, loc. cit.

The original writers on the meafles, however, not only laid the foundation for this error, but created a much greater confufion, by defcribing the fmall-pox and the meafles as one and the fame difeafe, which admitted of confiderable variety in its form. This confufion was tranfmitted from the Arabian phyficians, who firft defcribed thefe difeafes, through eight or nine centuries. But as the meafles and fcarlet fever were deemed one and the fame malady, even down to our own times; fo this confufion was greater than at at first sight it appears to have been; inasmuch as these *three* specific contagions were treated of as one disease, including also the chicken-pox, which was separated during the last century. This circumstance enables us to explain the opinion of the Arabian physicians, that the small-pox or measles not unfrequently occurred *twice*, but rarely *thrice*, in the course of the life of an individual; since the occurrence of any one of these four diseases would be considered as a recurrence of the small-pox. It would seem extraordinary, indeed, (if we did not know how completely the observation of mankind is obscured and perverted by pre-conceived opinions,) that the almost universal occurrence of both the small-pox and the measles, in the same individuals, should have escaped their notice. Yet even so late as the time of Sennertus, this fact was not known: for that able and learned physician discusses the question, Why the disease in some constitutions assumes the form of small-pox, and in others that of the measles? (See his Med. Pract. lib. iv. cap. 12.) He refers it merely to some indescribable idiosyncrasy, or peculiarity of habit. In his time, indeed, physicians had not entirely agreed upon the appropriation even of the names *variolæ* and *morbilli*; for some applied the term *variolæ* to the eruption of the measles, "quæ colorem cutis *variant*," they said. Diemerbroeck, an able Dutch professor, still later expressed his opinion, that small-pox and measles differed only casually and in degree, not in kind. "Differunt (morbilli) à variolis accidentaliter, vel quoad magis et minus." Tractat. de Variol. et Morbill. cap. xiv.

When the most able physicians did not step aside from the path which the Arabians had marked out for them, so as to ascertain the essential difference between the *pustular* small-pox and the *rash* called measles, it can scarcely be expected that they should have made out the distinction between the two rashes of measles and scarlatina. It is obvious, however, that the scarlatina was known to them, and they deemed it a variety of measles, as many later writers have done.

There is no trace in medical history of the origin and primary cause of the measles, nor of the other contagious eruptive fevers; but it is commonly supposed, that they had no existence in the time of the older Greek and of the Roman physicians; since, among the accurate descriptions which they have left of many diseases, that are at present familiar to us, no distinct account of these striking and formidable maladies is to be found. This is, indeed, an extraordinary circumstance; and by those who look back to the fathers of physic, as to the only correct and unbiassed observers of nature, it is deemed conclusive evidence on the subject. We have seen above, however, that the most accomplished physicians of later times were for ages blinded by the opinions of their predecessors, so as to overlook the most glaring facts; and it is not necessary to inform the learned reader, that no succession of writers ever displayed a more servile adherence to the doctrines of their ancestors, or composed their works by a more systematic transcription of those which had gone before, than the series of Greek physicians from Galen down to Actuarius; nor has any other class of observers been more enslaved by hypothesis, than the Greeks by the four humours of Hippocrates, and the four qualities which Galen engrafted upon them. Insomuch that they satisfied themselves, with giving general appellations to the eruptions, connected with fevers, which they classed together, as pestilential; and deemed the *anthraces* and carbuncles of the true plague, and the *erysipelata, ecthymata, phlyctænæ, erythemata, exanthemata, herpetes*, &c., under which most probably they included the small-pox, measles, scarlet-fever, nettle-rash, &c., as mere varieties of pestilential fever, arising from different combinations of the four humours. These eruptions are frequently mentioned as accompanying malignant fevers by Hippocrates and Galen.

Farther, it is remarkable, that the first writers (of the Arabian school) who treat of small-pox and measles, do not speak of them as new or unusual diseases. Aaron, a physician of Alexandria, and contemporary with Mahomet, considers them as the result of putridity, and similar to the carbuncles of the groin, axillæ, &c., which were often epidemical in the climate where he resided, and fatal within four or five days. Rhazes, a physician of Bagdad, who, about the middle of the ninth century, collected the observations of his predecessors, in a curious tract on this subject, takes it for granted that the small-pox and measles were known to Galen, more than six hundred years before his own time. Although we may admit, however, that the passages which Rhazes quotes (from an incorrect translation of the works of Galen, and not from the original Greek), do not bear him out in this opinion; yet it is scarcely possible to deny that the diseases in question were known *before* the time of Galen, if we carefully peruse a chapter "de Pustularum (ἐξανθημάτων) in febribus curatione," written by Herodotus, and preserved by Aëtius. (See Aëtii, tetrab. ii. serm. i. cap. 129.) This Herodotus was an eminent physician at Rome, in the reign of Trajan, more than half a century before the arrival of Galen in that city; the fragments of his writings, which have been transcribed by Oribasius and Aëtius, contain so much original observation and perspicuity of description, as to excite a regret that the greater part of them has been lost. Herodotus begins this chapter, by mentioning the herpetic eruptions that break out about the mouth and alæ of the nose, at the termination of catarrhal and other slight fevers. "In febrientibus assiduè fiunt exanthemata circa labia et nasum, juxta febrium solutionem." And he recommends these to be treated with a simple liniment, or a saturnine ointment. "But," he proceeds, "in the beginning of fevers, which are not simple, but the result of vitious humours, there arise *over the whole body* patches like flea-bites; and in malignant and pestilential fevers these ulcerate, and some of them have an affinity with carbuncles. All these eruptions are signs of the redundancy of corrupt and corrosive humours in the habit; but those which appear on the face are the most malignant of all. They are worse if numerous, than if few;—the larger are worse than those which are smaller,—and those which have a short course, than those which remain a long time. Those are more dangerous too which are hot and inflamed, than those which are accompanied by itching. And those again which are conjoined with a costive or gently open state of bowels, are favourable; while those accompanied by diarrhœa and vomiting are dangerous; but if, while the successive eruptions appear, the diarrhœa ceases, it is favourable. These exanthemata are attended by malignant symptoms of fever, and often by syncope." The first species, resembling the flea-bites, (by which he probably means the measles) "are to be treated by blood-letting in the beginning, if nothing contra-indicate that remedy; for if the eruptions be repelled inwards, they are wont to produce danger, unless the acrimony be carried off by vomiting or by stool." Hence he recommends "emollient clysters of ptisan, with egg, and oil of chamomile, and that the evening injection should be retained all night; and likewise a spare diet, quo undique multitudo tollatur." But "at the accession of the disease, on account of the violent pains at the region of the stomach, we order warm water to be given," he says, "and vomiting to be excited, by putting the finger or a feather into the throat; light cooling food, &c. &c." But in those cases where the eruptions are pestilential and carbunculous, "we employ blood-

blood-letting at the very outset, but not abstinence; for fasting renders the matter more malignant, and diminishes the vital powers, which we should support in all fevers, especially pestilential ones." He then tells us, that "the same cerates and plaisters, which are useful in burns, may be applied to the pustules, and that those on the face may be alleviated by washing with warm water." When they ulcerate, he recommends the application of poultices of bread, lentils, &c., boiled with honey; and at the same time a diet of goat's milk, to correct the morbid state of the humours. After the decline of the eruption, a proper purgative is to be administered; and the cure is to be completed by an antidote of theriaca or mithridate, "which may destroy the poisonous relics of the humours."

This account is applicable only to the exanthematic fevers, and especially to the small-pox, including measles and scarlatina; for we are acquainted with no other fevers, "occasionally pestilential, with eruptions over the whole body, that often ulcerate, especially on the face." And it appears from the conclusion of this chapter, that Herodotus was well acquainted with the danger of the confluent, and highly red or livid forms of these eruptions. "Moreover," he says, "those which are extremely red, are of the worst kind; but those which are livid, black, and tumid, like flesh that has been dotted, are still more fatal; and these are abundant on the face and breast, abdomen, sides, and back." His advice as to the conduct of the physician in these desperate cases, is curious. "In such instances it is prudent not to attempt any thing in the beginning, but to wait; for if it terminates ill, the blame will fall upon him, who endeavoured or promised to effect a cure; but if the disease goes on to its acme, without any increase of malignancy, then it should not be altogether left to itself; a little occasional assistance should be given, medicine should be administered at proper opportunities, and the cure be conducted with great vigilance. For those eruptions, which arise from beneath in a mortifying state of the surface, what can they denote but that the life is passing from within?"

It appears pretty obvious, from the preceding extracts, that the contagious exanthemata were familiarly known at Rome, at the end of the first century. For this is the language of observation and experience, and implies that the diseases, thus distinctly described, were of ordinary occurrence; their recent appearance is not once hinted at. If we trace the accounts of these exanthemata, down to the seventeenth century, even after appropriate names had been given to them, we still find a similar communion of nature, origin, and treatment, ascribed to them; and it was not till the end of the 18th century, that their peculiar characteristics were pointed out. The Arabians themselves have distinctly described the scarlatina, as a variety of measles [see Haly Abbas, Theorice. lib. viii. cap. 14. where the translator has distinguished it from the *morbilli* (or ordinary measles) by giving it the appellation of *rubeola*, from its scarlet colour]; yet the disease was still confounded with the measles, so late as the publication of sir W. Watson's paper, above referred to; so difficult it is to see with our own eyes through the veil of prejudice! Consult Rhazes de Variolis et Morbillis, translated by Channing. Sydenham, Obs. Med. sect. iv. chap. 5. Morton, de Morbis acutis, exercit. iii. Sennert. de Febribus, lib. iv. cap. 12. Diemerbroeck de Variol. et Morbill. cap. xiii. Heberden, in Med. Transact. vol. iii., and Commentar. cap. 63.; and Willan on Cutaneous Dis. order iii.

MEASURE, Mensura, in *Geometry*, denotes any certain quantity assumed as one, or unity, to which the ratio of other homogeneous or similar quantities is expressed.

This definition is somewhat more agreeable to practice than that of Euclid, who defines measure a quantity, which being repeated any number of times, becomes equal to another: which only answers to the idea of an arithmetical measure, or quota part.

Measure *of an Angle*, is an arc described from the vertex in any place between its legs. Hence angles are distinguished by the ratio of the arcs, described from the vertex between the legs, to the peripheries.

Angles then are distinguished by those arcs; and the arcs are distinguished by their ratio to the periphery. See Angle.

It is, however, in many cases, a more simple and more convenient method to estimate angles, not by the arcs subtending them, but by their sines, or the perpendicular falling from one leg to the other. Thus it is usual, among miners, to say that the ground rises or falls one foot, or one yard, in ten, when the sine of the angle of its inclination to the horizon is one-tenth of the radius. Angles of different magnitudes are indeed proportional to the arcs, and not to the sines, so that in this sense the sine is not a true measure of the comparative magnitude of the angle; but in making calculations, we are more frequently obliged to employ the sine or cosine of an angle than the angle or arc itself. Nevertheless, it is easy to pass from one of these elements to the other by means either of trigonometrical tables, or of the scales engraved on the sector.

To measure the height of a hill, see Altitude, and the latter part of the article Levelling.

Measure *of a Figure*, or plane surface, is a square; whose side is one inch, foot, yard, or some other determinate length.

Among geometricians, it is usually a rod, called a *square rod*, divided into ten square feet, and the square feet into square digits. Hence square measures. See Mensuration.

Measure *of a Line* is any right line taken at pleasure, and considered as unity.

The modern geometricians use a decempeda, or rod, divided into ten equal parts, called feet. The feet they subdivide into ten digits, the digit into ten lines, &c. This decimal division of the measure was first introduced by Stevinus, probably from the example of Regiomontanus. The index or character of the decempedæ he made 0, that of feet 1, of digits 2, of lines 3, &c. which, because the measure was subdivided in a decuple ratio, were the logarithms of the division. Bayer, in lieu of these, expressed the logarithms by the Roman characters; *v. g.* 5 perches, 4 feet, 3 digits, and 2 lines, he expressed thus; $5^{0}, 4^{\prime}, 3^{\prime\prime}, 2^{\prime\prime\prime}$. It is frequently most commodious to separate the integers, or rods, from the fractions, by a point; thus, instead of $5^{0}, 4^{\prime}, 3^{\prime\prime}, 2^{\prime\prime\prime}$, to write 5.432. F. Noel observes, that, among the Chinese, the decimal division obtains in their common measures, and even in their weights.

Measures, *Line of*. See Line.

Measure *of the Mass*, or *quantity of matter*, in *Mechanics*, is its weight; it being apparent, that all the matter which coheres and moves with a body, gravitates with it: and it being found by experiment, that the gravities of homogeneal bodies are in proportion to their bulks: hence, while the mass continues the same, the absolute weight will be the same, whatever figure it put on: but, as to its specific weight, it varies as the quantity of surface varies. See Weight.

Measure *of a Number*, in *Arithmetic*, is such a number as divides another, without leaving any fraction; thus 9 is a measure of 27.

Measure,

Measure, *Common.* See Common *Measure.*

Measure *of a Solid,* is a cube, whose side is one inch, foot, yard, or other determined length.

Among geometricians, it is sometimes a rod, or perch, called a *cubic perch;* divided into cubic feet, digits, &c. Hence cubic measures, or measures of capacity. See Cube and Mensuration.

Measure *of Velocity,* in *Mechanics,* is the space passed over by a moving body in any given time.

To measure a velocity, therefore, the space must be divided into as many equal parts as the time is conceived to be divided into. The quantity of space answering to such an interval of time, is the measure of the velocity.

Measure, *Universal* and *Perpetual,* is a kind of measure unalterable by time, to which the measures of different nations and ages might be reduced, and by which they might be compared and estimated. Such a measure is very desirable, if it could be attained. Huygens, in his Horol. Oscill. proposes, for this purpose, the length of a pendulum, vibrating seconds, taken from the point of suspension to the point of oscillation. The third part of such a pendulum may be called the horary foot, and serve as a standard to which the measure of all other feet may be referred. Thus, *v. g.* the proportion of the Paris foot to the horary foot would be that of 864 to 881; because the length of three Paris feet is 864 half lines, and the length of a pendulum, vibrating seconds, contains 3 horary feet, or 3 feet $8\frac{1}{2}$ lines, *i. e.* 881 half lines. But this measure, in order to its being universal, supposes, that the action of gravity is every where the same, which is contrary to fact; and, therefore, it would really serve only for places under the same parallel of latitude; and in order to its being perpetual, it supposes that the action of gravity continues always the same in the same place. (See Pendulum.) See also on the subject of a standard of measures, the article Standard, under which head the different modes of ascertaining it will be detailed and discussed.

Measure, in a legal, commercial, and popular sense, denotes a certain quantity or proportion of any thing bought, sold, valued, or the like. It denotes also a vessel of capacity employed in measuring grain and other articles: the fourth part of a peck.

The regulation of weights and measures ought to be universally the same throughout the kingdom, and should, therefore, be reduced to some fixed rule or standard; the prerogative of fixing which was vested, by our ancient law, in the crown. This standard was originally kept at Winchester; and we find, in the laws of king Edgar, cap. 8, near a century before the Conquest, an injunction, that the one measure, which was kept at Winchester, should be observed throughout the realm. With respect to measures of length, our ancient historians (Will. Malm. in Vita Hen. I. Spelm. Hen. I. apud Wilkins, 299.) inform us, that a new standard of longitudinal measure was ascertained by king Henry I. who commanded that the ulna, or ancient ell, which answers to the modern yard, should be made of the exact length of his own arm: and one standard of measures of length being once gained, all others are easily derived from hence; those of greater length by multiplying, those of less by subdividing the original standard. Thus, by the statute, called "Compositio ulnarum et perticarum," $5\frac{1}{2}$ yards make a perch; and the yard is subdivided into 3 feet, and each foot into 12 inches; which inches will be each of the length of 3 grains of barley. The standard of weights was originally taken from corns of wheat, whence the lowest denomination of weights which we have is still expressed by a "grain;" 32 of which are directed by the statute, called "Compositio mensurarum," to compose a pennyweight, of which 20 make an ounce, 12 ounces a pound, and so upwards. Upon these principles the standards were first made; which, being originally so fixed by the crown, their subsequent regulations have been generally made by the king in parliament. Thus, under king Richard I. in his parliament holden at Westminster, A.D. 1197, it was ordained that there should be only one weight and one measure throughout the kingdom, and that the custody of the assise or standard of weights and measures should be commited to certain persons, in every city and borough. (See Alnager.) In king John's time, this ordinance of king Richard was frequently dispensed with for money (Hoved. A.D. 1201); which occasioned a provision to be made for inforcing it, in the great charters of king John and his son. Stat. 9 Hen. III. c. 25.

The statute of Magna Charta, cap. 25, ordains, that there shall be but one measure throughout England, according to the standard in the exchequer; which standard was formerly kept in the king's palace; and in all cities, market-towns, and villages, it was kept in the churches. (4 Inst. 273.) By 16 Car. I. cap. 19, there is to be one weight and measure, and one yard, according to the king's standard, and whoever shall keep any other weight or measure, whereby any thing is bought or sold, shall forfeit for every offence five shillings. And by 22 Car. II. cap. 8, water measure, (*viz.* five pecks to the bushel,) as to corn or grain, or salt, is declared to be within the statute 16 Car. I. And if any sell grain or salt, &c. by any other bushel, or measure, than what is agreeable to the standard in the Exchequer, commonly called Winchester measure, he shall forfeit 40*s.* &c. (22 Car. II. c. 8. 22 and 23 Car. II. c. 12.) Notwithstanding these statutes, in many places and counties there are different measures of corn and grain; and the bushel in one place is larger than in another; but the lawfulness of it is not well to be accounted for, since custom or prescription is not allowed to be good against a statute. (Dalt. 250.) It is now settled, that no practice or usage can countervail the statutes 22 Car. II. c. 8. 22 and 23 Car. II. c. 12. above cited. 4 Term Rep. 750. 5 Term Rep. 353.

There are three different measures, *viz.* one for wine, one for ale and beer, and one for corn. In the measure of wine, 8 pints make a gallon, 8 gallons a firkin, 16 gallons a kilderkin, half barrel or rundlet, 4 firkins a barrel, 2 barrels a hogshead, 2 hogsheads a pipe, and 2 pipes a tun. (Stat. 15 R. II. c. 4. 11 H. VII. c. 4. 12 H. VII. c. 5.) In a measure of corn 8 pounds or pints of wheat make the gallon, 4 gallons a peck, 4 pecks a bushel, 4 bushels a sack, and 8 bushels a quarter, &c. And in other measure, 3 barley corns in length make an inch, 12 inches a foot, 3 feet a yard, 3 feet and 9 inches an ell, and $5\frac{1}{2}$ yards or $16\frac{1}{2}$ feet, make the perch, pole, or rod. (Stat. 27 Edw. III. c. 10.) Selling by false measure, being an offence by the common law, may be punished by fine, &c. upon an indictment at common law, as well as by statute. See the statute 11 Hen. VII. c. 4. which inflicts particular fines for offences, pillory, &c. The more easy and usual mode of punishment is by levying, on a summary conviction, by distress and sale, the forfeiture imposed by the several acts of parliament adapted to particular frauds.

Measures are various, according to the various kinds and dimensions of the things measured. Hence arise *lineal* or *longitudinal* measures for lines or lengths: *square* measures for areas or superficies: and *solid* or *cubic* measures for bodies and their capacities. All these again are very different in different countries, and in different ages, and even many of them for different commodities. Whence arise

arise other divisions of *domestic* and *foreign* measures, *ancient* and *modern* ones, *dry* and *liquid* measures, &c.

Under this head the reader will find enumerated and exhibited in tables, the various general standing measures, long, square, and cubic, now or heretofore in use, with their proportions and reductions: for particulars we refer to the following heads; as FOOT, DIGIT, ELL, TUN, GALLON, BUSHEL, PERCH, LEAGUE, FURLONG, &c.

MEASURES, *Assay of*. See ASSAY.

MEASURES, *Standard of*. See STANDARD.

The Tables of different Measures, extracted from various Publications, are as follow; beginning with Measures of Length.

TABLE I.—Scripture Long Measures.

								Engl. Feet	Inch. Dec.
Digit								0	0.912
4	Palm							0	3.648
12	3	Span						0	10.944
24	6	2	Cubit					1	9.888
96	24	8	4	Fathom				7	3.552
144	36	12	6	$1\frac{1}{2}$	Ezekiel's reed			10	11.328
192	48	16	8	2	$1\frac{1}{3}$	Arabian Pole		14	7.104
1920	480	160	80	20	$13\frac{1}{3}$	10	Scoenus, measuring line	145	1.104

N. B. There was another span used in the East, equal to $\frac{1}{4}$th of a cubit.

TABLE II.—Grecian Long Measures reduced to English.

												Engl. Paces.	Feet.	Inch. Dec.
Dactylus, Digit												0	0	$0.7554\frac{11}{10}$
4	Doron, Dochme, Palesta,											0	0	$3.0218\frac{3}{4}$
10	$2\frac{1}{2}$	Lichas										0	0	$7.5546\frac{7}{8}$
11	$2\frac{3}{4}$	$1\frac{1}{10}$	Orthodoron									0	0	$8.3101\frac{9}{11}$
12	3	$1\frac{1}{5}$	$1\frac{1}{11}$	Spithame								0	0	$9.0656\frac{1}{4}$
16	4	$1\frac{6}{10}$	$1\frac{5}{11}$	$1\frac{1}{3}$	Pous foot,							0	1	0.0875
18	$4\frac{1}{2}$	$1\frac{4}{5}$	$1\frac{2}{11}$	$1\frac{1}{2}$	$1\frac{1}{8}$	Pygme, cubit						0	1	$1.5984\frac{3}{8}$
20	5	2	$1\frac{9}{11}$	$1\frac{2}{3}$	$1\frac{1}{4}$	$1\frac{1}{9}$	Pygon					0	1	$3.109\frac{3}{8}$
24	6	$2\frac{2}{5}$	$2\frac{2}{11}$	2	$1\frac{1}{2}$	$1\frac{1}{3}$	$1\frac{1}{5}$	Pecus, cubit larger				0	1	6.13125
96	24	$9\frac{3}{5}$	$8\frac{8}{11}$	8	6	$5\frac{1}{3}$	$4\frac{4}{5}$	4	Orgya, pace			0	6	0.525
9600	2400	960	$872\frac{8}{11}$	800	600	$533\frac{1}{3}$	480	400	100	Stadium Aulus > furlong		100	4	4.5
76800	19200	7680	$6981\frac{9}{11}$	6400	4800	$4266\frac{2}{3}$	3840	3200	800	8	Million, Mile	805	5	0

N. B. Two sorts of long measures were used in Greece, *viz.* the Olympic and the Pythic. The former was used in Peloponnesus, Attica, Sicily, and the Greek cities in Italy. The latter was used in Thessaly, Illyria, Phocis, and Thrace, and at Marseilles in Gaul.

The Olympic foot, properly called Greek, according to	Dr. Hutton, contains		12.108 English inches,
	Folkes	—	12.072
	Cavallo	—	12.084
The Pythic foot, called also natural foot, according to	Hutton	—	9.768
	Pauċton	—	9.731

Hence it appears, that the Olympic stadium is $201\frac{1}{2}$ English yards, nearly; and the Pythic or Delphic stadium, $162\frac{1}{2}$ yards, nearly; and the other measures in proportion.

The Phyleterian foot is the Pythic cubit, or $1\frac{1}{2}$ Pythic foot. The Macedonian foot was 13.92 English inches; and the Sicilian foot of Archimedes, 8.76 English inches. See TABLE VII.

TABLE III.—Jewish Long or Itinerary Measures.

						Eng. Miles.	Paces.	Feet.Dec.
Cubit						0	0	1.824
400	Stadium					0	145	4.6
2000	5	Sab. day's journey				0	729	3.0
4000	10	2	Eastern mile			1	403	1.0
12000	30	6	3	Parasang		4	153	3.0
96000	240	48	24	8	A day's journey	33	172	4.0

TABLE IV.—Roman Long Measures reduced to English.

										Engl. Paces.	Feet.	Inch.Dec.
Digitus transversus										0	0	$0.725\frac{3}{4}$
$1\frac{1}{3}$	Uncia, or Inch									0	0	0.967
4	3	Palma minor								0	0	2.901
16	12	4	Pes, or Foot							0	0	11.604
20	15	5	$1\frac{1}{4}$	Palmipes						0	1	2.505
24	18	6	$1\frac{1}{2}$	$1\frac{1}{5}$	Cubitus					0	1	5.406
40	30	10	$2\frac{1}{2}$	2	$1\frac{2}{3}$	Gradus				0	2	5.01
80	60	20	5	4	$3\frac{1}{3}$	2	Passus			0	4	10.02
10000	7500	2500	625	500	$416\frac{2}{3}$	250	125	Stadium		120	4	4.5
80000	60000	20000	5000	4000	$3333\frac{1}{3}$	2000	1000	8	Milliare	967	0	0

N.B. The Roman measures began with 6 scrupula = 1 sicilicum; 8 scrupula = 1 duellum; $1\frac{1}{2}$ duellum = 1 seminaria; and 18 scrupula = 1 digitus. Two passus were equal to 1 decempeda.

TABLE V.—Proportions of several long Measures to each other, by M. Picard.

The Rhinland or Leyden foot (12 whereof make the Rhinland perch) supposed	696
The English foot	$675\frac{1}{2}$
The Paris foot	720
The Amsterdam foot, from that of Leyden, by Snellius	629
The Danish foot (two whereof make the Danish ell)	$701\frac{8}{10}$
The Swedish foot	$658\frac{1}{4}$
The Brussels foot	$609\frac{3}{5}$
The Dantzick foot, from Hevelius's Selenographia	636
The Lyons foot, by M. Auzout	$757\frac{2}{3}$
The Bologna foot, by the same	843
The braccio of Florence, by the same, and father Mersenne	1290
The palm of the architects at Rome, according to the observations of Messrs. Picard and Auzout	$494\frac{2}{4}$
The Roman foot in the Capitol, examined by Messrs. Picard and Auzout	653 or $653\frac{1}{2}$
The same from the Greek foot	652
From the vineyard Mattei	$657\frac{1}{2}$
From the palm	$658\frac{1}{4}$
From the pavement of the Pantheon, supposed to contain 10 Roman feet	653
From a slip of marble in the same pavement, supposed to contain 3 Roman feet	650
From the pyramid of Cestius, supposed to contain 95 Roman feet	$653\frac{1}{2}$
From the diameters of the columns in the arch of Septimius Severus	$653\frac{1}{3}$
From a slip of porphyry in the pavement of the Pantheon	$653\frac{1}{3}$

See on this subject Phil. Transf. vol. li. art. 69. p. 774.
For other measures, see FOOT.

TABLE VI.—Proportions of the long Meaſures of ſeveral Nations to the Engliſh Foot, taken from Meſſrs. Greaves, Auzout, Picard, and Eiſenchmid.

The Engliſh ſtandard foot being divided into 1000 equal parts, the other meaſures will have the proportions to it which follow:

	Feet.	Inches.
Engliſh foot	1000	12
Paris foot	1068	12.816
Venetian foot	1162	13.944
Rhinland foot	1033	12.396
Straſburg foot	952	11.424
Norimberg foot	1000	12
Dantzick foot	944	11.328
Daniſh foot	1042	12.504
Swediſh foot	977¾	11.733
Derahor cubit of Cairo	1824	21.888
Perſian ariſh	3197	38.364
Greater Turkiſh pike	2200	26.4
Leſſer Turkiſh pike	2131	25.572
Braccio at Florence	1913	22.956
Braccio for woollen at Sienna	1242	14.904
Braccio for linen at Sienna	1974	23.688
Canna at Naples	6880	82.56
Vera at Almeria and Gibraltar	2760	33.12
Palmo di Archtetti at Rome	7320	87.84
Fanna di Archtetti	7320	87.84
Palmo di bracchio di mercantia	695½	8.346
Genoa palm	815	9.78
Bolognian foot	1250	15
Antwerp ell	2283	27.396
Amſterdam ell	2268	27.216
Leyden ell	2260	27.12
Paris draper's ell	3929	47.148
Paris mercer's ell	3937	47.244

TABLE VII.—Ancient Meaſures taken from Folkes, Raper, Shuckburgh, Hutton, Cavallo, and others.

Arabian, foot	1.095	Engl. H.
Babylonian, foot	1.144	H.
	1.135	H.
Druſian, foot	1.090	H.
Egyptian, foot	1.421	H.
Egyptian, ſtadium	730.8	
Greek, foot	1.009	H.
	1.006 / 1.007	Folkes, 1 $\frac{1}{24}$ Roman f.
	1.007	C.
Greek, phyleterian foot	1.167	H.
Hebrew, foot	1.212	H.
Hebrew, cubit	1.817	H.
Hebrew, ſacred cubit	2.002	H.
Hebrew, great cubit = 6 common cubits. H.		
Macedonian, foot	1.160	H.
Natural foot	.814	H.
Ptolemaic = Greek foot		H.
Roman, foot	.970	Bernard.
	.967	Picard and Greaves.
	.966 / .967	Folkes.
Roman, foot	.970	before Titus. Raper.
	.965	after Titus. Raper.
	.9672	from rules. Sh.
	.9681	from buildings. Sh.
	.9696	from a ſtone. Sh.
	.967	H.
Roman mile of Pliny	4840.5	C.
Roman mile of Strabo	4903.	
Sicilian foot of Archimedes	.730	H.

The length of the Roman foot in inches is ſtated as follows:

By Bernard	11.640 Engliſh inches.
By Picard and Hutton	11.604
By Folkes	11.592
By Raper (before Titus)	11.640
By the ſame (after Titus)	11.580
By Schuckburgh, from rules	11.6064
By the ſame, from buildings	11.6172
By the ſame, from a tomb-ſtone	11.6352

N.B. Hence, 11.6 Engliſh inches ſeem to be a medium; and, therefore, the Roman mile = 1611 Engliſh yards, being 149 yards leſs than the Engliſh mile. See FOOT.

TABLE VIII.—Ancient Greek ſuperficial Meaſures.

Olympic Land Meaſure.

36	Olympic ſquare feet	=	1 Hexapodon.
6	Hexapoda	=	1 Hemihectos.
2	Hemihecti	=	1 Hectos or Modius.
6	Modii	=	1 Medimnus or Jugerum.

Hence it appears, that the Olympic jugerum was equal to 103 Engliſh perches, or nearly $\frac{5}{8}$ths of an acre.

Pythic Land Meaſure.

1666⅔	Square cubits	=	1 Hemihectos.
2	Hemihecti	=	1 Modius.
6	Modii	=	1 Medimnus or Jugerum.

Hence the Pythic jugerum appears to have been equal to 109 Engliſh perches, or nearly $\frac{11}{16}$ths of an acre.

N.B. The plethron, or acre, is ſaid by ſome to contain 1444, by others 10,000 ſquare feet; and aroura, the half of the plethron. The aroura of the Egyptians was the ſquare of 100 cubits.

TABLE IX.—Ancient Greek Corn Meaſure.

2	Xeſtes	=	1 Chœnix.
4	Chœnices	=	1 Hemihectos.
1½	Hemihectos	=	1 Tetarlon.
2	Hemihecti	=	1 Modius.
6	Modii	=	1 Medimnus or Achana.

Paucton ſtates the medimnus to have been 3½ French boiſſeaux = 1.27 Engliſh buſhels, and the inferior meaſures in proportion.

TABLE X.—Attic Dry Meafures reduced to Englifh.

							Pecks.	Gall.	Pints.	Sol. Inch.
Cochliarion							0	0	0	0.276 $\frac{1}{6}$
10	Cyathus						0	0	0	2.763 $\frac{1}{2}$
15	$1\frac{1}{2}$	Oxybaphon					0	0	0	4.144 $\frac{2}{4}$
60	6	4	Cotylus				0		0	16.579
120	12	8	2	Xeftes, fextary			0	0	0	33.158
180	18	12	3	$1\frac{1}{2}$	Chœnix		0	0	1	15.705 $\frac{1}{2}$
8640	864	576	144	72	48	Medimnus	4	0	6	3.5[illegible]1

TABLE XI.—Attic Meafures of Capacity for Liquids, reduced to the Englifh Wine Meafure.

										Gall.	Pints.	Sol. Inch. Dec.
Cochliarion										0	$\frac{1}{120}$	0.0356 [illegible]
2	Cheme									0	$\frac{1}{60}$	0.0712 $\frac{1}{5}$
$2\frac{1}{2}$	$1\frac{1}{4}$	Myfton								0	$\frac{1}{48}$	0.089 $\frac{1}{4}$
5	$2\frac{1}{2}$	2	Concha							0	$\frac{1}{24}$	0.178 $\frac{11}{24}$
10	5	4	2	Cyathus						0	$\frac{1}{12}$	0.356 $\frac{11}{21}$
15	$7\frac{1}{2}$	6	3	$1\frac{1}{2}$	Oxybaphon					0	$\frac{1}{8}$	0.535 $\frac{3}{8}$
60	30	24	12	6	4	Cotylus				0	$\frac{1}{2}$	2.141 $\frac{1}{2}$
120	60	48	24	12	8	2	Xeftes, fextary			0	1	4.283
720	360	288	144	72	48	12	6	Chous, congius		0	6	25.698
8640	4320	3456	1728	864	576	144	7	12	Metretes, amphora	10	2	19.626

Others reckon 6 choi = 1 amphoreus, and 2 amphorei = 1 keramion or metretes. The keramion is ftated by Paucton o have been equal to 35 French pints, or $8\frac{3}{4}$ Englifh gallons, and the other meafures in proportion.

TABLE XII.—Meafures of Capacity for Liquids, reduced to Englifh Wine Meafure.

										Gall.	Pints.	Sol. Inch. Dec.
Ligula										0	$\frac{1}{48}$	0.117 $\frac{5}{12}$
4	Cyathus									0	$\frac{1}{12}$	0.469 $\frac{2}{3}$
6	$1\frac{1}{2}$	Acetabulum								0	$\frac{1}{8}$	0.704 $\frac{1}{2}$
12	3	2	Quartarius							0	$\frac{1}{4}$	1.409
24	6	4	2	Hemina						0	$\frac{1}{2}$	2.818
48	12	8	4	2	Sextarius					0	1	5.636
288	72	48	24	12	6	Congius				0	7	4.942
1152	288	192	96	48	24	4	Urna			3	$4\frac{1}{2}$	5.33
2304	576	384	192	96	48	8	2	Amphora		7	1	10.66
46080	11520	7680	3840	1920	960	160	40	20	Culeus	143	3	11.095

Table XIII.—Jewish Dry Measures reduced to English.

							Pecks.	Gall.	Pints.	Sol. Inch.
Gachal							0	0	01$\frac{17}{20}$	0.031
20	Cab						0	0	2$\frac{5}{6}$	0.073
36	1$\frac{4}{5}$	Gomor					0	0	5$\frac{1}{10}$	1.211
120	6	3$\frac{1}{3}$	Seah				1	0	1	4.036
360	18	10	3	Epha			3	0	3	12.107
1800	90	50	15	5	Letteeh		16	0	0	26.500
3600	180	100	30	10	2	Chomer, coron	32	0	1	18.969

Table XIV.—Jewish Measures of Capacity for Liquids, reduced to English Wine Measure.

							Gall.	Pints.	Sol. Inch.
Caph							0	$\frac{5}{8}$	0.177
1$\frac{1}{3}$	Log						0	$\frac{5}{6}$	0.211
5$\frac{1}{3}$	4	Cab					0	3$\frac{1}{3}$	0.844
16	12	3	Hin				1	2	2.533
32	24	6	2	Seah			2	4	5.067
96	72	18	6	3	Bath, epha		7	4	15.2
960	720	180	60	30	10	Coron, chomer	75	5	7.625

Table XV.—Ancient Roman Land Measure.

100 Square Roman feet	=	1	Scrupulum of land
4 Scrupula	=	1	Sextulus
1$\frac{1}{5}$ Sextulus	=	1	Actus
6 Sextuli or 5 Actus	=	1	Uncia of land
6 Unciæ	=	1	Square Actus
2 Square Actus	=	1	Jugerum
2 Jugera	=	1	Heredium
100 Heredia	=	1	Centuria

N. B. The actus was a slip of ground four Roman feet broad, and 120 long. The jugerum or acre was considered as an integer, and divided, like the libra or as, in the following manner:

		Unciæ	Jugerum contained: Square Feet.	Scrup.	Eng. Roods.	Sq. Pol.	Sq. Feet.
1	As	12 As	28800	288	2	18	250.05
$\frac{11}{12}$	Deunx	11 Deunx	26400	264	2	10	183.85
$\frac{5}{6}$	Dextans	10 Dextans	24000	240	2	2	117.64
$\frac{3}{4}$	Dodrans	9 Dodrans	21600	216	1	34	51.42
$\frac{2}{3}$	Bes	8 Bes	19200	192	1	25	257.46
$\frac{7}{12}$	Septunx	7 Septunx	16800	168	1	17	191.25
$\frac{1}{2}$	Semis	6 Semis	14400	144	1	9	125.03
$\frac{5}{12}$	Quincunx	5 Quincunx	12000	120	1	1	58.82
$\frac{1}{3}$	Triens	4 Triens	9600	96	0	32	264.85
$\frac{1}{4}$	Quadrans	3 Quadrans	7200	72	0	24	198.64
$\frac{1}{6}$	Sextans	2 Sextans	4800	48	0	16	132.43
$\frac{1}{12}$	Uncia	1 Uncia	2400	24	0	8	66.21

N. B. If we take the Roman foot at 11.6 English inches (see Table VII.), the Roman jugerum was 5980 English square yards, or 1 acre 37$\frac{1}{2}$ perches.

TABLE XVI.—Roman Dry Meaſures reduced to Engliſh.

Measure	Ligula	Cyathus	Acetabulum	Hemina or Trutta	Sextarius	Semi d.	Peck.	Gall.	Pints.	Sol. Inch. Dec.
Ligula							0	0	$0\frac{1}{48}$	0.01
Cyathus	4						0	0	$0\frac{1}{12}$	0.04
Acetabulum	6	$1\frac{1}{2}$					0	0	$0\frac{1}{8}$	0.06
Hemina or Trutta	24	6	4				0	0	$0\frac{1}{2}$	0.24
Sextarius	48	12	8	2			0	0	1	0.48
Semi d.	384	96	64	16	8		0	1	0	3.84
Modius	768	192	108	32	16	2	1	0	0	7.68

TABLE XVII.—Ancient Roman Liquid Meaſures.

6 Sextarii	= 1 Congius
4 Congii	= 1 Urna
2 Urnæ	= 1 Amphora
20 Amphoræ	= 1 Dolium.

N. B. The ſextarius and its diviſions were uſed as in the preceding table. If the ſextarius be, as above ſuppoſed, = 36.94 Engliſh cubic inches, the amphora will be = $7\frac{1}{2}$ Engliſh gallons, and the dolium = $153\frac{1}{3}$ Engliſh gallons.

The principal modern meaſures will be found either in the following tables, or under the names of the countries and towns in which they are uſed, or under their own appropriate titles.

TABLE XVIII.—Engliſh Long Meaſures, or Meaſures of Application.

Measure	Barley-corn	Inch	Palm	Span	Foot	Cubit	Yard	Pace	Fathom	Pole, or Rod	Furlong
Barley-corn											
Inch	3										
Palm	9	3									
Span	27	9	3								
Foot	36	12	4	$1\frac{1}{3}$							
Cubit	54	18	6	2	$1\frac{1}{2}$						
Yard	108	36	12	4	3	2					
Pace	180	60	20	$6\frac{2}{3}$	5	$3\frac{1}{3}$	$1\frac{2}{3}$				
Fathom	216	72	24	8	6	4	2	$1\frac{1}{5}$			
Pole, or Rod	594	198	66	22	$16\frac{1}{2}$	11	$5\frac{1}{2}$	$3\frac{3}{10}$	$2\frac{3}{4}$		
Furlong	23760	7920	2640	880	660	440	220	132	110	40	
Mile	190080	63360	21120	7040	5280	3520	1760	1056	880	320	8

N. B. To the above meaſures we may add a link = 7.92 inches, a chain = 792, a nail of cloth = $2\frac{1}{4}$, a quarter = 9, an ell = 45, and a hand = 4 inches.

TABLE XIX.—Scotch Long Meaſures.

An Ell	= 37.2	Engliſh inches.
A Fall	= 223.2	
A Furlong	= 8928	
A Mile	= 71424	
A Link	= 8.928	
A Chain, or Short Rood	= 892.8	
A Long Rood	= 1339.2	

TABLE

Table XX.—English Square or Superficial Measures.

Inches	Feet	Yards	Paces	Poles	Rood	Acre
144						
1296	9					
3600	25	$2\frac{7}{9}$				
39204	$272\frac{1}{4}$	$30\frac{1}{4}$	10.89			
1568160	10890	1210	435.6	40		
6272640	43560	4840	1743.6	160	4	

N. B. English square or superficial measures are raised from the yard of 36 inches, multiplied into itself; and this producing 1296 square inches in the square yard, the divisions of this are square feet and inches; and the multiples, poles, roods, and acres, as in the table. The Scotch acre is 55353.6 square feet English, or 1.27 English acre. See Acre.

Table XXI.—English Dry or Corn Measures.

Solid Inches	Pint	Gallon	Peck	Winchester Bushel	Strike	Carnock or coom	Seam or quarter	Weigh	Last
$34\frac{1}{12}$									
$272\frac{1}{4}$	8								
$544\frac{1}{2}$	16	2							
2178	64	8	4						
	128	16	8	2					
	265	32	16	4	2				
17424	512	64	32	8	4	2			
	3072	384	192	48	24	12	6		
	5120	640	320	80	40	20	10	$1\frac{2}{3}$	

But if the corn gallon contain only 268.8 solid inches, the measures will be as follows:

Solid inches	Gallon	Peck	Winchester bushel *	Quarter
268.8				
537.6	2			
2150.42	8	4		
17203.36	64	32	8	

According to this estimate of the corn gallon, the pint will be 33.6 solid or cubic inches, a quart = 67.2, a pottle = 134.4.

* A heaped bushel is one-third more.

N. B. Some make five quarters a weigh or load, and two weighs a last of wheat; and others reckon ten quarters to the weigh, and twelve weighs to the last. A bushel of wheat, at a mean, weighs 60 pounds, of barley 50, of oats 38; a chaldron of coals is 36 heaped bushels, weighing about 2988 pounds. See Chaldron.

English

English dry or corn measures are raised from the Winchester gallon, which contains $272\frac{1}{4}$ solid inches, and is to hold of pure running or rain-water, nine pounds, thirteen ounces. This seems to stand on the foot of the old wine gallon, of 224 cubic inches; 12 being to $14\frac{13}{16}$, as 224 to $272\frac{1}{4}$. Yet by act of parliament, made 1697, it is decreed, that a round bushel, eighteen inches and a half wide, and eight deep, is a legal Winchester bushel. But such a vessel will only hold 2150.42 cubic inches: and consequently the gallon will contain $268\frac{4}{5}$ cubic inches. The divisions and multiples are in the preceding table.

TABLE XXII.—English Measures of Capacity of Liquids.

Wine Measure.

Solid or Cubic Inches.

28.875	Pint								
231	8	Gallon							
4158	144	18	Rundlet						
7276.5	252	$31\frac{1}{2}$	$1\frac{3}{4}$	Barrel					
9702	336	42	$2\frac{1}{3}$	$1\frac{1}{3}$	Tierce				
14553	504	63	$3\frac{1}{2}$	2	$1\frac{1}{2}$	Hogshead			
19404	672	84	$4\frac{2}{3}$	$2\frac{2}{3}$	2	$1\frac{1}{3}$	Puncheon		
29106	1008	126	7	4	3	2	$1\frac{1}{2}$	Butt or Pipe	
58212	2016	252	14	8	6	4	3	2	Tun

Ale Measure.

Solid Inches.

35.25	Pint					
282	8	Gallon				
2256	64	8	Firkin			
4512	128	16	2	Kilderkin		
9024	256	32	4	2	Barrel	
13536	384	48	6	3	$1\frac{1}{2}$	Hogshead

Beer Measure.

Solid Inches.

35.25	Pint						
282	8	Gallon					
2538	72	9	Firkin				
5076	144	18	2	Kilderkin			
10152	288	36	4	2	Barrel		
15228	432	54	6	3	$1\frac{1}{2}$	Hogshead	
30456	864	108	12	6	3	2	Butt

English

English liquid meafures were originally raifed from troy weight; it being enacted by feveral ftatutes that eight pounds troy of wheat, gathered from the middle of the ear, and well dried, fhould weigh a gallon of wine meafure; the divifions and multiples whereof were to form the other meafures: at the fame time it was alfo ordered, that there fhould be but one liquid meafure in the kingdom; yet cuftom has prevailed; and there having been introduced a new weight, *viz.* the avoirdupois, we have now a fecond ftandard gallon adjufted thereto, and therefore exceeding the former in the proportion of the avoirdupois weight to troy weight. From this latter ftandard are raifed two feveral meafures, the one for ale, the other for beer. For the method of reducing one into the other, fee WEIGHT.

The fealed gallon at Guildhall, which is the ftandard for wines, fpirits, oils, &c. is fuppofed to contain 231 cubic inches; and, on this fuppofition, the other meafures raifed therefrom will contain as in the preceding tables; yet, by actual experiment made in 1688, before the lord mayor and the commiffioners of excife, this gallon was only found to contain 224 cubic inches; it was however agreed to continue the common fuppofed contents of 231 cubic inches; fo that all computations ftand on their old footing. Hence, as 12 is to 231, fo is $14\frac{12}{20}$ to $281\frac{1}{2}$, the cubic inches in the ale gallon: but in effect the ale quart contains $70\frac{1}{2}$ cubic inches; on which principle the ale and beer gallon will be 282 cubic inches. See on this fubject Phil. Tranf. vol. xlvi. art. 15. p. 54.

The feveral divifions and multiples of thefe meafures and their proportions, are exhibited in the preceding tables.

It is conjectured, that fome centuries before the conqueft, a cubic foot of water weighing 1000 ounces, 32 cubic feet weighed 2000 pounds, or a ton; that the fame quantity was a ton of liquids, and a hogfhead eight cubic feet, or 13824 cubic inches, one fixty-third of which was 219.4 inches, or a gallon. A quarter of wheat was a quarter of a ton, weighing about 500 pounds, a bufhel one-eighth of this, equivalent to a cubic foot of water. A chaldron of coals was a ton, and weighed 2000 pounds. (Barlow, Phil. Tranf. for 1740.) At prefent 12 wine gallons of diftilled water weigh exactly 100 pounds avoirdupois.

Whereas it has been thought expedient that the quantities to be returned as and for a barrel of beer or ale brewed by the common brewer and the allowances for wafte fhould be in all places the fame, it is enacted that after the 5th day of July, 1803, every thirty-fix gallons of beer or ale brewed by the common brewers in Great Britain, whether within the weekly bills of mortality or without the fame, taken according to the ftandard of the ale-quart, four thereof to the gallon in the exchequer, fhall be reckoned and returned by the guager or other officer of excife for a barrel of beer or ale; and the allowances to be made in Great Britain to the common brewer not felling beer ale or worts in any lefs quantity than the whole cafk, containing $4\frac{1}{2}$ gallons, whether within or without the faid limits, for wafte by fillings and leakage, or otherwife, out of the returns by the gagers or other officers, fhall be three barrels upon every thirty-fix barrels, both of ftrong beer, or table beer and ale, and after that rate for any greater or lefs quantity. 43 Geo. III. c. 69.

TABLE XXIII.—Scotch Meafures of Capacity of Liquids.

A Gill is	6.462 Englifh cubic inches.
A Mutchkin	25.85
A Choppin	51.7
A Pint	103.4
A Quart	206.8
A Gallon	827.23
A Hogfhead	13235.7, or 16 gallons.

N.B. By the Act of Union, twelve Scotch gallons are reckoned equal to an Englifh barrel, or 9588 cubic inches, inftead of 9927.

A lippie or feed is 200.345 cubic inches.

TABLE XXIV.—French Meafures, according to the Old Syftem before the Revolution.

A Point is	.0148025 Englifh inch, or nearly $\frac{2}{135}$.
A Line	.088815, or nearly $\frac{6}{90}$.
An Inch or Pouce	1.06578, or $\frac{1}{.938226}$, or $\frac{81}{76}$.
A Foot	12.78933
An Ell or Aune	46.8947, or 44 French inches, or according to Vega, 43.9
A Sonde	63.9967, or 5 French feet, about $\frac{8}{9}$ Englifh fathom.
A Toife or Fathom	76.7360, or 6 French feet; formerly 76.71, Phil. Tranf. for 1742.
A Perche	230.2080, or 18 French feet.
A Perche, mefure royale	22 French feet.
A League	2282 toifes, or $\frac{1}{25}$ of a degree.
A Square Inch	1.13582 Englifh fquare inches.
An Arpent	100 fquare perches, about $\frac{5}{6}$ acre Englifh, ufed near Paris.
An Arpent, mefure royale	about $1\frac{1}{4}$ Englifh acre.
A Cubic Inch	1.21063 cubic inches Englifh.
A Litron	65.34
A Boiffeau	1045.44, or 16 litrons.
A Minot	2090.875, or 3 boiffeaux, nearly an Englifh bufhel.
A Mine	4181.75, or 2 minots.
A Septier	8363.5, or 2 mines, or 6912 inches French.
	double for oats.
A Muid	100362, or 12 feptiers.

N.B. A ton of fhipping contains 42 cubic feet. The aune or ell of Paris varies, being for filk ftuffs 527.5 lines, or $46\frac{17}{20}$ Englifh inches; for woollens, 526.4 French lines, or $46\frac{3}{4}$ Englifh inches; for linens, 524 French lines, or $46\frac{11}{20}$ Englifh inches; and it varies ftill more in other parts of France. The perch, which determines the meafure of the acre, varies in different parts of the country: but the arpent of wood-land is every where the fame, the perch being 22 feet long; and this arpent contains 48,400 French fquare feet, or 6108 Eng. fquare yards, or one acre, one rood, one perch.

2

perch. The arpent for cultivated land, in the vicinity of Paris, contains 900 square toises, or 4088 English yards, so that 43 such arpents are equal to 38 English acres nearly.

TABLE XXV.—French Measures, according to the New System, with the amended Nomenclature of Dr. Young.

Measures of Length.

	English Inches.
Millimetre - - - - -	.03937
Centimetre - - - - -	.39371
Decimetre - - - - -	3.93710
Metre - - - -	39.37100, or 3.281 feet, or 1.09364 yds. or nearly 1 y. 1¼ nail, or 443.2959 French lines, or .513074 toise.
Decametre - - - -	393.71000, or 10 yards, 2 feet, 9.7 inches.
Hecatometre - - -	3937.10000, or 100 yards, 1 foot, 1 inch.
Chiliometre - - -	39371.00000, or 4 furl. 213 yards, 1 foot, 10.2 inches: so that 8 chiliometres are nearly 5 miles.
Myriometre - - -	393710.0000, or 6 miles, 1 furl. 136 yds. 0 f. 6 inch.

N. B. An inch is .0254 metres; 2441 inches 62 metres, 1000 feet nearly 305 metres.

Superficial or Square Measures.

Are, a square decametre, is - -	3.95 Eng. perches, or 119.6046 square yards.
Decare - - - - -	1196.0460 square yards.
Hecatare - - - -	11960.4600 square yards, or 2 acres, 1 rood, 35.4 perches.

Measures of Capacity.

	Cubic Inches English.
Millilitre - - - - -	.06103
Centilitre - - - - -	.61028
Decilitre - - - - -	6.10280
Litre, a cubic decimetre - - -	61.02800, or 2.113 wine pints.
Decalitre - - - - -	610.28000, or 2.64 wine gallons.
Hecatolitre - - - -	6102.80000, or 3.5317 cubic feet, or 26.4 wine gallons.
Chiliolitre - - -	61028.00000, or 35.3170 cubic feet, or 1 tun, 12 wine gallons.
Myriolitre - - - -	610280.00000, or 353.1700 cubic feet.

Solid Measure.

	Cubic Feet.
Decistre, for fire wood - -	3.5317
Stere, a cubic metre - -	35.3170
Decastere - - - - -	353.1700

N. B. In order to express decimal proportions in this new system, the following terms have been adopted. The term *Deca* prefixed denotes 10 times; *Heca*, 100 times; *Chilo*, 1000 times; and *Myrio*, 10,000 times. On the other hand, *Deci* expresses the 10th part; *Centi*, the 100dth part; and *Milli*, the 1000dth part: so that *Decametre* signifies 10 metres; and a *Decimetre*, the 10th part of a metre, &c. &c. The *Metre* is the element of long measures; *Are*, that of square measures; *Stere*, that of solid measures: the *Litre* is the element of all measures of capacity; and the *Gramme*, which is the weight of a cubic centimetre of distilled water, is the element for all weights. (See WEIGHT.) For the principle on which this system of measures is founded, see STANDARD. See Dr. Young's Philos. vol. ii. Kelly's Un. Cambist. vol. ii.

TABLE XXVI.—Modern Measures of various Countries compared with those of England.

Altdorf, foot - -	.775	Engl. H.
Amsterdam, foot - -	.927	H.
	.930	C.
	.931	Howard.
Amsterdam, ell - -	2.233	C.
Ancona, foot - -	1.282	H.
Antwerp, foot - -	.940	H.
Aquileia, foot - -	1.128	H.
Arles, foot - -	.888	H.
Augsburg, foot - -	.972	H.
Avignon = Arles.		
Barcelona, foot - -	.992	H.
Basle, foot - -	.944	H.
Bavarian, foot - -	.968	Beigel. See Munich.
Bergamo, foot - -	1.431	H.
Berlin, foot - -	.992	H.
Bern, foot - -	.962	Howard.
Besançon, foot - -	1.015	H.
Bologna, foot - -	1.244	H.
	1.250	C.
Bourg en Bresse, foot -	1.030	H.
Brabant, ell, in Germany	2.268	V.
Bremen, foot - -	.955	H.
Brescia, foot - -	1.560	H.
Brescian, braccio - -	2.092	C.
Breslau, foot - -	1.125	H.
Bruges, foot - -	.749	H.
Brussels, foot - -	.902	H.
	.954	V.
Brussels, greater ell -	2.278	V.
Brussels, lesser ell - -	2.245	V.
Castilian, vara - -	2.746	C.
Chambery, foot - -	1.107	H.
China, mathematical foot	1.127	H.
China, imperial foot -	1.051	H.
	1.050	C.
Chinese, li - -	606.	C.
Cologne, foot - -	.903	H.
Constantinople, foot - -	2.195 } 1.165 }	H.
Copenhagen, foot - -	1.049	H.
Cracau, foot - -	1.169	H. V.
Cracau, greater ell - -	2.024	V.
Cracau, smaller ell - -	1.855	V.
Dantzic, foot - -	.923	H.
Dauphiné, foot - -	1.119	H.
Delft, foot - -	.547	H.
Denmark, foot - -	1.047	H.

Dijon,

Dijon, foot	1.030	H.
Dordrecht, foot	.771	H.
Drefden, foot	.929	Wolfe, Ph. Tr. 1769 V.
Drefden, ell = 2 feet	1.857	V.
Ferrara, foot	1.317	H.
Florence, foot	.995	H.
Florence, braccio	1.900 }	C.
	1.910 }	
Franche Comté, foot	1.172	H.
Frankfort = Hamburg		H.
Genoa, palm	.812	H.
	.800 }	C.
	.817 }	
Genoa, canna	7.300	C.
Geneva, foot	1.919	H.
Grenoble = Dauphiné		H.
Haarlem, foot	.937	H.
Halle, foot	.977	H.
Hamburg, foot	.933	H.
Heidelberg, foot	.903	H.
Infpruck, foot	1.101	H.
Leghorn, foot	.992	H.
Leipzig, foot	1.034	H.
Leipzig, ell	1.833	H. Journ. R. I.
Leyden, foot	1.023	H.
Liege, foot	.944	H.
Lifbon, foot	.952	H.
Lucca, braccio	1.958	C.
Lyons = Dauphiné.		
Madrid, foot	.915	H.
	.918	Howard.
Madrid, vara	3.263	C.
Maeftricht, foot	.916	H.
Malta, palm	.915	H,
Mantua, braffo	1.521	H.
Mantuan, braccio = Brefcian		C.
Marfeilles, foot	.814	H.
Mechlin, foot	.753	H.
Mentz, foot	.988	H.
Milan, decimal foot	.855	H.
Milan, aliprand foot	1.426	H.
Milanefe, braccio	1.725	C.
Modena, foot	2.081	H.
Monaco, foot	.771	H.
Montpelier, pan	.777	H.
Moravian, foot	.971	V.
Moravian, ell	2.594	V.
Mofcow, foot	.928	H.
Munich, foot	.947	H.
Naples, palm	.861	H.
	.859	C.
Naples, canna	6.908	C.
Nuremberg, town foot	.996	H.
	.997	V.
Nuremberg, country foot	.907	H.
Nuremberg, artillery foot	.961	V.
Nuremberg, ell	2.166	V.
Padua, foot	1.406	H.
Palermo, foot	.747	H.
Paris, foot	1.066	H.
Paris, metre	3.281	Y.
Parma, foot	1.869	H.
Parmefan, braccio	2.242	C.
Pavia, foot	1.540	H.
Placentia = Parma		C.
Prague, foot	.987	H.
	.972	V.
Prague, ell	1.948	V.
Provence = Marfeilles.		
Rhinland, foot	(† 1.023	H.)
	1.030	V. Eytelwein.
Riga = Hamburg.		
Rome, palm	.733	H.
Rome, foot	.966	Folkes
Rome, deto, $\frac{1}{16}$ f.	.0604	F.
Rome, oncia, $\frac{1}{12}$ f.	.0805	F.
Rome, palmo	.2515	F.
Rome, palmo di architettura	.7325	F.
Rome, canna di architettura	7.325	F.
Rome, ftaiolo	4.212	F.
Rome, canna dei mercanti	6.5365	F. 8 palms.
Rome, braccio dei mercanti	2.7876	F. 4 palms.
	2.856	C.
Rome, braccio di teffitor di tela	2.0868	F.
Rome, braccio di architettura	2.561	C.
Rouen = Paris		H.
Ruffian, archine	2.3625	C.
Ruffian, arfchin	2.3333	Ph. M. XIX.
Ruffian, verfchock, $\frac{1}{16}$ arfchin	.1458	
Savoy = Chambery		H.
Seville = Barcelona		H.
Seville, vara	2.760	C.
Sienna, foot	1.239	H.
Stettin, foot	1.224	H.
Stockholm, foot	1.073	H.
Stockholm, foot	(.974	Celfius Ph. Tr.)
Strafburg, town foot	.956	H.
Strafburg, country foot	.969	H.
Toledo = Madrid		H.
Trent, foot	1.201	H.
Triefte, ell for woollens	2.220	H.
Triefte, ell for filk	2.107	H.
Turin, foot	1.676	H.
	1.681	C.
Turin, ras	1.958	C.
Turin, trabuco	10.085	C.
Tyrol, foot	1.096	V.
Tyrol, ell	2.639	V.
Valladolid, foot	.908	H.
Venice, foot	1.137	H.
	1.140	Bernard, Howard, V.
	1.167	C.
Venice, braccio of filk	2.108	C.
Venice, ell	2.089	V.
Venice, braccio of cloth	2.250	C.
Verona, foot	1.117	H.
Vicenza, foot	1.136	H.
Vienna, foot	1.036	H.
	1.037	Howard, C. V.
Vienna, ell	2.557	V.
Vienna, poft mile	24888.	V.
Vienne in Dauphiné, foot	1.058	H.
Ulm, foot	.826	H.
Urbino, foot	1.162	H.
Utrecht, foot	.741	H.
Warfaw, foot	1.169	H.
Wefel = Dordrecht		H.
Zurich, foot	.979	H.
	.984	Ph. M. VIII. 289.

N. B. The preceding table has been formed by Dr. Young from the authorities of Folkes, Vega, Hutton, Cavallo, and others.

TABLE

TABLE XXVII.—A Comparifon of the Foot, and other Meafures of Length in different Countries, namely, the Number of Feet, &c. of each Place, correfponding to 100 Englifh Feet; and alfo the Length of a fingle Meafure of each denomination in Englifh Inches, and Hundredths of an Inch.

Place	Measure	Number of each equal to 100 Englifh Feet.	Length of a fingle Meafure of each Sort.
			E. Inches.
Aix la Chapelle	Feet	105.18	11.41
Amfterdam	ditto	107.62	11.15
Anfpach	ditto	102.38	11.72
Ancona	ditto	78.02	15.38
Antwerp	ditto	106.76	11.24
Aquileia	ditto	88.69	13.53
Augfburg	ditto	103	11.65
Bafil	ditto	102.22	11.74
Bavaria	ditto	105.08	11.42
Bergamo	ditto	69.89	17.17
Berlin	ditto	98.44	12.19
Bern	ditto	103.98	11.54
Bologna	ditto	80.05	14.99
Bremen	ditto	105.45	11.38
Brefcia	Bracci	64.10	18.72
Breflaw	Feet	107.24	11.19
Brunfwick	ditto	106.85	11.23
Bruffels	ditto	104.80	11.45
Cadiz	(See Spain.)		
Cagliari	Palmi	150.52	7.97
Calemberg	Feet	104.34	11.50
Carrara	Palmi	125	9.60
Caftile	(See Spain.)		
Chamberry	Feet	90.36	13.28
China	Mathematical Feet	91.46	13.12
	Builders' ditto	94.41	12.71
	Tradefmen's ditto	90.08	13.32
	Land Survey. do.	95.39	12.58
Cleves	Feet	103.18	11.63
Cologne	ditto	110.80	10.83
Copenhagen	Legal Feet	97.17	12.35
	Fathoms	16.20	74.10
	Ruthes	9.71	123.50
Cracow	Feet	85.53	14.03
Dantzic	ditto	106.28	11.29
	Ruthes	7.08	169.35
Dordrecht	Feet	84.74	14.16
Drefden	ditto	107.62	11.14
Embden	ditto	102.92	11.66
England	ditto	100	12
	Yards	33.33	36
	Poles	6.06	198
Ferrara	Feet	75.95	15.80
	Pertiche	11.11	108
Florence	Builders' Bracci	55.55	21.60
France	Pieds de Roi	93.89	12.78
	Toifes	15.65	76.68
	Metres	30.48	39.37
Francfort	Feet	106.48	11.27
Geneva	ditto	62.50	19.20
Genoa	Palmi	123.45	9.72
Gottingen	Feet	104.80	11.45
Gotha	ditto	106	11.32
Groningen	ditto	104.44	11.49
Hamburgh	Feet	106.28	11.29
	Rhineland ditto	97.17	12.35
	Clafters	17.71	67.74
	Mafch Ruthes	7.59	158.06
	Geeft ditto	6.64	180.64
	Rhineland ditto	8.10	148.20
Hanover	Feet	104.80	11.45
	Ruthes	6.50	183.20
Harlem	Feet	106.67	11.25
Heidelberg	ditto	109.48	10.96
Hildefheim	ditto	108.60	11.05
Holftein	(See Copenhagen.)		
Infpruck	Feet	96	12.50
Konigfberg	ditto	99.09	12.11
Leghorn	(See Florence.)		
Leipfic	Common Feet	108.01	11.11
	Builders' ditto	107.81	11.13
Leyden	ditto	97.24	12.34
Liege	ditto	106	11.32
Lindau	Common Feet	105.26	11.40
	Long ditto	96.77	12.40
Lifbon	Feet	92.78	12.96
	Palmi	139.17	8.64
Lorraine	Feet	106.20	11.30
Lubec	ditto	104.80	11.45
	Ruthes	6.55	183.20
Luneburg	Feet	104.80	11.45
Madrid	(See Spain.)		
Magdeburg	Feet	107.52	11.16
Malta	ditto	107.43	11.17
Manheim	ditto	105.39	11.41
Mantua	Bracci	65.75	18.25
Maftricht	Feet	108.60	11.05
Mecklenburg	(See Hanover.)		
Mentz	Feet	101.26	11.85
Middleburg	ditto	101.61	11.81
Milan	ditto	76.82	15.62
	Bracci	62.34	19.25
Monaco	Feet	129.73	9.25
Mofcow	ditto	91.12	13.17
Naples	Palmi	115.62	10.38
Neufchatel	Feet	101.61	11.81
Nuremberg	ditto	100.34	11.96
Oldenburg	ditto	103	11.65
Ofnaburg	ditto	109.09	11
Padua	ditto	86.15	13.93
Palermo	Palmi	125.93	9.53
Paris	(See France.)		
Parma	Surveyors' Bracci	56.23	21.34
Pavia	ditto	65.57	18.30
Perfia	Arifh	31.36	38.27
Pomerania	Feet	104.34	11.50
Portugal	(See Lifbon.)		
Prague	Feet	101	11.88

		Number of each equal to 100 English Feet.	Length of a single Measure of each Sort.
			E. Inches.
Ratisbon - -	(See Bavaria.)		
Ratzburg - -	Feet - -	104.80	11.45
Revel - -	ditto - -	113.96	10.53
Reggio - -	Bracci - -	57.55	20.85
Rhineland - -	Feet - -	97.17	12.35
Riga - -	ditto - -	111.21	10.79
Rimini - -	Bracci - -	56.10	21.39
Rome - -	Feet - -	103.45	11.60
	Builders' Canne	13.65	87.92
	Palmi - -	136.49	8.79
Rostock - -	Feet - -	105.45	11.38
Rotterdam -	(See Rhineland.)		
Russia - -	Arsheens - -	42.86	28
	Sashes - -	14.28	84
	Feet - -	87.27	13.75
Sardinia - -	Palmi - -	122.70	9.78
Savoy - -	(See Chamberry.)		
Sienna - -	Feet - -	80.75	14.86
Sicily - -	(See Palermo.)		
Silesia - -	Ruthes - -	7.06	170
Spain - -	Feet - -	107.91	11.12
	Toesas - -	17.98	66.72
	Palmos - -	143.88	8.34
Stade - -	Feet - -	104.80	11.45
Stettin - -	ditto - -	107.91	11.12
Stockholm -	(See Sweden.)		
Strasburg - -	Feet - -	105.35	11.39
	Land ditto -	103.28	11.62
	(See also France.)		
Stutgard - -	(See Wurtemberg.)		
Sweden - -	Feet - -	102.66	11.69
	Fathoms - -	17.11	70.14
	Rods - -	6.43	187.04
Trent - -	Feet - -	83.28	14.41
Turin - -	ditto - -	94.34	12.72
Ulm - -	ditto - -	105.35	11.39
Utrecht - -	ditto - -	111.82	10.74
Venice - -	ditto - -	87.72	13.40
Verona - -	ditto - -	89.55	13.68
Vicenza - -	ditto - -	88.04	13.63
Vienna - -	ditto - -	96.39	12.45
Warsaw - -	ditto - -	85.53	14.03
Wismar - -	ditto - -	103.63	11.58
Wurtemberg -	ditto - -	104.80	11.45
Zell - - -	(See Hanover.)		
Ziriczee - -	ditto - -	98.28	12.21
Zurich - -	Feet - -	101.60	11.81
	Ruthes - -	10.16	118.10
	Fathoms - -	16.32	73.50

TABLE XXVIII.—A Comparison of the Itinerary Measures of different Countries, exhibiting the Number of each, answering to 100 English Miles; also the Length of a single Measure of each Sort, in English Yards.

		Number of each equal to 100 En. Miles.	Length of a single Measure of each Sort.
			Eng. Yards
Arabia - -	Miles - -	81.93	2148
Bohemia - -	ditto - -	17.36	10137
Brabant - -	ditto - -	28.93	6082
Burgundy - -	ditto - -	28.46	6183
China - -	Lis - - -	279.80	629
Denmark - -	Miles - -	21.35	8244
England - -	ditto - -	100	1760
	ditto geographical	86.91	2025
Flanders - -	Miles - -	25.62	6869
France - -	Leagues, Astronomical - -	36.21	4860
	ditto Marine -	28.97	6075
	ditto legal of 2000 Toises.	41.28	4263
Germany - -	Miles, geograph.	21.72	8101
	ditto, Long -	17.38	10126
	ditto, Short -	25.66	6859
Hamburgh -	Miles - -	21.35	8244
Hanover - -	ditto - -	15.23	11559
Hesse - -	ditto - -	16.68	10547
Holland - -	ditto - -	27.52	6395
Hungary - -	ditto - -	19.31	9113
Ireland - -	ditto - -	57.93	3038
Italy - -	ditto - -	86.91	2025
Lithuania - -	ditto - -	18	9781
Oldenburgh -	ditto - -	16.26	10820
Poland - -	Miles, Short -	28.97	6075
	ditto, Long -	21.72	8101
Portugal - -	Legoas - -	26.03	6760
Prussia - -	Miles - -	20.78	8468
Rome - -	Ancient Miles of 8 Stadia -	109.18	1612
	Modern Miles -	86.91	2025
Russia - -	Versts - -	150.81	1167
Saxony - -	Miles - -	17.76	9905
Scotland - -	ditto - -	88.70	1984
Silesia - -	ditto - -	27.67	7083
Spain - -	Leguas common of 8000 Varas	23.73	7416
	ditto Legal, of 5000 Varas	37.97	4635
Swabia - -	Miles - -	17.38	10126
Sweden - -	ditto - -	15.04	11700
Switzerland -	ditto - -	19.23	9153
Turkey - -	Berries - -	96.38	1826
Westphalia - -	Miles - -	14.56	12151

TABLE XXIX. Shewing the Contents of a Square Foot of different Countries, in Engliſh Square Inches, and hundredth Parts of an Inch.

	English Square Inches.
A Square Foot of Amſterdam contains -	124.32
Antwerp - - -	126.34
Berlin - - -	148.59
Bern - - - -	133.23
Bologna - - -	224.70
Bremen - - -	129.50
Denmark or Rhineland -	152.52
Dantzic - - -	127.46
Dreſden - - -	124.10
England - - -	144.00
France - - -	163.32
Hamburgh - - -	127.46
Hanover - - -	131.10
Konigſberg - - -	146.65
Leipſic - - -	123.43
Liſbon - - -	167.96
Milan - - -	243.98
Nuremberg - - -	143.04
Oſnaburg - - -	121.00
Rome - - -	134.56
Spain - - - -	123.65
Sweden - - -	136.65
Turin - - - -	161.80
Venice - - -	187.13
Vienna - - -	155.00
Zurich - - -	139.42
A French Square Metre - - - -	1550.00

TABLE XXX.—Shewing the Contents of a Cubic Foot of different Countries, in Engliſh Cubic Inches, and hundredth Parts of an Inch.

	Engliſh Cubic Inches.
A Cubic Foot of Amſterdam contains -	1386.20
Antwerp - - -	1420.03
Berlin - - -	1811.39
Bern - - -	1536.80
Bologne - - -	3368.25
Bremen - - -	1473.76
Denmark or Rhineland	1883.65
Dantzic - - -	1439.07
Dreſden - - -	1382.50
England - - -	1728.00
France - - -	2087.34
Hamburgh - - -	1439.07
Hanover - - -	1501.12
Konigſberg - - -	1775.96
Leipſic - - -	1371.33
Liſbon - - -	2177.80
Milan - - -	3812.98
Nuremberg - - -	1710.76
Oſnaburgh - - -	1331.00
Rome - - -	1560.90
Spain - - -	1375.04
Sweden - - -	1597.52
Turin - - -	2058.07
Venice - - -	2560.10
Vienna - - -	1929.78
Zurich - - -	1647.20
A French Cubic Metre - - -	61023.50

TABLE XXXI.—A Compariſon of the Corn Meaſures of different Places; namely, the Number of Meaſures of each Place, correſponding to 10 Quarters, or 80 Engliſh Buſhels, Wincheſter Meaſure; alſo, the Contents of a ſingle Meaſure in Engliſh Cubic Inches.

		Number of each equal to 10 Eng. Quarters.	Contents of a ſingle Meaſure of each Sort.
			Cub. Inch.
Abbeville - -	Setiers - -	18.37	9364
Agen - -	Sacks - -	32.23	5337
Aix-la-Chapelle -	Faſs - -	117.73	1461
Alcmaar - -	Sacks - -	34.80	4943
Alexandria -	Rebebes - -	17.94	9587
	Kiſlos - -	16.51	10418
Algiers - -	Tarrie - -	141.10	1219
Alicant - -	Caffiſes - -	11.44	15038
Altona - -	(See Hamburgh.)		
Amersfort - -	Mudden - -	12.30	13986
Amiens - -	Setiers - -	85.79	2005
Amſterdam -	Mudden - -	26.06	6596
	Sacks - -	34.76	4947
	Scheepels - -	104.28	1649
	Tonnes - -	20.85	8245
Ancona - -	Rubbi - -	10.32	16662
Antwerp - -	Viertels - -	36.55	4705
Apulia - -	Tomoli - -	55.11	3121
Archangel - -	Czetwer - -	14.46	11888
Arles - -	Setiers - -	47.40	3628
Arnheim - -	Mouvers - -	21.27	8087
Augſburg - -	Schaff - -	6.41	26812
Avignon - -	Boiſſeaux - -	30.65	5612
Azores - -	Alquieres - -	235.30	731
Barcelona - -	Quarteras - -	39.08	4401
Baſil - -	Sacks - -	21.93	7844
Bayonne - -	Conques - -	68.72	2503
Bergamo - -	Soma - -	17.18	10008
Bergen - -	(See Copenhagen.)		
Bergen-op-Zoom	Siſters - -	60.98	2821
Berlin - -	Scheffels - -	54.09	3180
Bern - - -	Mutt - -	16.76	10260
Beauvais - -	Tonneaux - -	1.45	118529
Bilboa - -	Fanegas - -	47.19	3645
Boiſleduc - -	Mouvers - -	19.84	8671
Bologna - -	Corbe - -	38.20	4503
Botzen or Bolſano	Scheffels - -	25.84	6657
Boulogne - -	Setiers - -	16.32	10535
Bourdeaux -	Boiſſeaux - -	36.73	4682
Breda - -	Viertels - -	32.41	5806
Bremen - -	Scheffels - -	39.64	4339
Breſlaw - -	ditto - -	40.32	4266
Breſt - -	Tonneaux - -	2.04	84200
Brille - -	Sacks - -	39.22	4385
Bruges - -	Hoeds - -	16.92	10164
Brunſwick -	Himten - -	90.62	1898
	Scheffels - -	9.06	18980
Bruſſels - -	Sacks - -	24.17	7117
Cadiz - -	Fanegas - -	50	3439
Calabria - -	Tomoli - -	55.15	3119
Calais - -	Setiers - -	16.95	10144
Campen - -	Mudden - -	24.10	7137
Candia - -	Charges - -	18.52	9288
Caſſel - -	Viertels - -	19.75	8710
Caſtile - -	Fanegas - -	49.74	3458

Cette

		Number of each equal to 10 Eng. Quarters.	Contents of a ſingle Meaſure of each Sort.
			Cub. Inch.
Cette	Setiers	42.98	4002
Cleves	Malters	15.70	10954
Cologne	ditto	17.39	9892
Colberg	Scheffels	56.72	3032
Conſtantinople	Kiſlos	85.02	2023
Copenhagen	Toende	20.26	8489
Corfu	Moggi	23.21	6097
Corſica	Stajo	28.60	6014
Corunna	Ferrados	174.44	986
Culm	Scheffels	51.37	3348
Creutznach	Malters	19.38	8874
Cyprus	Medimni	38.62	4453
Dantzic	Scheffels	57.95	2968
Darmſtadt	ditto	28.14	6111
Denmark	(See Copenhagen.)		
Delft	Sacks	28	6141
Deventer	Mudden	34.80	4942
Dieppe	Mines	27.55	6243
Dixmude	Raſieres	29.51	5821
Dordrecht	Great Sacks	23.17	7428
	Little ditto	30.91	5565
Dreſden	Scheffels	26.64	6456
Dunkirk	Sea Raſieres	17.40	9884
	Land ditto	19.57	8786
Elbing	Scheffels	58	2965
Embden	Tonnen	14.70	11697
	Verps	58.80	2924
England	Wincheſter Buſh.	80	2150
	ditto Quarters	10	17200
Enkhuyſen	Mudden	21.25	8095
	Sacks	42.50	4048
Erfurt	Scheffels	50.01	3430
Faro	Alquieres	174.26	987
Femeren	Scheffels	74.98	2294
Ferrara	Stari	93.22	1845
Ferrol	Ferrados	155.80	1104
Florence	Stari	118.70	1449
Fluſhing	Sacks	37.67	4566
France	Old Syſtem. (See Paris.)		
	New Syſ. Litres	2818.70	61
	Decalitres	281.87	610
	Hectalitres	28.18	6102
Francfort	Malters	26.10	6590
Friderickſtadt	Tonnen	21.74	7913
Galicia	Ferrados	149.16	1153
Geneva	Coupes	36.29	4739
Genoa	Mina	23.30	7382
Ghent	Halfter	54.12	3178
Goes	Sacks	38.70	4444
Gluckſtadt	Tonnen	22	7815
Gouda	Sacks	27.09	6348
Gorcum	Mudden	16.67	10314
Gravelines	Raſieres	21.29	8080
Greece	Medimni	71.96	2390
Greipſwald	Scheffels	72.36	2377
Groningen	Mudden	31.93	5386
Hague (The)	Sacks	27.06	6356
Hamburgh	Scheffels	26.76	6426
	Faſs	53.52	3213
	Himten	107.04	1606
Hanau	Malters	25.04	6868
Hanover	ditto	15.10	11388
Harderwick	Mudden	28.87	5957
Harlem	Sacks	36.80	4673
Harlingen	Mudden	31.93	5386
Havre-de-Grace	Boiſſeaux	81.55	2109
Heidelberg	Malters	27.37	6285
Heuſden	Mudden	16.69	10305
Hildeſheim	Scheffels	54.36	3164
Holſtein	Tonnen	20.26	8489
Honfleur	Boiſſeaux	71.96	2390
Hoorn	Sacks	42.50	4047
Huſum	Rye Tonnes	18.34	9378
	Wheat ditto	18.25	9426
Ingolſtadt	Schaff	2.70	63536
Ireland	Barrels	20	8600
Kiel	Tonnes	23.78	7232
	Scheffels	71.34	2411
Konigſberg	New Scheffels	54.56	3152
Laland	Tonnen	20.52	8380
Lawemburg	Sacks	16.43	10466
Leghorn	Staji	114.60	1501
	Sacchi	38.20	4503
Leipſic	Scheffels	20.28	8481
Lewarden	Mudden	31.93	5386
Leyden	Sacks	42.47	4049
Libourne	Sacks	33.86	5079
Liebau	Loofs	45	3822
Liſbon	Alquieres	210.52	817
	Fanegas	52.63	3268
Liege	Setiers	94.14	1827
Liſle	Razieres	39.64	4339
Lubec	Wheat Scheffels	84.27	2041
	Oats ditto	71.81	2395
Lucca	Staji	116.85	1472
Luneburgh	(See Hanover.)		
Lyons	Anées	14.69	11706
Madeira	Alquieres	251.46	684
Magdeburgh	Scheffels	54.56	3152
Majorca	Quarteras	41.83	4112
Malaga	Fanegas	45.46	3783
Malta	Salme	10.15	16930
Manheim	Malters	27.37	6285
Mantua	Stari	80.94	2125
Marſeilles	Charges	18.27	9411
Maſtricht	Setiers	124.38	1383
Mentz	Malters	30.94	5558
Mecklenburgh	Scheffels	66.39	2591
Memel	ditto	58.22	2954
Middleburg	Sacks	40.08	4291
Milan	Moggi	20.37	8444
	Staji	162.96	1055
Modena	ditto	40	4297
Montpellier	Setiers	53.21	3232
Morlaix	Boiſſeaux	52.56	3272
Munich	Scheffels	7.74	22130
Muyden	Sacks	42.50	4048
Nancy	Reals	14.70	11700
	Cartes	58.80	2925
Nantes	Setiers	19.68	8739
Naples	Tomoli	55.09	3122

		Number of each equal to 10 Eng. Quarters.	Contents of a single Measure of each Sort.
			Cub. Inch
Narva - -	Tonnes - -	17.38	9893
Naumburg -	Scheffels - -	36.50	4712
Negropont -	Kiflos - -	93.02	1849
Nice - -	Staji - -	70.46	2441
Nieuport - -	Razieres - -	16.93	10157
Nimeguen - -	Mouvers - -	21.04	8181
Nuremberg -	Malters - -	16.86	10200
Oldenburg -	Tonnen - -	17.28	9946
Oneglia - -	Mine - -	23.78	7233
Oporto - -	Alquieres - -	163.66	1051
Ofnaburg - -	Scheffels - -	98.12	1753
Oftend - -	Razieres - -	16.02	10733
Oviedo - -	Fanegas - -	37.51	4585
Paris - -	Setiers - -	18.38	9360
	Boiffeaux - -	220.52	780
Paffau - -	Sechfling - -	8.83	19465
Patras - -	Stare - -	34.31	5012
	Bachels - -	102.93	1671
Pernau - -	Tonnes - -	22.25	7729
Perfia - -	Artabas - -	42.85	4013
Poland - -	Corzecs - -	55.13	3120
Prague - -	Stricks - -	26.39	6516
Ratifbon - -	Maafs - -	10.64	16171
Revel - -	Tonnen - -	23.83	7219
Riga - -	Loofs - -	43.24	3978
	Tonnen - -	21.62	7956
Rochelle - -	Boiffeaux - -	85.70	2007
Rome - -	Rubbi - -	10.17	16904
	Quarti - -	40.70	4226
Roftock - -	Scheffels - -	79.40	2166
Rotterdam -	Sacks - -	27.04	6361
	Hoeds - -	2.53	67850
Rouen - -	Setiers - -	15.75	10920
	Boiffeaux - -	126	1365
Ruffia - -	Chetwer - -	13.82	12448
St. Andero -	Fanegas - -	51.95	3311
St. Gall - -	Charges - -	38.71	4443
St. Maloes -	Boiffeaux - -	63.77	2697
St. Omer - -	Rafiares - -	21.77	7900
St. Sebaftian -	Fanegas - -	47.12	3650
St. Valery -	Setiers - -	18.38	9356
Sardinia - -	Starelli - -	57.56	2988
Schiedam - -	Sacks - -	27.04	6360
Scotland - -	Wheat Firlots -	78.28	2197
	Barley ditto -	53.66	3205
Slefwig - -	Tonnen - -	20.19	8520
Seville - -	(See Spain.)		
Sicily - -	Salme Groffe -	8.18	21014
	Salme Generale -	10.18	16886
Smyrna - -	Kiflos - -	80.34	2141
Spain - -	Fanegas - -	50.01	3439
	Cahizes - -	4.16	41268
Stettin - -	Scheffels - -	54.09	3180
Stolberg - -	Viertels - -	61.30	2806
Stralfund - -	Tonnen - -	24.11	7134
	Scheffels - -	72.33	2378
Sweden - -	Tunnor - -	19.24	8940
	ditto (with good measure)	17.10	10058
Tonningen -	Tonnen - -	23.20	7413
Tortofa - -	Quarteras - -	31.77	5414
Toulon - -	Emines - -	79	2178
Triefte - -	Stari - -	38.04	4521
Tripoli - -	Caffifi - -	8.69	10780
Tunis - -	ditto - -	7.87	21855
Turin - -	Sacchi - -	24.52	7 15
	Staji - -	73.56	2338
Ulm - -	Immis - -	12.26	14021
Utrecht - -	Mudden - -	24.16	7117
Valencia - -	Cahizes - -	17.13	10037
Vannes - -	Tonneaux - -	1.84	93556
Venice - -	Staji - -	34.78	4945
Verona - -	Minelli - -	76.41	2251
Viana - -	Alquieres - -	173.88	989
Vienna - -	Metzen - -	45.83	3753
Weimar - -	Scheffels - -	31.67	5430
Wifmar - -	ditto - -	73.66	2336
Wolgaft - -	ditto - -	69.38	2479
Wurtemberg -	ditto - -	53.28	3228
Zant - -	Barrili - -	76.41	2251
Zell - - -	(See Hanover.)		
Ziriczee - -	Sacks - -	36.28	4741
Zurich - -	Mutten - -	34.07	5048
Zwoll - -	Sacks - -	25.16	6836

TABLE XXXII.—A Comparifon of the Liquid Meafures of different Places; namely, the Number of Meafures of each Place, correfponding to 100 Englifh Gallons, Wine Meafure; and alfo the Contents of a fingle Meafure of each Sort, in Englifh Cubic Inches.

		Number of each equal 100 Eng. Gallons.	Contents of a fingle Meafure of each Sort.
			Cub. Inch
Alicant - -	Cantaras - -	37.14	622
Altona - -	Tonnes - -	3.26	7072
	Stubgens - -	104.52	221
Amfterdam -	Ankers - -	9.91	2331
	Stekans - -	19.82	1165
	Viertels - -	52.03	444
	Stoops - -	158.22	146
	Mingels - -	316.44	73
Augfburgh -	Maafs - -	255.71	90
Ancona - -	Boccali - -	267.04	86
Antwerp - -	Stoops - -	119.08	194
Apulia - -	Salme - -	2.45	9428
Arragon - -	Cantaras - -	39.49	585
Barcelona - -	Wine Cargas -	2.93	7877
	Arrobas - -	35.21	656
	Oil Cargas -	3.12	7394
Bari - - -	Oil Staji - -	22.87	1010
	Salme - -	2.29	10100
Bafil - - -	Ohms - -	7.56	3053
Bayonne - -	Veltes - -	51.22	451
Bergamo - -	Brente - -	5.20	4441
Berlin - -	Ankers - -	10.31	2239
Bern - - -	Maafs - -	226.48	102
Blois - - -	Quartauts - -	3.74	6183

		Number of each equal 100 Eng. Gallons.	Contents of a single Measure of each Sort.
			Cub. Inch.
Bologna	Corbe	5.13	4503
	Boccali	308	75
Bourdeaux	Barriques	1.64	14033
	Veltes	52.74	438
	Pots	181.18	127½
Bremen	Stubgens	118.79	194½
Breſlaw	Eimers	6.82	3389
	Tops	135.88	170
Brunſwick	Stubgens	203.12	224
Burgundy	Quartauts	3.68	6275
Cadiz	(See Spain.)		
Canary Iſlands	Arrobas	24.34	949
Candia	Oil Miſtati	34.95	661
Caſſel	Quartlins	46.29	499
Champaigne	Quartauts	4.20	5496
Cognac	Veltes	51.68	447
Cologne	Ohms	2.43	9501
	Viertels	63.29	365
Conſtantinople	Almuds	72.41	319
Copenhagen	Ahms	2.45	9420
	Ankers	9.81	2355
	Stubgens	98.07	235½
Cracow	(See Poland.)		
Dantzic	Beer Stofs	164.40	140½
	Wine ditto	221.06	104½
	Ahms	2.01	11495
Dijon	Quartauts	3.68	6275
Dreſden	Viſier Kannes	268.60	86
	Common ditto	102.90	57½
	Wine Eimers	5.59	4128
	Beer Tonnen	3.85	5993
Dunkirk	Pots	167.39	138
England	Beer Gallons	81.91	285
	Pints	655.28	32¼
	Wine Gallons	100	231
	Pints	800	28⅞
Ferrara	Maſtelli	4.60	5015
	Secchie	36.84	627
Florence	Oil Barrili	11.87	1946
	Wine ditto	9.52	2427
	Fiaſchi	190.90	121
	Boccali	381.80	60½
France	Old Syſtem, (See Paris.)		
	New Syſt. Litres	377.20	61¼
	Decalitres	37.72	612½
	Hectalitres	3.77	6124
Francfort	Viertels	51.33	450
	Maaſs	205.33	112½
Gallipoli	Salme	2.44	9459
Geneva	Setiers	8.37	2760
	Quarterons	200.87	115
	Pots	401.74	57½
Genoa	Wine Barrili	5.10	4530
	Pinte	255.24	90½
	Oil Barrili	5.85	3946
Gotha	Stubgen	111.86	206½
Hamburgh	Ahms	2.61	8836
	Ankers	10.45	2209
	Eimers	13.07	1767
	Viertels	52.26	442

		Number of each equal 100 Eng. Gallons.	Contents of a single Measure of each Sort.
			Cub. Inch.
Hamburgh	Stubgen	104.53	221
	Beer Tonnes	2.17	10608
Hanover	Ahms	2.43	9493
	Stubgen	97.46	237
	Beer Tonnes	3.73	6198
Heidelberg	Viertels	41.10	562
	Maaſs	164.40	140½
Holſtein	(See Hamburgh.)		
Hungary	Eimers	5.16	4474
	Tokay Anthals	7.49	3084
Konigſberg	Stofs	264	87½
	Quarts	330	70
Leghorn	Wine Barrili	9	2564
	Fiaſchi	180.47	128
	Boccali	360.94	64
	Oil Barrili	11.89	1942
Leipſic	Eimers	4.97	4644
	Kannen	312.16	74
	Viſier Kannen	268.60	86
	Beer Tonnes	4.16	5550
Lindau	Quarts	165	140
Liſbon	Almudes	22.21	1040
	Potes	44.42	520
	Canhadas	265.51	87
Liſle	Lots	183.33	126
London	(See England.)		
Lubec	(See Hamburgh.)		
Lucca	Oil Coppi	3.79	6093
Lyons	Pots	403.49	57½
Macon	(See Burgundy.)		
Majorca	Oil Cortanes	91.66	252
Malaga	(See Spain.)		
Malta	Caffiſi	18.19	1270
Mantua	Oil Moggi	3 39	6804
Marſeilles	Millerolles	6.35	3639
	Eſcandeaux	25.40	910
	Pots	380.75	60¾
Maſſa	Oil Barrili	10.69	2161
Mentz	Maaſs	202.63	114
Meſſina	Wine Salme	4.40	5242
	Oil Caffiſi	34.89	662
Minorca	Barriles	12	1927
	Quartillos	66	350
Montpellier	Setiers	11.17	2067
	Wine Barrals	14.89	1550
	Pots	358.14	64½
	Oil Barrals	11.39	2028
	Pots	363.78	63½
Nantes	Veltes	67.34	343
Naples	Wine Barrili	9.08	2544
	Oil Staji	20.39	1133
Narva	Ankers	9.77	2364
	Stofs	292.40	79
Nice	Rubbi	44	525
Nuremberg	Eimers	5.56	4149
	Viſier Maaſs	355.38	65
	Schenck Maaſs	381.18	60¾
Oneglia	Oil Barrili	6.16	3749
Oporto	Almudes	14.85	1555
	Alquieres	29.73	777
	Canhadas	178.38	129½

Orleans

		Number of each equal 100 Eng. Gallons.	Contents of a single Measure of each Sort.
			Cub. Inch
Orleans - -	(See Burgundy.)		
Ofnaburg -	Kannes - -	310.06	74½
Oviedo - -	Cantaras - -	20.17	1145
Paris - -	Setiers - -	50.43	458
	Pots - -	201.75	114½
	Pintes - -	403.50	57¼
Pernau - -	(See Narva.)		
Poland - -	Garmees - -	238.14	97
Prague - -	Eimers - -	5.89	3916
	Pints - -	188.93	122¼
Ratifbon - -	Great Eimers -	3.33	6934
	Berg ditto -	4.31	5359
	Common ditto -	4.58	5043
	Kopfen - -	293.33	78¾
Revel - -	Ankers - -	10.43	2214
	Stofs - -	312.16	74
Riga - -	Idem.		
Rochelle - -	Wine Barriques	2.17	10636
	Brandy Veltes -	51.79	446
Rome - -	Wine Barrili -	9.02	2560
	Oil ditto - -	10.31	2240
	Boccali - -	288.75	80
Rotterdam -	(See Amfterdam.)		
Rouen - -	Pots - -	232.16	99½
Ruffia - -	Weddras - -	30.72	752
	Krufkas - -	245.75	94
Saragoffa - -	Cantaras - -	39.55	584
Scotland - -	Pints - -	223.18	103½
Schaffhaufen -	Maafs - -	288.75	80
Sicily - - -	Oil Caffifi -	34.89	662
Spain - - -	Wine Arrobas -	23.60	981
	Azumbres -	188.56	122½
	Quartillos -	757.37	30½
	Oil Arrobas -	29.97	771
Stettin - -	Ankers - -	7.34	3165
Stralfund - -	Stubgen - -	97.45	237
Strafburg - -	Ohms - -	8.21	2813
	Pots - -	197.43	117
Sweden - -	Eimers - -	4.82	4794
	Ankar - -	9.64	2397
	Kannor - -	144.37	160
	Stops - -	288.74	80
Toulon - -	Millerolles -	5.93	3893
Triefte - -	Orne - -	5.76	4007
	Boccali - -	207.48	111⅓
Tripoli - -	Oil Mattari -	16.80	1376
Tunis - -	Oil ditto - -	19.98	1157
	Wine ditto -	39.96	578
Turin - -	Brente - -	6.71	3441
	Rubbi - -	40.31	573
Valencia - -	Arrobas - -	28.44	812
	Azumbres -	113.79	203
Venice - -	Secchie - -	36.78	628
Verona - -	Brente - -	5.23	4417
	Baffe - -	83.68	276
Warfaw - -	(See Poland.)		
Vienna - -	Eimers - -	6.69	3452
	Maafs - -	267.57	86⅓
Zell - -	Stubgen - -	97.45	237
Zurich - -	Land Maafs -	206.25	112
	City dito -	228.71	101
	Old ditto - -	273.91	84¼

Dr. Kelly, always actuated by a defire of promoting literature and fcience, has, with a polite attention, which we thus refpectfully acknowledge, allowed us to extract feveral of the preceding tables from his very valuable work, the "Univerfal Cambift:" a work which is planned with judgment, and executed, at the expence of much time and labour, with accuracy, and which will be no lefs acceptable and ufeful to men of fcience in general, than to mercantile perfons in particular.

Measures *ufed by different artificers* are 144 fquare inches = a fquare foot, 9 fquare feet = a fquare yard, 63 fquare feet = 7 fquare yards = a rood, 100 fquare feet = a fquare, and 272¼ fquare feet = 30¼ fquare yards = a rod, perch, or fquare pole.

Measure *of fire-wood.* See Cord *of wood.*

Measure *for Horfes.* See Hand.

Measure is alfo ufed to fignify the cadence and time obferved in poetry, dancing, and mufic, to render them regular and agreeable.

The different meafures or metres, in poetry, are the different manners of ordering and combining the quantities, or the long and fhort fyllables. Thus hexameter, pentameter, iambic, fapphic verfes, &c. confift of different meafures. In Englifh verfes, the meafures are extremely various and arbitrary, every poet being at liberty to introduce any new form that he pleafes. The moft ufual are, the heroic, generally confifting of five long, and five fhort fyllables; and verfes of four feet; and of three feet and a cæfura, or fingle fyllable.

The ancients, by varioufly combining and tranfpofing their quantities, made a vaft variety of different meafures. Of words, or rather feet, of two fyllables, they formed a fpondee, confifting of two long fyllables; a pyrrhic, of two fhort fyllables; a trochee, of a long and a fhort fyllable; and an iambic, of a fhort and a long fyllable.

Of their feet of three fyllables, they formed a moloffus, confifting of three long fyllables; a tribrach, of three fhort fyllables; a dactyl, of one long and two fhort fyllables; and an anapæft, of two fhort and one long fyllable. The Greek poets contrived a hundred and twenty-four different combinations or meafures, under as many different names, from feet of two fyllables to thofe of fix. See Metre and Prosody.

Measure, in *Mufic*, the interval, or fpace of time, which the perfon who beats time, takes between the raifing and falling of his hand or foot, in order to conduct the movement, fometimes quicker, and fometimes flower, according to the kind of mufic, or the fubject that is fung or played.

The meafure is that which regulates the time we are to dwell on each note. See Time.

The ordinary or common meafure is one fecond, or fixtieth part of a minute, which is nearly the fpace between the beats of the pulfe or heart; the fyftole or contraction of the heart anfwering to the elevation of the hand; and its diaftole, or dilatation, to the letting it fall. The meafure ufually takes up the fpace that a pendulum, of two feet and a half long, employs in making a fwing or vibration. The meafure is regulated according to the different quality or value of the notes in the piece; by which the time, that each note is to take up, is expreffed. The femi-breve, for inftance, holds one rife, and one fall; and this is called the *meafure*, or *whole meafure*; fometimes the *meafure-note*, or *time-note*; the minim, one rife, or one fall; and the crotchet, half a rife, or half a fall, there being four crotchets in a full meafure.

Measures, *Mufical*, are now much fimplified, compared with thofe which our anceftors *defcribed*, we cannot fay *ufed*, as fome of them are impracticable. In the mufical MS. of Waltham holy-crofs, in the poffeffion of the marquis of Lanfdowne,

downe, N° 9, by Chiliton, we have not only double and triple proportions, but quintuple, ſeſquialterate, and ſeſquioctavan; that is, when one minim in the baſe is as long as a ſemibreve, or two minims in the treble; as three minims; as five; as one and a half; as 16 to 12, or 12 to 9.

Whether all theſe meaſures were ever received in practical muſic, does not appear; but we can be very certain, if they were, that the reſult would be nothing but diſlocation and confuſion.

All meaſures and ſpecies of time in modern muſic are reduced to two proportions; the *binary*, *dual*, or *even meaſure*, in which the riſe and fall of the hand are equal; and the *ternary*, *triple*, or *odd* meaſure, in which the fall is double to the riſe. The firſt, uſually called *common time*, is the meaſure conſiſting of two ſemibreves, two minims, or two crotchets; the ſecond, or *triple time*, of three minims, three crotchets or three quavers.

To this purpoſe the number 3 is placed at the beginning of the lines, when the meaſure is intended to be triple; and a C, when the meaſure is to be common or double. This riſing and falling of the hands was called by the Greeks αρσις and θεσις. St. Auguſtine calls it *plauſus*, and the Spaniards *compas*. See Arsis and Thesis.

There is likewiſe a mixed or compound meaſure of 6 or 12 crotchets or quavers in a bar, indicated at the beginning of a movement, thus: $\frac{6}{4}$, or $\frac{12}{4}$, $\frac{9}{4}$, or $\frac{6}{8}$. But as all theſe meaſures move in triplets, for each portion of a bar, they are reducible to binary and ternary meaſures.

Measures, *Powder*, in *Artillery*, are made of copper, and contain from an ounce to twelve pounds: theſe are very convenient in a ſiege, when guns or mortars are loaded with looſe powder, eſpecially in ricochet firing, &c.

MEASURING, Mensuration, defined *geometrically*, is the aſſuming any certain quantity, and expreſſing the proportion of other ſimilar quantities to the ſame.

Measuring, defined *popularly*, is the uſing of a certain known meaſure, and determining thereby the preciſe extent, quantity, or capacity of any thing.

Meaſuring, in the general, makes the practical part of geometry. See Mensuration.

From the various ſubjects on which it is employed, it acquires various names, and conſtitutes various arts. Thus,

Measuring *of Lines*, or quantities of one dimenſion, we call *longimetry*; and when thoſe lines are not extended parallel to the horizon, *altimetry*. When the different altitudes of the two extremes of the lines are alone regarded, we call it *levelling*.

Measuring *of Superficies*, or quantities of two dimenſions, is variouſly denominated, according to its ſubjects: when converſant about lands, it is called *geodeſia*, or *ſurveying*: in other caſes, it is called ſimply *meaſuring*. The inſtruments uſed are the ten-foot rod, chain, compaſs, circumferentor, &c.

Measuring *of Solids*, or quantities of three dimenſions, we call *ſtereometry*; where it is converſant about the capacities of veſſels, or the liquors they contain particularly, *gauging*.

The inſtruments for this art are the gauging-rod, ſliding-rule, &c.

From the definition of meaſuring, where the meaſure is expreſſed to be ſimilar or homogeneous to, *i. e.* of the ſame kind with, the thing meaſured, it is evident, that in the firſt caſe, or in quantities of one dimenſion, the meaſure muſt be a line; in the ſecond, a ſuperficies; and in the third, a ſolid. For a line, *v. gr.* cannot meaſure a ſurface; to meaſure, being no more than to apply the known quantity to the unknown, till the two become equal. Now a ſurface has breadth, and a line has none: and if one line have no breadth, two or a hundred have none. A line, therefore, can never be applied ſo often to a ſurface, as to be equal to it, *i. e.* to meaſure it. And from the like reaſoning it is evident, a ſuperficies, which has no depth, cannot become equal to, *i. e.* cannot meaſure, a ſolid, which has.

While a line continues ſuch, it may be meaſured by any part of itſelf: but when the line begins to flow, and to generate a new dimenſion, the meaſure muſt keep pace, and flow too; *i. e.* as the one commences ſuperficies, the other muſt do ſo too. Thus we come to have *ſquare* meaſures, and *cubic* meaſures.

Hence we ſee why the *meaſure of a circle* is an arc, or part of the circle; for a right line can only touch a circle in one point, but the periphery of a circle conſiſts of infinite points. The right line, therefore, to meaſure the circle, muſt be applied infinite times, which is impoſſible. Again, the right line only touches the circle in a mathematical point; which has no parts or dimenſions, and has conſequently no magnitude; but a thing that has no magnitude or dimenſions, bears no proportion to another, that has; and cannot therefore meaſure it. Hence we ſee the reaſon of the diviſion of circles into 360 parts or arcs, called *degrees*. See Arc, Circle, and Degree. See alſo Mensuration.

Measuring *of Triangles*, or from three given ſides or angles to determine all the reſt, is called *trigonometry*.

Measuring *of the Air*, its preſſure, ſpring, &c. is called *aerometry*, or *pneumatics*.

MEAT, Cibus. See Food and Diet.

Meats, *Dreſſing of.* See Dressing.

Meats, *Dry.* See Xerophagy.

Meats, *White.* See White.

MEATH, in *Geography*, a county of Ireland, which, though only the tenth in ſize, is one of the moſt diſtinguiſhed on account of its many natural advantages. It is bounded on the north by the counties of Cavan, Monaghan, and Louth; on the eaſt by the Iriſh channel and port of Dublin; on the ſouth by the county of Kildare, and on the weſt by Weſtmeath. It extends from N. to S. 29 miles (36 Engliſh), and from E. to W. 35 (44½ Engliſh) miles, including an area of 512 ſquare miles, or 327,900 acres Iriſh meaſure, which are equal to 822 ſquare miles, or 526,700 acres Engliſh meaſure. This county, united with Longford, Weſtmeath, and part of ſome adjoining counties, was formerly one of the five kingdoms into which Ireland was divided; and long after the Engliſh obtained poſſeſſion of the country, it was conſidered as a diſtinct province, though it is now part of Leinſter. It derived its name, according to ſome, from a corruption of Media, from its being ſurrounded by the other kingdoms, but others derive its name from the Iriſh Magh or Maith, which ſignifies a plain or level country. On the eſtabliſhment of the Engliſh in Ireland, Henry II. made a grant of Meath to Hugh de Lacy, who planted ſeveral colonies, and erected many caſtles, and was more powerful in Ireland, as he boaſted, than Henry himſelf. In 1234 the inheritance of Meath paſſed, by marriage, to Jeffery de Geneville, from whom it, in like manner, paſſed to Mortimer, earl of March, whoſe daughter and heir married the duke of York, father of Edward IV. Meath formed a principal part of what was called the Engliſh Pale, and from the number of pariſhes into which it was divided, and the many ruins it contains, it is probable that it was then very populous. In 1792, the 147 pariſhes were, by unions, reduced to 59 benefices, of which 44 had churches, and 19 only glebe houſes. The population was eſtimated by Dr. Beaufort at 112,400, the number of houſes amounting to 22,468. Since the time that calculation was made (1792) a very great increaſe has probably taken place, but the writer knows of no *data* from which it can be eſtimated. The country

country is, in general, level, having few hills, and thofe of inconfiderable height. The foil is variable, but that moft generally met with is a ftrong deep clay upon limeftone gravel, at a greater or lefs diftance from the furface, in different places. That land which borders on the county of Louth, north of the river Boyne, is the worft and moft unprofitable, whilft the north-weftern and fouth-eaftern diftricts are the moft productive. Though fome peculiar diftricts in other counties are richer, yet there is no tract of equal extent in Ireland of fuch excellent quality, and fo appropriate to every purpofe of grazing and tillage. Meath is indeed proverbial for cattle, and not only fupplies the Dublin market, but alfo buyers from the north of Ireland, and from different parts of England. There is alfo a number of dairy farms, efpecially in the fouth-eaftern part, which fend their produce to the metropolis. Some butter is alfo made for exportation, but it is not highly prized. At Slaine there is a manufactory of cheefe carried on by natives of England. The paftures yield a luxuriant crop of natural graffes, and there is little attention paid to the introduction of others. Some marfhes on the Moynalty river feed an immenfe number of horfes in the fummer feafon; and the Kilcrew hills in the weftern angle adjoining Cavan, are remarkable for fattening fheep. Agriculture has of late years extended much, and about one-third of the county is at prefent under tillage. The crops commonly cultivated are, wheat, oats, barley, rye, clover, flax and potatoes. Cabbages, turnips, rape, and peas are alfo frequently met with, though not very general. The quantity of wafte land, exclufive of bog, is very fmall, and chiefly confifts of the commons belonging to fome of the towns, which will probably be foon enclofed.

The manufactures of this county are few. The principal is that of facking, which is made from tow, brought out of the northern counties. This manufacture is chiefly carried on in the neighbourhood of Navan. Dowlas and three-quarters wide coarfe linens are made in the parts near Drogheda, which are exported thence to the Weft Indies to clothe the negroes. In the north-weftern parts linen of a finer texture is made, which is fold in the county of Cavan. In the fouthern parts fpinning is generally neglected, and there is no manufacture except of fome coarfe frieze for home confumption. It may be added that the manufacture of ftraw hats, both of fplit and whole ftraw, has been brought to great perfection, and is carried on to a great extent. In the weftern and northern parts of the county are fome confiderable bogs, which fupply a large quantity of fuel, though not equal to the wants of the inhabitants; whilft the eaftern parts have coal from Dublin or Drogheda. There are fuppofed indications of coal in feveral parts of the county, but no mine is worked. The other mineral productions are of little importance. There is a copper mine at Skreen, from which the proprietor has yet derived no benefit; and a valuable potters' clay near Dunfhaughlin, reckoned equal, if not fuperior (fays Mr. Thompfon) to moft of the potters' clay found in Staffordfhire, which, though within fifteen miles of Dublin, has been turned to no account. Marle is found at fome depth under the bogs, fimilar to that found in Louth, which is ufeful in agriculture; and the limeftone at Ardbraccan has been thought ornamental in building.

Meath is well watered, and the attention paid to inland navigation cannot fail of contributing to its rapid improvement. The principal river is the Boyne, which rifing in the county of Kildare, enters Meath in the fouth-weftern angle, and divides it into two nearly equal parts. Its courfe lies through fome of the moft fertile and beft improved parts of the county. Its banks in moft parts rife to a confiderable height, gradually floping from the water's edge to their verdant brow, and in others bold projecting rocks and fteep precipices overhang its limpid furface. Though in fome places the river is much difturbed in its courfe by fharps and rocks, yet in others it fteals filently along through flats of confiderable extent, adding elegance and beauty to fcenes fcarcely to be equalled in Ireland. On this river, in its courfe within the county, are fix extenfive bolting mills, befides feveral grift and cloth mills, and one for the manufacture of cotton. A canal has been made, called the Boyne navigation, which is for the moft part contiguous to the river. This canal has been completed as far as Navan, but the other projected cuts to Trim, Athboy, and Kells, remain unfinifhed, which appears, from Mr. Wakefield's account, to be the cafe with moft of fuch undertakings in Ireland. The Blackwater, flowing from lough Ramor in the county of Cavan, enters the county in the north-weft, and paffing near the town of Kells, joins the Boyne at Navan. The Moynalty flows into the Blackwater, and the Athboy, Knightfbrook, and fome other fmall rivers, add their waters to the Boyne. The river Nanny, or, as it is ufually called, the *Nanny water*, rifes near Navan, and takes nearly an eafterly direction to the Irifh fea. The water of this river has, like the Bann, the character of being peculiarly adapted to the purpofes of bleaching. The fea-coaft is principally a fhelving ftrand with fhallow water, fo that little advantage is derived from it. The land adjoining is a light foil, refembling fea fand, without much vegetative power, and well adapted for rabbits. The towns in Meath are numerous, but generally fmall and ill built. Trim is the county town, but Navan is more thriving, from its eafy communication with Drogheda. Tarah hill, on which there is now an infignificant village, is faid to have been formerly the royal refidence, not only of the kings of Meath, but alfo of the monarchs of Ireland. A Danifh invader is fuppofed to have alfo taken up his abode there, and to have built the fine Danifh fort or rath on the fouth-eaft fide of the hill, which is now beautifully planted. Thompfon's Statiftical Survey of Meath. Wakefield's Account of Ireland.

Meath, a bifhopric in Ireland, the bifhop of which takes precedence of all other Irifh ones. Several fmall bifhoprics gradually coalefced into one fee, which received the name of Meath at the end of the 12th century, being the only one not taking its name from a city or town. In 1568 the bifhopric of Clonmacnoife was incorporated with it by act of parliament. It extends from the fea to the Shannon, over part of fix counties, and contains 663,600 Irifh acres. The parifhes are 224, but unlefs late improvements have been made, the churches are little more than a third part of the number. There is no cathedral in this diocefe; neither is there a chapter, nor even a dean of Meath; the only dignities are the deanery of Clonmacnoife and the archdeaconry of Meath. The revenue of this fee is ftated by Mr. Wakefield to be 6000*l. per annum*. The epifcopal refidence is at Ardbraccan, near Navan. Dr. Beaufort's Memoir of a Map of Ireland.

MEATUS, in *Anatomy*, a term applied to two paffages belonging to the ear. The meatus auditorius externus is the tube leading from the external ear to the membrana tympani. The meatus auditorius internus is the opening in the petrous portion of the temporal bone receiving the nerves of the feventh pair. See Cranium and Ear.

Meatus *Auditorius*, *Imperforate*, in *Surgery*. Obftruction of the external tube of the ear is fometimes a congenital malformation. In particular cafes, the outer opening

ing of the paſſage is cloſed by a membranous ſubſtance; in others, the canal is entirely obliterated, either by the approximation of its cartilaginous and bony parietes to each other, or by being filled up with a fleſhy maſs. In all theſe caſes of ſimple cloſure, or complete obliteration, the deafneſs, that is unavoidably produced, is not equally eaſy of cure. When the opening of the meatus auditorius externus is merely ſhut up by membrane, this may have a crucial inciſion made into it, or it may be removed altogether by cutting in a circular manner. After either of theſe operations, the new opening muſt be kept from becoming again impervious, by the introduction of tents, until the part is entirely healed. When the membrane is more deeply ſituated, the operation is leſs eaſy of accompliſhment. In this ſort of caſe Richerand adviſes us to draw the external ear upwards, in order to efface the natural curvature of the meatus, and let the entrance of the light make the ſtate of the inſide of the paſſage viſible. We are then to introduce a narrow ſtraight biſtoury, the blade of which is wrapped round with lint nearly to the point, and make an inciſion with great caution, taking particular care to avoid injuring the membrane of the tympanum. It was the apprehenſion of doing miſchief to the latter part, that induced Leſchevin to prefer, in ſuch examples, the application of cauſtic, to the employment of a cutting inſtrument. (Prix de l'Acad. de Chirurg. tom. i. p. 67. 118. 4to.) He adviſes us to apply the cauſtic to the bottom of the meatus auditorius ſeveral times, ſo as to deſtroy the preternatural membrane. It appears to us, however, that the uſe of cauſtic muſt here be exceedingly inconvenient, and hardly ſo ſafe as a biſtoury. Perhaps cauſtic may be attended with the advantage of making an opening, that will be leſs likely to cloſe again. Experience can alone determine ſuch points.

When the bony and cartilaginous parietes of the meatus auditorius are in contact, the obliteration of the paſſage is incurable. But when the canal is filled up with a fleſhy ſubſtance, the diſeaſe ſometimes admits of relief. In ſuch a caſe, M. Leſchevin recommends us to introduce a trocar, in the natural direction of the meatus auditorius, to the depth of from 15 to 18 lines. Should the point of the trocar now meet with no reſiſtance, the inſtrument muſt be withdrawn, and a tent paſſed into the artificial opening, in order to keep it from becoming cloſed. When the trocar, after being introduced to ſuch a depth, that there is reaſon to believe it has reached the natural ſituation of the cavity of the tympanum, and yet the ſame reſiſtance to its further introduction is experienced, we are recommended to abandon the operation. Were any one, ſays M. Leſchevin, here to aſcribe the want of ſucceſs to unſkilfulneſs in the ſurgeon, he would be very unjuſt.

A preternatural narrowneſs of the meatus auditorius externus is not ſo bad a caſe as its obliteration, and the deafneſs produced by it is incomplete. But it is not to be imagined, that a cure is practicable when the bony portion of this tube is the ſeat of the contraction. Should the cartilage alone be concerned, a gradual dilatation may be accompliſhed by means of prepared ſponge, or tents made of lint, the ſize of which is to be increaſed every day. Richerand acquaints us, that he has preſerved ſeveral temporal bones which belonged to ſubjects who were very hard of hearing; and in all of them the bony portion of the meatus anditorius is remarkably narrow. M. Lametrie has recorded an inſtance, in which this paſſage was ſo narrow in a young perſon, that it would ſcarcely admit of the introduction of a needle into it. Noſog. Chir. tom. ii. p. 124.—126. edit. ii.

There was a curious caſe (which was ſeen a few years ago by many medical gentlemen in London), of a total deficiency of the external ears, unattended with any meatus auditorius, the ſituation of this opening, on each ſide of the head, preſenting only the common integuments. It was remarkable, that notwithſtanding ſuch malformation, the faculty of hearing was far from being altogether deſtroyed. In all probability, the internal and moſt eſſential parts of the ear were, in this example, altogether perfect; and it ſeems not unlikely, that, by removing a portion of the ſkin over the orifice of each meatus auditorius, the hearing might have been rendered ſtill leſs dull.

Meatus Auditorius Externus, Extraneous Subſtances in.—Beſides the defects of which we have been ſpeaking, and which are, for the moſt part, congenital, the meatus auditorius may be obſtructed by foreign bodies. With reſpect to water and other liquids, they readily eſcape on putting the head in a favourable poſition. Small ſolid ſubſtances, like a pea, bean, &c. are uſually extracted with a pair of forceps, the blades of which ſhould be of a ſlender conſtruction. But if the foreign bodies cannot be thus extracted, ſurgical authors recommend us to try to break them to pieces with a ſtronger pair of forceps, in order to facilitate their removal. They alſo adviſe us to inſtil into the ear a few drops of the oil of almonds, both before and after the operation. The lodgment of extraneous ſubſtances in the ear may give riſe to a train of moſt unaccountable and perplexing ſymptoms, as may be ſeen by referring to the fourth obſervation of Fabricius Hildanus, cent. 13.

Meatus Auditorius Externus, obſtructed with Cerumen. See Deafness.

Meatus Auditorius Externus, Polypi and other Tumours of.—Theſe, when their ſituation will permit, muſt be removed with a knife, and the part to which they were attached may be touched with the argentum nitratum. When they cannot be cut away, they ſometimes admit of extraction, or of being tied in the manner of other excreſcences, ſituated in cavities. (See Polypus.) The application of cauſtic to them can ſcarcely ever be a prudent mode of treatment.

Meatus Auditorius Externus, containing Inſects.—Worms which make their appearance in the meatus auditorius are always produced ſubſequently to ulcerations in the paſſage, or in the interior of the tympanum, and, very often, ſuch inſects are quite unſuſpected cauſes of particular ſymptoms. In the caſes of ſurgery, publiſhed in 1778 at Stockholm, by Olaus Acrel, there is an inſtance confirming the ſtatement juſt offered. It is the caſe of a woman, who, having been long afflicted with a hardneſs of hearing, was ſuddenly ſeized with very violent convulſions, without any apparent cauſe, and ſoon afterwards complained of an acute pain in the ear. This affection was followed by a recurrence of convulſions, which were more vehement than before. A ſmall tent of fine linen, moiſtened with a mixture of oil and laudanum, was introduced into the meatus auditorius, and on removing it the next day, ſeveral ſmall round worms were obſerved upon it, and from that period all the ſymptoms diſappeared. To this caſe we ſhall add another from Morgagni. A young woman conſulted Valſalva, and told him, that when ſhe was a girl a worm had been diſcharged from her left ear; that another one, about ſix months ago, had alſo been diſcharged, very much like a ſmall ſilk-worm in ſhape. This event took place after ſome very acute pain in the ſame ear, the forehead, and temples. She added, that ſince this ſhe had been tormented with the ſame pains at different intervals, and ſo ſeverely, that ſhe often ſwooned away for two hours together. On recovering from this ſtate,

ſtate, a ſmall worm was diſcharged of the ſame ſhape as, but much ſmaller than, the preceding one, and that ſhe was now afflicted with deafneſs and inſenſibility on the ſame ſide. After hearing this relation, Valſalva no longer entertained any doubt of the membrane of the tympanum being ulcerated. He propoſed the employment of an injection, in order to deſtroy the neſt of worms, which he preſumed to exiſt. For this purpoſe diſtilled water of St. John's wort, in which mercury had been agitated, was uſed. Morgagni adds, that nothing appears to him more proper in ſuch caſes, to prevent a recurrence of ſuch worms, than to avoid going to ſleep, particularly in autumn and ſummer, without taking care to ſtop up the affected ear. If this be not done, flies, attracted by the ſuppuration, enter the meatus auditorius, and, while the patient is unconſcious, depoſit their eggs in the ear. Acrel, in ſpeaking of worms generated in the meatus auditorius, obſerves, that there is no better remedy for them, than the decoction of ledum paluſtre, injected into the ear ſeveral times a day. However, as it is not always poſſible to procure this plant, we ſhall recommend in ſuch caſes, in preference to all other remedies, a ſlight infuſion of tobacco in oil of almonds, a few drops of which are to be dropped into the ear, and to be retained there by means of a little bit of cotton. This application, which is not injurious to the lining of the paſſage, is fatal to inſects, and eſpecially to worms, as various experiments have convinced naturaliſts. This method may alſo ſucceed in caſes, in which caterpillars, ants, and other inſects, have inſinuated themſelves into the meatus auditorius; but it is always better, firſt to endeavour to extract them. A piece of lint, ſmeared with honey, often ſuffices for this purpoſe; and when they cannot be extracted by this ſimple means, they may be taken out with a very ſmall pair of forceps, however little of them may be viſible.

Meatus Auditorius Externus, Purulent Diſcharges from.—The ſecreted matter may either proceed from ſuppuration of this paſſage itſelf, or from diſeaſe in the tympanum, the membrane of which is imperfect. The latter caſe may be the conſequence of blows on the head, abſceſſes after fevers, the ſmall-pox, or the venereal diſeaſe. In moſt inſtances, the little bones of the internal ear are detached, and eſcape externally, complete deafneſs generally enſuing. A total loſs of hearing, however, does not invariably follow this kind of miſchief, as we have ourſelves witneſſed in one or two examples. Greater hopes of ſuch an event being avoidable may be indulged, when the diſorder is confined to the meatus; as judicious treatment may now avert the moſt ſerious conſequences. In Acrel's ſurgical caſes, there is a caſe relative to the circumſtance of which we are ſpeaking. Suppuration took place in the meatus auditorius externus in conſequence of acute rheumatiſm, which was followed by vertigo, reſtleſſneſs, and a violent head-ache. The matter diſcharged was yellowiſh, of an aqueous conſiſtence, and acid ſmell. The meatus auditorius was filled with a ſpongy fleſh. On introducing the probe, our author felt a piece of looſe rough bone, which he immediately took hold of with a pair of forceps, and extracted. From the time, when this was accompliſhed, the diſcharge diminiſhed, and, with the aid of proper treatment, the patient became perfectly well.

Meatus Auditorius Externus, Inflammation of.—This paſſage, like every other part of the body, is ſubject to inflammation, which is frequently brought on by expoſure to cold. It is hardly neceſſary to ſay, that topical bleeding and antiphlogiſtic means in general are indicated. The meatus auditorius ſhould alſo be protected from the cold air, particularly in the winter ſeaſon, by means of a piece of cotton.

Mr. Saunders obſerves, "When the means employed to reduce the inflammation have not ſucceeded, and matter has formed, it is generally evacuated; as far as I have obſerved, between the auricle and maſtoid proceſs, or into the meatus. If it has been evacuated into the meatus, the opening is moſt commonly ſmall, and the ſpongy granulations, ſqueezed through a ſmall aperture, aſſume the appearance of a polypus. Sometimes the ſmall aperture, by which the matter is evacuated, is in this manner even cloſed, and the patient ſuffers the inconvenience of frequent returns of pain from the retention of the diſcharge. When the parts have fallen into this ſtate, it will be expedient to haſten the cure by making an inciſion into the ſinus, between the auricle and maſtoid proceſs.

"It occaſionally happens, that the bone itſelf dies, in conſequence of the ſinus being neglected, or the original extent of the ſuppuration. The exfoliating parts are the meatus externus of the os temporis or the external lamina of the maſtoid proceſs." See Saunders on the Anatomy of the Human Ear and its Diſeaſes, p. 24, 25.

Meatus Auditorius, Herpetic Diſeaſe of. See Deafness.

Meatus Urinarius, Imperforate. See Urethra, *Imperforate.*

MEAVAUA, in *Geography*, a town of Italy, in the county of Bormio; five miles N.E. of Bormio.

MEAUDEE, a town of the Birman empire, on the left bank of the Ava; 10 miles N. of Prome.

MEAUX, a town of France, principal place of a diſtrict, in the department of the Seine and Marne, before the revolution the ſee of a biſhop, and diſtinguiſhed by having been the firſt ſcene of the reformation in the time of Francis. The chief traffic conſiſts in grain, wool, and cheeſe. The city contains 6447, and the canton 14,484 inhabitants, on a territory of 127 kiliometres, in 15 communes. N. lat. 48° 58′. E. long. 2° 57′.

MEBOREA, in *Botany*, a word of whoſe origin no account is given, Aubl. Guian. 826. t. 323. (See Rhopium.) Juſſieu places this genus amongſt his *Plantæ incertæ ſedis*. We ſhould have ſuppoſed it one of his *Euphorbiæ*, though it may not anſwer to all the characters he has given of that order.

MEBU, in *Geography*, a town of Japan, in the iſland of Niphon; 160 miles N.W. of Jedo.

MECATINA, an iſland in the gulf of St. Lawrence. N. lat. 50° 48′. W. long. 59° 10′.

MECCA, a city of Arabia, known to the Greeks under the name of "Macoraba," is ſituated in a dry and barren tract of country, a full day's journey from *Jidda*, which ſee. "Some latent motives perhaps of ſuperſtition," ſays Gibbon (Decl. Rom. Emp. vol. ix. p. 223.) "muſt have impelled the founders of this city to the choice of a moſt unpromiſing ſituation. Their habitations were erected of mud or ſtone, in a plain about two miles long and one broad, at the foot of three barren mounatins; the ſoil being a rock; the water even of the holy well of Zemzem being bitter or brackiſh; the paſtures remote from the city; and grapes tranſported to it above 70 miles from the gardens of Tayef. The fame and ſpirit of the Koreiſhites, who reigned in Mecca, were conſpicuous among the Arabian tribes; but their ungrateful ſoil refuſed the labours of agriculture, and their poſition was favourable to the enterprizes of trade. By the ſea-port of Gedda (or Jidda), at the diſtance only of 40 miles, they maintained an eaſy correſpondence with Abyſſinia; and the Chriſtian kingdom afforded the firſt refuge to the diſciples of Mahomet. The treaſures

treasures of Africa were conveyed over the peninsula to Gerrha or Katif, in the province of Bahrein, a city built, as it is said of rock salt, by the Chaldean exiles; and from thence, with the native pearls of the Persian gulf, they were floated in rafts to the mouth of the Euphrates. Mecca is placed almost at an equal distance, a month's journey, between Yemen on the right, and Syria on the left hand. The former was the winter, and the latter the summer station of her caravans: and their seasonable arrival relieved the ships of India from the tedious and troublesome navigation of the Red sea. In the markets of Saana and Merab, in the harbour of Oman and Aden, the camels of the Koreishites were laden with a precious cargo of aromatics; a supply of corn and manufactures was purchased in the fairs of Bostra and Damascus; the lucrative exchange diffused plenty and riches in the streets of Mecca; and the noblest of her sons united the love of arms with the profession of merchandize." On an approach to the high lands, a few leagues beyond it, abundance of excellent fruits is to be found. In the summer months, the heat is excessive at Mecca, and in order to avoid and moderate it as much as possible, the inhabitants take care to shut their windows and water the streets. Instances have occurred, of persons that have been suffocated in the streets by the burning wind, called "Samoum," or "Samiel." As many of the first nobility in Hedjas reside at Mecca, the buildings are better here than in any other city in Arabia. Among its elegant edifices the most remarkable is the Kaba or Caaba, or house of God, which was held in high veneration by the Arabians, even before the days of Mahomet. (See CAABA.) Niebuhr says, that no Christian dares to enter Mecca, on account of the prejudices of the people with respect to the sanctity of the place, who think that it would be profaned by the feet of infidel Christians; though there is no prohibition to this purpose in the laws of Mahomet. The superstitious people persuade themselves, that Christians are restrained from approaching it by a supernatural power. We may hence presume, that the Christians of Europe, who describe Mecca as eye-witnesses, have been renegadoes, who have escaped from Turkey. The Mahometans have such high ideas of the sanctity of Mecca, that they suppose it to extend even to the environs of the city. Its territory is reputed sacred, to a certain distance round it, which is indicated by marks set up for this purpose. Every caravan finds one of these marks in their way, which warns the pilgrims to put on the modest garb which it becomes them to wear on that sacred ground. The government of this holy city is seated in a Sherriff, who is a temporal prince; and his revenue is increased by the donations of Mahometan sovereigns. N. lat. 21° 47′. E. long. 56° 46′.

Every Mussulman, it is well known, is obliged, once in his life, to visit Mecca, and to perform acts of devotion in the sacred places. But if this duty were universally performed, the concourse of pilgrims would be immense, and the city would not contain the crowds that would resort to it from every country in which the Mahometan religion has been introduced. Those, whose circumstances do not admit of their undertaking this pilgrimage, are allowed to have a person to perform it for them. But a pilgrim of this description can act for no more than one person at the same time; and, in order to prevent imposture, he must bring back a formal attestation from an Imam at Mecca, testifying, that he has actually performed the appointed devotional exercises in the holy places, in the name of such a person, living or dead; for even after the death of any person, who, during life, has neglected this duty, it may be discharged in his name, and for his benefit. The caravans that visit this city, are frequently composed of persons who become pilgrims more from motives of interest and traffic than from those of devotion. (See CARAVAN.) A pilgrim who has not been present from the commencement at the celebration of all the ceremonies, and performed every act of devotion, cannot obtain the title of "Hadgi;" an honour much courted by the Turks, because it confers substantial privileges, and commands respect to those who bear it. (See MAHOMET and MAHOMETANISM.) We shall here observe, that a similar custom prevails among the Christians in the East, who are very anxious to obtain the title of "Hadgi" or "Mokdasi," which they give to pilgrims of their communion. In order to acquire this title, it is not sufficient for a person to go in pilgrimage to Jerusalem: he must spend the season of the passover in that city, and assist at all the ceremonies in the holy weeks. See PILGRIM.

MECCA, a town of Morocco, near the coast of the Atlantic. S. lat. 29° 45′. W. long. 9° 45′.

MECHADER, a town of Arabia, in Yemen; 27 miles S. of Sana. N. lat. 14° 7′. E. long. 44° 15′.

MECHAIN, PETER FRANCIS ANDREW, in *Biography*, a very able French mathematician and astronomer, was born at Laon in the year 1744. At an early age he discovered a strong inclination for mathematical pursuits, and while he was under the instruction of his tutors, corresponded with Lalande, whom he was desirous of assisting in his labours. In 1772, Mechain was invited to Paris, where he was employed at the depôt of the marine, and assisted M. Darquier in correcting his observations. Here his merit brought him acquainted with M. Doisy, director of the depôt, who gave him a more advantageous situation at Versailles. At this place he diligently observed the heavens, and, in 1774, sent to the Royal Academy of Sciences, "A Memoir relative to an Eclipse of Aldebaran," observed by him on the 15th of April. He calculated the orbit of the comet of 1774; and discovered that of 1781. In 1782, he gained the prize of the academy on the subject of the comet of 1661, the return of which was eagerly expected in 1790; and in the same year he was admitted a member of the academy, and soon selected for the superintendance of the Connoissance des Tems. In the year 1790, M. Mechain discovered his eighth comet, and communicated to the academy his observations on it, together with his calculations of its orbit. In 1792 he undertook, conjointly with M. Delambre, the labour of measuring the degrees of the meridian, for the purpose of more accurately determining the magnitude of the earth and the length of a metre. In the month of June 1792, M. Mechain set out to measure the triangles between Perpignan and Barcelona; and notwithstanding that the war occasioned a temporary suspension of his labours, he was enabled to resume and complete them during the following year. He died on the 20th of September 1805, at Castellon de la Plana, in the sixty-second year of his age. Lalande deplores his loss as that of not only one of the best French astronomers, but one of the most laborious, the most courageous, and the most robust. His last observations and calculations of the eclipse of the sun on the 11th of February, are inserted in the Connoissance des Tems for the year 15, and he also published a great many in the Ephemerides of M. Bode of Berlin, which he preferred to a former work after Lalande became its editor. A more extensive memoir of his labours may be seen in baron von Zach's Journal for July 1800; and Lalande's History of Astronomy for 1804.

MECHANICS, that branch of practical mathematics which

which confiders motion and moving powers, their nature, laws, effects, &c. This term, in a popular fenfe, is applied equally to the doctrine of the equilibrium of powers, more properly called ftatics, and to that fcience which treats of the generation and communication of motion, which conftitutes dynamics, or mechanics ftrictly fo called. See STATICS, POWER, MOTION, and DYNAMICS.

This fcience is divided by Newton into practical and rational mechanics, the former of which relates to the mechanical powers, *viz.* the lever, balance, wheel and axis, pulley, wedge, fcrew, and inclined plane; and the latter, or rational mechanics, to the theory of motion; fhewing, when the forces or powers are given, how to determine the motion that will refult from them, and converfely when the circumftances of the motion are given, how to trace the forces or powers from which they arife.

Mechanics, according to the ancient fenfe of the word, confiders only the energy of *organa*, or machines. The authors who have treated the fubject of mechanics fyftematically have obferved, that all machines derive their efficacy from a few fimple forms and difpofitions, that may be given to the *organa*, which are interpofed between the agent and the refiftance to be overcome; and to thofe fimple forms they have given the name of mechanical powers, fimple powers, or fimple machines. See MECHANICAL *Powers*.

The practical ufes of the feveral mechanical powers were undoubtedly known to the ancients, but they were almoft wholly unacquainted with the theoretical principles of this fcience till a very late period; and it is therefore not a little furprifing that the conftruction of machines, or the inftruments of mechanics, fhould have been purfued with fuch induftry, and carried by them to fuch perfection. Vitruvius, in his 10th book, enumerates feveral ingenious machines which had then been in ufe from time immemorial. We find, that for raifing or tranfporting heavy bodies, they employed moft of the means which are at prefent commonly ufed for that purpofe, fuch as the crane, the inclined plane, the pulley, &c.: but with the theory or true principles of equilibrium they feem to have been unacquainted till the time of Archimedes. This celebrated mathematician, in his book of Equiponderants, confiders a balance fupported on a fulcrum, and having a weight in each fcale; and taking as a fundamental principle, that when the two arms of the balance are equal, the two weights fuppofed to be in equilibrio are alfo of neceffity equal, he fhews, that if one of the arms be increafed, the weight applied to it muft be proportionally diminifhed. Hence he deduces the general conclufion, that two weights fufpended to the arms of a balance of unequal length, and remaining in equilibrio, muft be reciprocally proportional to the arms of the balance; and this is the firft trace any where to be met with of any theoretical inveftigation of mechanical fcience. Archimedes alfo farther obferved, that the two weights exert the fame preffure on the fulcrum of the balance, as if they were directly applied to it; and he afterwards extended the fame idea to two other weights fufpended from other points of the balance, then to two others, and fo on, and hence, ftep by ftep, advanced towards the general idea of the centre of gravity, a point which he proved to belong to every affemblage of fmall bodies, and confequently to every large body, which might be confidered as formed of fuch an affemblage. This theory he applied to particular cafes, and determined the fituation of the centre of gravity in the parallelogram, triangle, trapezium, parabola, parabolic trapezium, &c. &c. To him we are alfo indebted for the theory of the inclined plane, the pulley, and the fcrew, befides the invention of a multitude of compound machines, of which, however, he has left us no defcription, and therefore little more than their names remain.

We may judge of the very imperfect ftate in which the theory of mechanics was at that time, by the aftonifhment expreffed by king Hiero, when Archimedes exclaimed, "Give me a place to ftand on and I will move the earth," a propofition which could have excited no furprife in any perfon poffeffing a knowledge of the fimple property of the lever. Of the theory of motion, however, it does not appear that even Archimedes poffeffed any adequate idea; the properties of uniform motion feem only to have engaged the attention of the ancients, and with thofe of accelerated and variable motion they were totally unacquainted: thefe were fubjects to which their geometry could not be applied, the modern analyfis being neceffary to bring this branch of the fcience to perfection.

From the time of Archimedes till the commencement of the fixteenth century, the theory of mechanics appears to have remained in the fame ftate in which it was left by this prince of Grecian fcience, little or no additions having been made to it during fo many ages; but about this time, Stevinus, a Flemifh mathematician, made known directly, without the introduction of the lever, the laws of equilibrium of a body placed on an inclined plane: he alfo inveftigated, with the fame fuccefs, many other queftions on ftatics, and determined the conditions of equilibrium between feveral forces concurring in a common point, which comes, in fact, to the famous propofition relating to the parallelogram of forces; but it does not appear, however, that he was at all aware of its confequences and application. In 1592, Galileo compofed a treatife on Statics, which he reduced to this fingle principle, *viz.* it requires an equal power to raife two different bodies to heights having the inverfe ratio of their weights; that is, whatever power will raife a body of two pounds to the height of one foot, will raife a body of one pound to the height of two feet. On this fimple principle he inveftigated the theory of the inclined plane, the fcrew, and all the mechanical powers, and Defcartes afterwards employed it in confidering the ftatical equilibriums of machines in general, but without quoting Galileo, to whom he had been indebted for the firft idea. To Galileo we are alfo indebted for the theory of accelerated motion, and its complete coincidence with the obferved phenomena of nature may be confidered as one of the greateft fteps made at one time in the fcience of phyfics. Since all bodies, faid this philofopher, are heavy, into whatever number of parts we divide any mafs, it follows, that its total weight is proportional to the number of material atoms of which it is compofed. Now the weight being thus a power always uniform in quantity, and its action never undergoing any interruption, it muft, in confequence, be continually giving new impulfes to a body, in every equal and fucceffive inftant of time, and while the body is falling, thefe impulfes are inceffantly accumulating, and remain in the body without alteration, the refiftance of the air alone being deducted, and hence the motion muft be accelerated by equal degrees.

Torricelli, a pupil of Galileo, profecuted the fubject after his mafter, and added feveral curious propofitions concerning projectiles, to thofe which the latter had previoufly inveftigated. Huygens confidered the motion of bodies along given curves, and demonftrated that the velocity of a heavy body, which defcends along any curve, is the fame at every inftant in the direction of the tangent, as it would have acquired by falling freely from a height equal to the correfponding vertical abfcifs. Then applying this principle to the inverted cycloid, the axis of which is vertical, he found that

that a heavy body, from whatever part of the cycloidical arc it falls, always arrives at the lowest point of that arc in the same space of time. This very remarkable proposition includes what is commonly called the *isochronism* of the cycloid, and would alone have been sufficient to establish the fame of a geometrician. In 1661, Huygens, Wallis, and sir Christopher Wren, all discovered the true laws of percussion separately, and without any communication with each other, a proposition which Descartes had previously attempted, but failed in giving it a general solution. The finding of the centres of oscillation in compound bodies soon followed that relating to percussion, and here again Huygens equally distinguished himself by the accuracy and elegance of his solution; but as the principles which he employed were not well understood by the philosophers and mathematicians of that period, his investigations were much criticised at the time; but the honour of the discovery was finally attributed to him, and those of Descartes and Roberval admitted to be erroneous, or at least not sufficiently general. However, before the discovery of the fluxional calculus, there were many curious and interesting mechanical properties which the ancient geometry was incompetent to investigate, and which could never have been brought to light but by the assistance of this modern branch of analysis.

After the foundation of statics was laid by Archimedes, it was not difficult to discover the conditions of equilibrium in every particular case, and these had guided the genius of invention in a number of machines, but they were not yet reduced to a general and uniform principle.

Varignon undertook and accomplished this plan of combining them, by means of the theory of compound motions. He gave some sketches of this in 1687, in his Project of a new System of Mechanics, and he in some degree exhausted all the combinations of the equilibrium of machines, in his "General Mechanics," not published till after his death, in 1725. In 1695, la Hire published a "Treatise on Mechanics," the general object of which, like that of Varignon's, is the equilibrium of machines, beside which it contains various applications of machines to the arts, in which the author was well versed. He also subjoined a treatise on epicycloids, and their use in this science, particularly as relating to the forms of teeth in wheel-work. This is a beautiful theory, and is highly creditable to its author, who it appears from the testimony of Leibnitz was not la Hire, though he published it as such, but was due to the celebrated Danish mathematician Roemer, who had communicated it to Leibnitz twenty years before la Hire's work appeared. After this period, several elementary treatises on the subject of mechanics were published, without, however, adding much to the previous stock of knowledge, unless indeed we except that of Cormus, a work highly valuable for the strictness and perspicuity of its demonstrations.

At this time very little had been done with regard to the theory of variable motion; this now began to engage the attention of mathematicians, and opened an extensive field to their researches. Galileo, as we have seen, made known the properties of rectilinear and uniformly accelerated motions; Huygens had treated of curvilineal motion, which finally led to the beautiful theory of central forces in a circle, and which is equally applicable to motion in any curve, by considering them as infinite series of small arcs of a circle, agreeably to the idea which he himself had employed in his general theory of evolutes. The laws of the communication of motion, likewise sketched by Descartes, and farther pursued by Wallis, Huygens, and Wren, had made a new and very considerable step, by means of the solution which Huygens gave of the celebrated problem of the centres of oscillation. All these acquisitions, at first separate and in some measure independent of each other, having been reduced to a small number of simple, commodious, and general formulæ, by means of the analysis of infinites, the science of mechanics acquired fresh vigour, and was prosecuted with the most unbounded success. The problems relating to motion were reduced into two classes; the first comprising the general problem of the motion of a single body acted upon by any given powers; and the second, the motions which result from the action and re-action that several bodies exert on each other in any given manner.

In the motion of a single body, we observe that matter, being of itself passive, if once set in motion, must uniformly persevere in it; and that its motion can neither increase nor diminish, unless by the action of some external power, which may be either constant or variable. And hence arise two principles, that of *vis inertiæ* and that of compound motion; and on these are founded the whole theory of motion, rectilineal or curvilineal, constant or variable, according to a given law. By virtue of the *vis inertiæ*, motion at every instant is essentially rectilinear and uniform, setting aside resistance and every obstacle that might otherwise impede or change its direction; and by the nature of compound motion, a body exposed to the action of a given number of forces, all tending at the same time to change the quantity and direction of its motion, takes such a path through space that in the last instant it reaches the same point at which it would have arrived, had it successively and freely obeyed each of the forces proposed.

On applying these principles to rectilineal motions uniformly accelerated, we perceive, 1st, that in this motion, the velocities increasing by equal degrees, or proportionally to the time, the accelerating force must be constant, or incessantly give equal impulses to the moving body, and that, consequently, the final velocity is as the product of the accelerating force multiplied by the time. 2dly. Each elementary portion of space passed through being as the product of the corresponding velocity multiplied by the element of the time, the whole of the space passed through is as the product of the accelerating force multiplied by the square of the time; and these two properties equally take place for each elementary portion of any variable motion whatever. Thus in every rectilineal motion variable according to a given law, the increment of the velocity is as the product of the accelerating force into the element of the time, and the second fluxion of the space passed through is as the product of the accelerating force into the square of the element of the time. Now if to these principles we add that of compound motion, we shall arrive at the knowledge of all curvilineal motion whatever. In fact, whatever forces be applied to a body describing a curve, we may at each instant reduce these forces to two, the one acting in the direction of the tangent at any point of the curve, and the other perpendicular to it; the first produces an instantaneous rectilineal motion, to which the principle of *vis inertiæ* applies; and the second is expressed by the square of the actual velocity of the body, divided by the radius of curvature, agreeably to the theory of central forces in the circle, which equally reduces to the same principle the motion in the direction of the radius of curvature. Such were the general principles introduced into the science of mechanics by means of the modern analysis, and there seems to be no doubt that it was by pursuing this theory, Newton was led to those brilliant discoveries which he afterwards published in his "Principia" under a different form. In 1716, Hermann published his "De Phoronomia," in which he undertook to explain all that regards mechanics, both of solids

solids and fluids, that is to say, statics, dynamics, hydrostatics, and hydraulics; in which he employs the synthetic method, although, like Newton, he doubtless derived most of his results from analysis, a circumstance which frequently interrupts the unity and connection of his problems.

The Mechanics of Euler, published in 1736, contain the whole theory of rectilinear and curvilinear motion in an isolated body, acted upon by any accelerating forces whatever, either in vacuo or in a resisting medium. The author has every where followed the analytical method, which, by reducing all the branches of this theory to uniformity, greatly facilitates the connection of it, and the whole is managed with an elegance and perspicuity, of which, before this time, we had no example. As to the principles of mechanics by which he puts his problems into equations, he employs those above mentioned.

This manner of laying the foundation of the calculation, however, though sufficiently commodious, was not the only one that might have been employed, nor was it the most simple. For the forces and motions at every instant may be resolved into other forces and motions parallel to fixed lines of given position in space. In which case nothing more is necessary than to apply the equations of the principles of *vis inertiæ* to these motions and forces, by which means the theorem of Huygens may be avoided. This simple idea, which was first employed by Maclaurin in his "Treatise on Fluxions," threw new light on the theory of mechanics, and much facilitated the solution of various problems. When the body moves constantly in one plane, two fixed axes only are to be taken, which are supposed to be perpendicular to each other, for the sake of greater simplicity; but when we are obliged, by the nature of the forces, to change the path continually in all directions, and to describe a curve of double curvature, three axes are to be employed perpendicular to each other, or forming the edges of a right-angled parallelopipedon. But the problems relating to the communication of motion, commonly called *dynamic problems*, required new principles. These, for instance, consist in determining the motions that result from the percussion of several bodies; the centre of oscillation of a compound pendulum; the motions of several bodies strung upon a rod, which has a rotatory movement round a fixed axis; &c.

Now it is evident, that in all cases of this kind the motion of the bodies is not the same as if the bodies were isolated and at liberty, but that there must be a distribution of the forces among all the bodies forming one whole, so that the motion gained by some of them is lost by others. The motion gained or lost is always estimated by the product of the mass into the velocity received or lost, whether the communication or the loss of motion be produced every instant by finite degrees, as in the shock of hard bodies, or whether the velocity change at each instant only by degrees infinitely small, as in motion of several bodies strung on a moveable rod, and generally in all cases where forces act in the manner of gravitation.

When Huygens gave his solution of the problems of oscillation, some unskilful mathematicians attacked it in reviews. James Bernouilli defended it in the Leipsic Transactions for 1686, and undertook to give a direct demonstration by means of the principle of the lever. At first, he considered only two equal weights fastened to an inflexible rod devoid of gravity, which was in motion round an horizontal axis. Having then observed that the velocity of the weights, nearest to the axis of rotation, must necessarily be less, and that on the other greater, than if each acted on the rod separately, he concludes that the force lost and the force gained balance each other, and that, consequently, the product of the quantity of matter in one, into the velocity it loses, and that of the other multiplied by the velocity it gains, must be inversely proportional to the arms of the lever. This reasoning is in fact accurate, only James Bernouilli mistook in setting out, by considering the velocities of the two bodies as finite, instead of which he should only have considered the elementary velocities, and compared them with the similar velocities produced every instant by the action of gravitation. De l'Hôpital remarked this error, and in correcting it, he found the centre of oscillation of the two weights, without departing in other respects from the principle of Bernouilli. In order then to proceed to a third weight, he united the former two at their centre of oscillation, and combined this new weight with the third, as he had combined together the former two, and so on. But the proposed union was a little precarious, and could not be admitted without a demonstration. This led Bernouilli to revive his former solution, in order to extend it generally to any number of bodies, which he finally accomplished. His method consists in resolving the motion of each body at any given instant into two other motions, the one, that which the body actually takes; and the other, that which is destroyed, and in forming equations which express the condition of equilibrium between the motions lost; by which means the problem is brought under the general laws of statics. The author applies this principle to several examples, and demonstrates strictly, and in the most evident manner, the proposition which Huygens employed as the basis of his solution. See Memoirs of the Academy of Sciences for 1703.

This solution of the problem of the centres of oscillation, seemed to leave nothing to be desired; yet, in 1714, it was brought forward again by John Bernouilli and Dr. Taylor, which were fundamentally the same. This occasioned warm disputes between them, as to the originality of their performances. Here, instead of the elementary weights of which the pendulum is composed, other weights are supposed to be substituted, in one and the same point, such that their motion of angular acceleration, and their motion with respect to the axis of rotation, shall be the same, and the new pendulum oscillate as the former. But these solutions are not considered so luminous as that of James Bernouilli, which was founded immediately on the laws of equilibrium. Leibnitz estimated the momenta of bodies by the mass into the square of their velocities, and John Bernouilli having adopted the same opinion, gave to the principles of Huygens, for the problem of the centres of oscillation, the name of the principle of conversion of the *vires vivæ*, which it has retained, because, in fact, in the motion of a system of heavy bodies, the sum of the products of the masses into the squares of the velocities remains the same, when the bodies descend conjointly, and when they afterwards ascend separately, with the velocities they acquired by their descent. This principle was also followed with success in dynamical problems, by several able analysts of the last century; but as it gives only a single equation, from which the velocity or the time must afterwards be expunged, the second object was attained by different means.

John Bernouilli employed for this purpose the principle of *tensions*; Euler, that of *pressures*; Daniel Bernouilli, that of *virtual power*, which a system of bodies has of re-establishing itself in its former state; and in certain cases both he and Euler made use of the constant quantity of circulatory motion round a fixed point. And when at length all the differential, or fluxional equations of the problem were

were eſtabliſhed, it remained only to reſolve them, which was of courſe the leaſt difficult part of their inveſtigations.

The principle which had been employed by James Bernouilli, in the ſolution of the problem relating to the centre of oſcillation, was generalized by D'Alembert; he ſhewed, that in whatever manner the bodies of one ſyſtem act upon each other, their motions may always be reſolved at every inſtant into two ſorts of motions, thoſe of the one being deſtroyed in the ſucceſſive inſtant, but the other retained; and that the motions retained are neceſſarily known from the conditions of the equilibrium between the motions deſtroyed. This general principle applies to all the problems of dynamics, and at leaſt reduces all their difficulties to thoſe of the problems of ſimple ſtatics; and renders uſeleſs that of the converſion of *vires vivæ*. By this means D'Alembert has reſolved a number of very beautiful and very difficult problems, ſome of which were abſolutely new, as, for example, that relating to the preceſſion of the equinoxes. Theſe general principles were firſt developed by D'Alembert in 1743, but they were more fully treated of in his Treatiſe of Dynamics, publiſhed in 1749; a truly intereſting and original work, highly creditable to the talents of this celebrated author. The ſcience of dynamics having thus gradually attained a high degree of perfection, was ſtill farther enriched, in 1765, by an important diſcovery, which is due to Segner; who has ſhewn in a ſhort paper entitled "Specimen Theoriæ Turbinum," *that if a body, of any ſize and figure, after rotatory or gyratory motions in all directions have been given to it, be left entirely to itſelf, it will always have three principal axes of rotation;* that is, that all the rotatory motions, by which it is affected, may conſtantly be reduced to three, which are performed round three axes perpendicular to each other paſſing through the centre of gravity or inertiæ of the body, and always preſerving the ſame poſition in abſolute ſpace, while the centre of gravity is at reſt, or moves uniformly in a right line; the poſition of theſe three axes being determined by an equation of the third order. This theory, which its author had not ſufficiently developed, Albert, the ſon of the celebrated Euler, treated at length in his paper "On the Stowage of Ships," which ſhared the prize of the Academy of Sciences at Paris for 1761, as did likewiſe his father, according to the ſame method, in the Memoirs of the Academy at Berlin for 1759, and in his work entitled "Theoria Motus Corporum rigidorum, 1765." Laſtly, D'Alembert ſhewed in his "Mathematica Opuſcula," vol. iv. publiſhed in 1768, that the ſolution of the problem was deducible from the formulæ which he had given in a memoir for determining the motion of a body of any figure, acted upon by any forces whatever, printed in vol. i. of his Opuſcula in 1761. The knowledge of theſe motions of free rotation round three principal axes, naturally led to the determination of the motion round any variable axes whatever; and hence, if we conſider the body to be acted upon by any given accelerating forces, we muſt begin with determining the rectilinear or curvilinear motion of the centre of gravity abſtractedly from all rotatory motion, and then combining this progreſſive motion with the rotatory motion of a given point of the body round a variable axis, we ſhall know at every inſtant the compound motion of this point in abſolute ſpace. On theſe principles Euler has reſolved many curious and intereſting problems relating to dynamics, and the ſame have been ſince farther proved by ſubſequent mathematicians. (Boſſut's Hiſt. Math.) We have thus given a ſketch of the hiſtory and ſucceſſive improvements of the ſcience of mechanics, which is all that is neceſſary under the preſent article, as the particular branches connected with this ſubject are treated of ſeparately under their reſpective heads in the different articles of this work. But as we have only directed our attention to the more prominent parts of the hiſtory, the works to which our references have been made are very limited. It remains, therefore, before we conclude this article, to enumerate ſome of the principal writers on mechanics, or on particular branches of it, which are as follows, *viz.*

Newton, in his "Principia;" Guido Ubaldus, in his "Liber Mechanicorum;" Torricelli, "Libri de Motu Gravium naturalitis Decendentium et Projectorum;" Balianus, "Tractatus de Motu naturali Gravium;" Huygens, "Horologium Oſcillatorium," and "Tractatus de Motu Corporum ex Percuſſione;" Leibnitz, "Reſiſtentia Solidorum," in Acta Euroditus, ann. 1684; Guldinus, "De Centro Gravitatis;" Wallis, "Tractatus de Mechanica;" Varignon, "Projet d'une Nouvelle Mechanique," and his papers in the Memoires Acad. ann. 1702; Borelli, "Tractatus de Vi Percuſſionis, de Motionibus naturalibus, &c.;" De Chales, "Treatiſe on Motion;" Pardies, "Diſcourſe on Local Motion;" Parent, "Elements of Mechanics and Phyſics;" Caſatus, "Mechanica;" Oughtred, "Mechanical Inſtitution;" Robault, "Tractatus de Mechanica;" Lamy, "Mechanique;" Keil, "Introduction to true Philoſophy;" De la Hire, "Mechanique;" Mariotte, "Tracti du Choc du Corps;" Ditton, "Laws of Motion;" Hermann, "Phoronomia;" Graveſande, "Phyſics;" Euler, "Tractatus de Motu;" Muſchenbroeck, "Phyſics;" Boſſu, "Mechaniques;" La Grange, "Mechanique Analytique;" Atwood, "On Motion;" Prony, "Architeture Hydraulique," and "Mechanique Analytique;" Francear, "Mechanique;" Gregory, "Mechanics in Theory and Practice," &c. &c. to which may be added the names of Nicholſon, Enfield, Wood, Ferguſon, Young, and Marat. For thoſe works which relate principally to the deſcription of machinery, ſee the article MACHINE.

MECHANICAL, ſomething that relates to mechanics, or is regulated by the nature and laws of motion.

In which ſenſe we ſay mechanical powers, mechanical properties or affections, mechanical principles, reaſoning, knowledge, &c.

MECHANICAL *Affections*, are ſuch properties in matter, as reſult from their figure, bulk, and motion.

MECHANICAL *Cauſes*, are thoſe founded on ſuch affections.

MECHANICAL *Force*. See FORCE.

MECHANICAL *Solutions*, are accounts of things on the ſame principles.

MECHANICAL *Philoſophy*, is the ſame with what we otherwiſe call the *corpuſcular philoſophy; viz.* that which explains the phenomenon of nature, and the operations of corporeal things, on the principles of mechanics; *viz.* the motion, gravity, figure, arrangement, diſpoſition, greatneſs, or ſmallneſs of the parts which compoſe natural bodies. See CORPUSCULAR.

MECHANICAL *Powers*, (ſo called,) are thoſe machines which are uſed for raiſing greater weights, or overcoming greater reſiſtances than could be effected by the natural ſtrength without them; the power of ſtrength being applied to one part of the machine, and another part of the machine applied to the weight or reſiſtance.

There are two principal problems that ought to be reſolved in treating of each of them.

The firſt is, to determine the proportion which the power and

and weight ought to have to each other, that they may juſt ſuſtain one another, or be in equilibrio.

The ſecond is, to determine what ought to be the proportion of the power and weight to each other in a given machine, that it may produce the greateſt effect poſſible, in a given time.

As to the firſt problem, this general rule holds in all powers; ſuppoſe the engine to move, and reduce the velocities of the power and weight to the reſpective directions in which they act; find the proportions of thoſe velocities; then if the power be to the weight as the velocity of the weight is to the velocity of the power; or, which amounts to the ſame thing, if the power multiplied by its velocity, gives the ſame product as the weight multiplied by its velocity, this is the caſe wherein the power and weight ſuſtain each other, and are in equilibrio; ſo that in this caſe the one would not prevail over the other, if the engine was at reſt; and if it is in motion, it would continue to proceed uniformly, if it were not for the friction of its parts, and other reſiſtances.

The ſecond general problem in mechanics is, to determine the proportion which the power and weight ought to bear to each other, that when the power prevails, and the machine is in motion, the greateſt effect poſſible may be produced by it in a given time. It is manifeſt, that this is an enquiry of the greateſt importance, though few have treated of it. When the power is only a little greater than that which is ſufficient to ſuſtain the weight, the motion is too ſlow; and though a greater weight is raiſed in this caſe it is not ſufficient to compenſate the loſs of time. When the weight is much leſs than that which the power is able to ſuſtain, it is raiſed in leſs time; and this may happen not to be ſufficient to compenſate the loſs ariſing from the ſmallneſs of the load. It ought, therefore, to be determined when the product of the weight, multiplied by its velocity, is the greateſt poſſible; for this product meaſures the effect of the engine in a given time, which is always the greater in proportion as the weight which is raiſed is greater, and as the velocity with which it is raiſed is greater. For other conſiderations neceſſary to be regarded in the conſtruction and uſe of machines, we refer to the articles MACHINE and MACHINERY.

The ſimple machines by which power is gained, are ſix in number, *viz.* the *lever*, the *wheel and axle*, or *axis in peritrochio*, the *pulley* (or rather ſyſtem of pullies), the *inclined plane*, the *wedge*, and the *ſcrew*. Of theſe, all ſorts of mechanical engines conſiſt; and in treating of them, ſo as to ſettle their theory, we muſt conſider them as mechanically exact, and moving without friction. Although theſe machines are treated of at large under their proper heads, it may not be amiſs to give a ſhort account of them all here.

1. A *lever* is an inflexible bar, turning upon a ſupporting prop as its centre of motion, which muſt be firm enough to bear the lever and the weight with which it is charged. There are three kinds of levers, and in each of them the velocity of each point is directly as its diſtance from the prop.

A lever is ſaid to be of the firſt kind when the prop is between the weight and the power. Here the power and weight balance each other, when the power is in proportion to the weight as the diſtance of the weight from the prop is to the diſtance of the power from it; ſo that if a weight be twenty pounds, and at one foot from the prop, a power of one pound at twenty feet from the prop will balance the weight, ſuppoſing the lever itſelf to have no weight. To this ſort of lever may be reduced all iron crows, ſciſſars, pinchers, candle-ſnuffers, and the like.

A lever is ſaid to be of the ſecond kind, when the weight is between the prop and the power. Here the lever and weight balance each other when the power is in proportion to the weight as the diſtance of the weight from the prop is to the diſtance of the power from it. Of this ſort are doors turning on hinges, oars, and ſuch knives as are fixed at the point.

A lever is ſaid to be of the third kind when the power is between the weight and the prop. In this, the power and weight balance each other, when the power is in proportion to the weight, as the diſtance of the weight from the prop is to the diſtance of the power from it: but this lever is never uſed where power is wanted to be gained; for in it, the intenſity of the power applied, muſt always exceed the intenſity of the weight to be raiſed, or reſiſtance to be overcome. Of this ſort are the bones of our legs and arms, and the wheels of clocks and watches. See LEVER and BALANCE.

2. In the *wheel and axle*, where the power is applied to the wheel, and the weight drawn up by a rope winding round the axle, the velocity of the power is to the velocity of the weight, as the circumference of the wheel is to the circumference of the axle, and the advantage gained by the machine is in the ſame proportion: for the power and weight balance each other when the power is in proportion to the weight, as the circumference of the axle is to the circumference of the wheel. This machine is the principal part of a common *crane*. See AXIS in *Peritrochio*.

3. A *pulley*, that only turns on its axis, and does not riſe with the weight, ſerves only to change the direction of the power; for it gives no mechanical advantage thereto. But when, beſides the upper pullies, which turn round in a fixed frame, or block, there is a block of pullies moving equally faſt with the weight, the velocity of the weight is to the velocity of the power as one is to twice the number of pullies in the moveable block: and the power and weight balance each other when the power is in proportion to the weight, as one is to twice the number of pullies in the moveable block. See PULLEY.

4. An *inclined plane* is like one-half of a wedge which has been cut in two equal parts lengthwiſe. A weight raiſed, or a reſiſtance moved, by an inclined plane, moves only through a ſpace equal to the height of that machine, in the time that a power drives it through a ſpace equal to its whole length. Therefore, the velocity of the power is in proportion to the velocity of the weight, as the length of the machine is to its thickneſs or height at the back; and the power and weight balance each other when the power is in proportion to the weight, as the thickneſs of the plane is to its length. All edge tools, which are chamfered (or ground down only on one ſide to the edge) are inclined planes, as far as the chamfer goes from the edge. See *Inclined* PLANE.

5. A *wedge*, in the common form, is like two inclined planes, joined together at their baſes; and the thickneſs of theſe planes (oppoſite their ſharp edges) makes the back of the wedge, to which the power of the ſledge or hammer is applied in cleaving of wood.

When two equal reſiſtances act perpendicularly againſt oppoſite ſides of the wedge, and a power acts perpendicularly againſt the back of the wedge, the velocity of the power is in proportion to the velocity of the reſiſtance on either ſide, as the length of the ſide is to half the thickneſs of the back: and the power balances the reſiſtance of the wood, when the power is in proportion to the reſiſtance, as half the thickneſs of the back of the wedge is to the length of either of its ſides, if the ſharp edge goes to the bottom

 of

of the cleft in the wood. But when the wood ſplits before the wedge, as it generally does, the power balances the reſiſtance, when the former is to the latter as half the thickneſs of the wedge (when it is driven quite into the wood) is to the whole length of the cleft below the back of the wedge. See WEDGE.

6. The *ſcrew* may be conſidered as if it were an inclined plane, wrapt round a cylinder. In this machine, the power muſt turn the cylinder quite round, in the time that the weight or reſiſtance (as in a common preſs) moves through a ſpace equal to the diſtance between the threads or ſpirals of the ſcrew. Therefore, the velocity of the power is in proportion to the velocity of the weight or reſiſtance, as the circumference of a circle, deſcribed by the power, is to the diſtance between the ſpirals of the ſcrew; and the power and reſiſtance balance each other, when the former is to the latter as the diſtance between the ſpirals is to the circumference of the circle deſcribed by the power. This machine, beſides the advantage peculiar to itſelf, has generally the benefit of the wheel and axle, on account of the winch or lever by which it is turned. See SCREW.

Of theſe ſix ſimple machines, all the moſt compound engines in the world are made. As the ſcrew includes the inclined plane, and two equally inclined planes make the wedge, we have all the mechanical powers combined together in a common jack, if it be turned by the fly; for then we have alſo the lever, the wheel and axle, and the pullies.

Thus, in a frame A B C D, (*Plate* XXXII. *Mechanics, fig.* 5.) faſtened by the nut O upon the ſtand O O, and held together by the pillars V W and B *q*, is adapted firſt the piece E F, whoſe fans or flies may be put in motion by the wind, or drawn by a hair faſtened at F, which repreſents the lever and balance: at right angles to this piece is joined the perpendicular ſpindle G H, having upon it the endleſs ſcrew H, which may be alſo conſidered as a wedge. This endleſs ſcrew or worm takes the ſkew teeth of the wheel K, which is the axis in peritrochio, and, in turning round, winds up the ſtring L M upon its axis, which paſſing round the pullies at M and N, or drawing by a tackle of five, raiſes the weight P. But as the ſcrew has no progreſſive motion on its axis, it cannot here be ſaid to comprehend the inclined plane; therefore, in order to make this machine take in all the mechanical powers, we may add the inclined plane, *r q* Q R, by making it reſt on the ground at Q R, and on the pillar *q* B, at *q r*, and thereby the force of the power drawing at F, will be farther increaſed in the proportion of Q T to T S. The whole force gained by this machine is found by comparing the ſpace gone through by the point F, with the height through which the weight is raiſed, in any determinate number of revolutions of F. An hundred pounds weight at P will be eaſily raiſed by the hair of a man's head drawing at F.

If an engine conſtructed in this manner be uſed for raiſing a weight, by means of a power applied to the fly, the power will balance the weight, if it be in proportion to the weight as the velocity of the weight is to the velocity of the fly. Now, conſidering how faſt the fly moves with reſpect to the motion of the weight, it is evident, that a crane, conſtructed in the manner of a common jack, would be an engine of very great power. But then the time loſt in raiſing the weight would alſo be very great: for, in any machine or engine whatever, the time loſt in working it will be as great as the power gained by it.

If machines or engines could be made without friction, the leaſt degree of power added to that which balances the weight would be ſufficient to raiſe it. In the lever, the friction is next to nothing; in the wheel and axle it is but ſmall; in the pullies it is very conſiderable; and in the inclined plane, wedge, and ſcrew, it is very great. The univerſal law or principle in all mechanical machines or engines, made to gain power, is, that the power gained will be always as great as the velocity of the power exceeds the velocity of the weight or reſiſtance: and, upon this principle, it is eaſy to compute the power, force, or advantage, of any ſimple machine or compound engine whatever.

E gr. If the body A (*Plate* XXXII. *Mechanics, fig.* 6.) be triple the body B, and each of them be ſo fixed to the extremities of a lever A B, whoſe fulcrum or fixed point is C, as that the diſtance of B C be triple the diſtance C A; the lever cannot be inclined on either ſide, but the ſpace B E, paſſed over by the leſs body, will be triple the ſpace A D, paſſed over by the great one. So that their motions or moments will be equal, and the two bodies in equilibrio.

Hence that noble challenge of Archimedes, *datis viribus, datum pondus movere;* for as the diſtance C B may be increaſed infinitely, the power or moment of A may be increaſed infinitely. So that the whole of mechanics is reduced to the following problem.

Any body, as A, *with its velocity* C, *and alſo any other body, as* B, *being given; to find the velocity neceſſary to make the moment or quantity of motion, in* B, *equal to the moment of* A, *the given body.* Here, ſince the moment of any body is equal to the rectangle under the velocity, and the quantity of matter; as B : A :: C : to a fourth term, which will be *c*, the celerity proper to B, to make its moment equal to that of A. Wherefore in any machine or engine, if the velocity of the power be made to the velocity of the weight, reciprocally as the weight is to the power, ſuch power will always ſuſtain, or, if the power be a little increaſed, it will move the weight.

Let, for inſtance, A B be a lever, whoſe fulcrum is at C, and let it be moved into the poſition *a* C *b*. Here, the velocity of any point in the lever is as the diſtance from the centre. For let the point A deſcribe the arc A *a*, and the point B the arc B *b*; then theſe arcs will be the ſpaces deſcribed by the two motions: but ſince the motions are both made in the ſame time, the ſpaces will be as the velocities. But it is plain, the arcs A *a* and B *b* will be to one another as the radii A C and C B, becauſe the ſectors A C *a* and B C *b* are ſimilar: wherefore the velocities of the points A and B are as their diſtances from the centre C.

Now if any powers be applied to the ends of the lever A and B, in order to raiſe its arms up and down; their force will be expounded by the perpendiculars S *a* and *b* N; which, being as the right ſines of the former arcs, *a* A and B *b*, will be to one another alſo as the radii A C and C B; wherefore the velocities of the powers are alſo as their diſtances from the centre. And ſince the moment of any body is as its weight, or gravitating force, and its velocity, conjunctly; if different powers of weights be applied to the lever, their moments will always be as the weights and the diſtances from the centre conjunctly. Wherefore, if to the ſame lever there be two powers or weights applied reciprocally proportional to their diſtances from the centre, their moments will be equal; and if they act contrarily, as in the caſe of a ſteel-yard, the lever will remain in an horizontal poſition, or the balance will be in equilibrio. And thus it is eaſy to conceive how the weight of one pound may be made to equibalance a thouſand, &c.

Hence alſo it is plain, that the force of the power is not at all increaſed by engines; only the velocity of the weight, in either lifting or drawing, is ſo diminiſhed by the application of the inſtrument, as that the moment of the weight is not greater than the force of the power. Thus, for inſtance, if if any force can raiſe a pound weight with a given velocity, it is impoſſible by any engine to effect, that the ſame power ſhall raiſe two pound weight with the ſame velocity: but by an engine it may be made to raiſe two pound weight, with half the velocity: or 1000 times the weight with $\frac{1}{1000}$ of the former velocity.

We ſhall here introduce into one view, an account of the principal methods that have occurred to us of explaining and demonſtrating the fundamental property of the ſeveral mechanical powers. It has been already obſerved, that, with regard to the lever, when any two forces act againſt each other on its arms, they will continue in equilibrio, if their quantities are inverſely as the diſtance between the points to which they are applied, and the point or fulcrum round which the lever turns. The demonſtration commonly aſcribed to Archimedes is founded upon this principle, that when any cylindric or priſmatic body is applied upon a lever, it has the ſame effect as if its whole weight was united and applied at the middle point of its axis. Let A B, *Plate* XXXII. *Mechanics*, *fig.* 7, be a cylinder, of an uniform texture, C its middle point; and it is manifeſt, that if the point C be ſupported, the equal halves of the cylinder, C A and C B, will balance each other about the point C, and the body will remain in equilibrio. Let the cylinder A B be diſtinguiſhed into any unequal parts, A D and D B; biſect A D in E, and D B in F; then a power applied at E, equal to the weight of the part A D, with a contrary direction, will ſuſtain it; and a power applied at F, equal to the weight of the part D B, with a contrary direction, will ſuſtain that part; ſo that theſe two powers acting at E and F, reſpectively equal to the weights of A D and D B, have preciſely the ſame effect as a prop at C, ſuſtaining the whole cylinder A B, and may be conſidered as in equilibrio with a power, acting at C, equal to the whole weight of the cylinder. But the diſtance $CE = CA - AE = \frac{1}{2}AB - \frac{1}{2}AD = \frac{1}{2}DB$; and, in like manner, the diſtance $CF = CB - BF = \frac{1}{2}AB - \frac{1}{2}DB = \frac{1}{2}AD$; conſequently C E is to C F as D B to A D; that is, as the power applied at F to the power applied at E, theſe being in equilibrio with the weight of the whole cylinder applied at C. From which it appears, that powers applied at E and F, which are to each other in the proportion of C F to C E, ſuſtain one another about the centre C.

It has been objected by M. Huygens and others, to this demonſtration of Archimedes, that when the whole cylinder is diſtinguiſhed into two ſegments, part of the weight of the greater ſegments acts on the ſame ſide of the fulcrum with the leſſer ſegment; and, therefore, when the whole weight of the greater ſegment is contracted into its middle point on one ſide of the fulcrum, and acts altogether againſt the leſſer ſegment, it requires ſome proof to ſhew, that this contracted weight will be balanced by the weight of the leſſer ſegment. M. Huygens propoſed a method of his own, depending on a poſtulatum aſſumed in common with Archimedes, and needing demonſtration, *viz.* that when equal bodies are placed on the arms of a lever, the one which is fartheſt from the fulcrum will prevail and raiſe the other up.

Sir Iſaac Newton demonſtrates the fundamental propoſition concerning the lever, from the reſolution of motion: let C, *fig.* 8, be the centre of motion in the lever K L; let A and B be any two powers applied to it at K and L, acting in the directions K A and L B. From the centre of motion, C, let C M and C N be perpendicular to thoſe directions in M and N; ſuppoſe C M to be leſs than C N, and from the centre C, at the diſtance C N, deſcribe the circle N H D, meeting K A in D. Let the power A be repreſented by D A, and let it be reſolved into the power D G acting in the direction C D, and the power D F perpendicular to C D, by completing the parallelogram A F D G. The power D G, acting in the direction C D from the centre of the circle, or wheel, D H N, towards its circumference, has no effect in turning it round the centre, from D toward H, and tends only to carry it off from that centre. It is the part D F only that endeavours to move the wheel from D towards H and N, and is totally employed in this effort. The power B may be conceived to be applied at N as well as at L, and to be wholly employed in endeavouring to turn the wheel the contrary way, from N towards H and D. If, therefore, the power B be equal to that part of A which is repreſented by D F, theſe efforts, being equal and oppoſite, muſt deſtroy each other's effect; that is, when the power B is to the power A, as D F to D A, or (becauſe of the ſimilarity of the triangles, A F D, D M C) as C M to C D or as C M to C N, then the powers muſt be in equilibrio; and thoſe powers always ſuſtain each other that are in the inverſe proportion of the diſtances of their directions from the centre of motion; or when the product of the one power multiplied by the diſtance of its direction from the centre, is equal to the product of the power on the other ſide multiplied by the like diſtance from it.

Mr. Maclaurin propoſes a new method of demonſtrating the law of equilibrium in the lever, which ſeems, he ſays, to be founded on the plaineſt and moſt evident principles: theſe principles are the following, *viz.* that if equal powers act at equal diſtances on different ſides of the fulcrum or centre of motion, with directions oppoſite and parallel to each other, they will have the ſame effect: and that, if gravity be ſuppoſed to act in parallel lines, and the fulcrum be between the bodies, whoſe powers are eſtimated, it muſt bear the ſum of their weights; becauſe the lever being loaded with thoſe weights, it muſt give way, if the fulcrum does not ſuſtain their ſum: but if the powers are on the ſame ſide of the fulcrum, in which caſe one of them muſt pull upwards whilſt the other pulls downwards, that there may be an equilibrium, it is then only loaded with the difference of the powers.

Suppoſing, therefore, firſt, two equal powers, A and B, *fig.* 9, acting in the directions A F, B H, to carry a body C, upon the lever A B, placed at C at equal diſtances from them; it is evident that, in this caſe, each of the powers A and B ſuſtains one-half of the weight C, by dividing it equally between them. Imagine now that the power A is taken away, and that, inſtead of reſting upon it, the end A of the lever reſts upon a prop at A; it is manifeſt that the power B, and the prop at A ſuſtain, as before, each one-half of the weight C; the prop now acting, in every reſpect, as the power at A before; and, the equilibrium continuing, it appears that, in this caſe, a power B equal to one-half of the weight C ſuſtains and balances it, when the diſtance of C from the prop A is one-half of the diſtance of B from the ſame; that is, when B is to C, as C A to B A, or $B \times BA = C \times CA$. From this ſimple inſtance we ſee, that powers act upon a lever not by their abſolute force only, but that their effect neceſſarily depends upon the diſtance of the point where they act from the prop, or centre of motion; and particularly, that a power balances a double power which acts at half its diſtance from the prop, on the ſame ſide of it, with an oppoſite direction.

The caſe when the two powers act on the different ſides of the prop, follows from this, by the principles already laid down. For let B H and C G (*fig.* 10.) repreſent the directions and forces with which the powers B and C act upon the lever; upon B A produced take A E equal to A C, or ½ A B, and in place of the power C G ſubſtitute

an

an equal power E K at E, with an oppofite direction; and, by the firft of thofe principles, this power E K will have the fame effect as C G, only the prop or centre of motion A will now fuftain the fum of the forces E K and B H, by the fecond of thofe principles. But the equilibrium between the powers B H and E K will continue as it was before, between B H and C G; fo that the powers B H and E K will be in equilibrio, when the power B H is one-half of E K, and the diftance of E K from the prop A is one-half of the diftance of B H from the fame; that is, when the power at B is to the power at E, as A E to A B, or $B \times BA = E \times EA$. In this cafe, the prop A being loaded with both the powers B and E, which act with the fame direction, its re-action muft be equal to their fum, $EK + BH = 3\,BH$, and muft be in the oppofite direction A F. In place of this re-action, let us now (*fig.* 11.) fubftitute a power A F at A, equal to thrice B H; and in place of the power E K, let us fubftitute a prop at E, fuftaining that end of the lever B E; and fince the equilibrium continues as before, it follows that the prop or centre of motion, being at E, the power B H fuftains the power A F, which is triple of B H, when the diftance of B H from the prop E is triple of the diftance of the power A F from the fame, that is, when $BH \times BE = AF \times AE$.

If we fuppofe the power E K to remain (*fig.* 12.) but the end B of the lever E B to reft upon a prop, then the powers A F and E K will fuftain and balance each other, the prop at B now coming in place of the power B H; in which $AF = 3\,BH$, and $EK = 2\,BH$; fo that A F is to E K as 3 to 2; and the diftances E B and A B being in the fame proportion, it appears that when two powers in the proportion of three to two act upon a lever on the fame fide of the prop, or centre of motion, with oppofite directions, at diftances in the proportion of two to three, they then fuftain each other. We have demonftrated therefore, that when the powers are in the proportion either of two to one, or of three to one, or of three to two, and the diftances of their application from the centre of motion are in the inverfe proportion, then thofe powers balance each other, or are in equilibrio.

Upon B E produced (*fig.* 13.) take $EL = EA$; and in place of the power A F fubftitute a power $LM = AF$, but with a contrary direction; this power L M will have the fame effect to turn the lever round the centre of motion E as A F had; confequently it will be in equilibrio with the power B H, as A F was. Therefore, when two powers L M and B H, in the proportion of three to one, act upon a lever with the fame direction, they are in equilibrio, if their diftances from the centre of motion L E and E B be in the ratio of one to three: that is, when $LM \times LE = BH \times BE$. In this cafe, the powers L M and B H acting with the fame direction, the prop E muft fuftain their fum $LM + BH = 4\,BH$, by the fecond principle above premifed. Therefore a power at L, as 3, and a power acting at B with the fame direction, as 1, are fuftained by a power acting at E, with a contrary direction, as 4. From which it follows, by fubftituting in the place of the power L M a prop at L, that a power at B, as 1, fuftains a power at E, as 4, acting with a contrary direction, when B L is to E L as 4 to 1; that is, when the powers are inverfely as their diftances from the prop, or centre of motion. By fubftituting the prop at B in the place of the power B H, it appears that a power L M at L, as 3, fuftains a power, acting with an oppofite direction at E, as 4, when their diftances L B and E B, from the prop B, are to each other as 4 to 3, or when $LM \times LB = EK \times EB$. By taking upon L B produced $Be = BE$ (*fig.* 14.), and in place of the power at E, fubftituting an equal power at *e* with a contrary direction, it appears, that a power at L, as 3, fuftains a power acting at *e*, with the fame direction, as 4, when the diftance L B is to the diftance *e* B, as 4 to 3. In this cafe, the prop at B fuftains the fum of the powers acting at L and *e*, that is, a power equal to feven times B H. From which it follows, by fubftituting a prop at L or *e*, in place of the powers that act there, that a power at *e*, as 4, fuftains a power at B, as 7, about the centre of motion L, when their diftances from it, *e* L, B L, are to each other as 7 to 4: and that a power at L, as 3, fuftains the power at B, as 7, about the centre of motion *e*, when their diftances from it, L *e* and B *e*, are to each other as 7 to 3.

By proceeding in this manner it appears, that when the powers are to each other as number to number, and when their diftances from the centre of motion are in the inverfe ratio of the fame numbers, then the powers fuftain each other, or are in equilibrio. From which it is eafy to fhew, in general, that when the powers are to each other in any ratio, though incommenfurable, and the diftances of their application from the centre of motion in the fame inverfe ratio, then they are in equilibrio; becaufe the ratio of incommenfurable quantities may be always limited to any degree of exactnefs at pleafure, between a greater and a leffer ratio of number to number. To Mr. Maclaurin's demonftration it has been objected, that it cannot be applied when the arms of the lever are incommenfurable, and as it cannot conclude generally, it muft, therefore, be imperfect.

Dr. Hamilton, having obferved that thefe feveral methods of demonftrating the fundamental property of the lever are liable to objections, propofes a new proof, depending on the following poftulatum, *viz.* if a force be uniformly diffufed over a right line, fo that an equal part of the force acts upon every point of the line, and if the whole force acts according to one and the fame plane, this force will be fuftained, and the line kept in equilibrio, by a fingle force applied to the middle point of the line equal to the diffufed force, and acting in a contrary direction. He alfo premifes this lemma: if a right line be divided into two fegments, the diftances between the middle of the whole line and the middle points of the fegments, will be inverfely as the fegments. This is felf-evident when the fegments are equal; and, when they are unequal, fince half of the whole line is equal to half of the greater and half of the leffer fegment, it is plain that the diftance between the middle of the whole line and the middle of one fegment, muft be equal to half of the other fegment, fo that thefe diftances muft be to each other inverfely as the fegments.

Let the line G H, then, *fig.* 15, whofe middle point is D, be divided into the unequal fegments G L and L H, whofe middle points are C and F, and let two forces or weights, A and B, which are to each other as the fegments G D and L H, be applied to their middle points C and F, and let them act perpendicularly on the line G H: then, (by the lemma) the weights A and B will be to each other inverfely as C D and F D (the diftances of the points C and F, to which they are applied, from the middle of the whole line); if then a third force or weight E, equal to the fum of the forces A and B, be applied to the point D, and acts on the line in an oppofite direction; I fay thefe three forces will fuftain each other, and keep the line in equilibrio. For let us fuppofe the force E to be removed, and inftead of it another force, equal alfo to the fum of A and B, to be uniformly diffufed over the whole line G H, and to act directly againft the forces A and B, then the part of this force which acts on the fegment G L, will be equal to the force A, and therefore will be fuftained by it (poftulatum);

latum); and the other part, which is diffused over the segment L H, will be equal to and sustained by the force B, so that the forces A and B will sustain this diffused force and keep the line in equilibrio. Let now two other forces act also on this line in opposite directions, one of them the force E acting on the point D, as it was first supposed to do, and the other an uniformly diffused force equal to E (and consequently equal to the other diffused force), then these two additional forces will also balance each other, and therefore the equilibrium will still remain. So that the two forces A and B, and a diffused force acting on one side of the line sustains the force E, and a diffused force acting on the other side: but it is manifest, that in this equilibrium, the two diffused forces acting on opposite sides are perfectly equivalent, and therefore if they are taken away from both sides, the equilibrium must still remain. Hence it appears that the three weights or forces A, B, and E, any two of which are, (by the construction) to each other inversely as their distances from the third, will sustain each other and keep the line on which they act in equilibrio; which is the first and most simple case of the property of the lever; for here the directions of the weights are supposed to be perpendicular to the line on which they act, and it is evident that, if one of the points C, D, or F be fixed or considered as a fulcrum, the weights acting on the other two points will continue to support each other. The second case of the property of the lever is easily deduced from the first; for when two weights act on the arms of a lever in oblique directions, and are to each other inversely as the perpendicular distances of the lines of direction from the centre of motion, then by the resolution of forces, it is easily proved that the parts of those forces which act perpendicularly on the arms of the lever, and which only are exerted to turn the lever, are to each other inversely as the lengths of those arms; and therefore by the first case they must balance each other.

From what has been above demonstrated, it appears, that the powers with which any two forces move or endeavour to move the arms of a lever, are as the rectangles, under lines proportional to the forces, and the perpendicular distances of their lines of direction from the fulcrum; and also that when two bodies acting on the arms of a lever sustain each other, if one of them be removed farther from the fulcrum, it will preponderate; but if it be brought nearer to the fulcrum, the other weight will prevail: because the product to which its force is proportional will be increased in the first case, and diminished in the second.

When a weight is to be raised by means of an axle and wheel, it is fastened to a chord that goes round the axle, and the power, which is to raise it, is hung to a chord that goes round the wheel. If then the power be to the weight as the radius of the axle to the radius of the wheel, it will just support that weight; as will easily appear from what was proved of the lever. For the axle and wheel may be considered as a lever, whose fulcrum is a line passing through the centre of the wheel and middle of the axle, and whose long and short arms are the radii of the wheel and axle which are parallel to the horizon, and from whose extremities the chords hang perpendicularly. And thus an axle and wheel may be looked upon as a kind of perpetual lever, on whose arms the power and weight always act perpendicularly, though the lever turns round its fulcrum. And in like manner, when wheels and axles move each other by means of teeth on their peripheries, such a machine is really a perpetual compound lever; and, by considering it as such, we may compute the proportion of any power to the weight it is able to sustain by the help of such an engine. And since the radii of two contiguous wheels, whose teeth are applied to each other, are as the number of teeth in each, or inversely as the number of revolutions, which they make in the same time: we may, in the computation, instead of the ratio of these radii, put the ratio of the number of teeth on each wheel; or the inverse ratio of the number of revolutions they make in the same time.

The most natural method of explaining the effects of the pulley, that is, of computing the proportion of any power to the weight it can sustain by means of any system of pullies, is, by considering that every moveable pulley hangs by two ropes equally stretched, which must bear equal parts of the weight: and, therefore, when one and the same rope goes round several fixed and moveable pullies, since all its parts on each side of the pullies are equally stretched, the whole weight must be divided equally amongst all the ropes by which the moveable pullies hang. And consequently if the power which acts on one rope be equal to the weight divided by the number of ropes, or double the number of moveable pullies, that power must sustain the weight.

The several cases in which the wedge is applied may be comprehended in one general proposition: let the equicrural triangle A B C (*fig.* 16.) represent a wedge, the lines A B and C B will be the sides of the wedge, A C its base, or back, and its height will be the line P B bisecting the base A C, and also the vertical angle A B C.

When any two resisting forces act on the sides of a wedge, in directions which make equal angles with the sides, (as they are always supposed to do,) a power acting perpendicularly at P on the base of the wedge will keep the resisting forces in equilibrio, when it is to the sum of these forces, as the sine of half the vertical angle of the wedge, to the sine of the angle which the directions of the forces contain with the sides of the wedge.

For let E and F be two bodies acting on the sides of the wedge, and let them be first supposed to act in the directions E P and F P perpendicular to the sides; then since the power P acts perpendicularly on the base A C, if these three forces keep the wedge in equilibrio, they will be to each other, as the sides of a triangle to which their directions are parallel, or (which is the same thing) as the sides of the triangle A B C, to which their directions are perpendicular. Therefore, the power P is to the sum of the resisting forces which it sustains as A C, the base of the wedge, to the sum of the sides, or as P A, half the base, to A B, one of the sides; but P A is to A B as the sine of P B A, half the vertical angle of the wedge, to the radius which is the sine of a right angle, and the directions of the resisting forces are supposed in this case to contain a right angle with the sides of the wedge.

Let now the resisting bodies E and F be supposed to act on the wedge in directions parallel to the lines D P and O P, which make oblique angles with its sides, draw E G and F K perpendicular to those lines. From what has been proved, it appears that the power P is to the force with which it is able, by means of the wedge, to protrude the resisting bodies in the directions P E and P F, as the sine of half the vertical angle to the radius; let this protruding force be expressed by the line P E, and let it be resolved into two forces expressed by the lines P G and G E, the former of these only will act in opposition to the resisting bodies, therefore the whole protruding force of the power is to the force with which it acts against the resisting bodies E and F in the directions P D and P O as P E to P G, or (because the triangles E P G and D P E are similar) as P D to P E, that is, as the radius to the sine of the angle P D E; compounding, therefore, the ratio of the sine of half the vertical angle to the radius, with the ratio of the radius to the sine of the angle P D E,

the

the power P, when the wedge is kept in equilibrio, will be to the force with which it protrudes the resisting bodies in directions opposite to those in which they act, as the sine of half the vertical angle to the sine of the angle P D E or P O F, which the directions of the resisting forces contain with the sides of the wedge.

Hence, when the directions in which resisting bodies act on a wedge are given, we may easily find two lines that will express the proportion between the resistance and the power which sustains it by means of the wedge. For from P, the middle point of the wedge, draw the line P D meeting one of the sides, and parallel to the direction in which the resisting force acts on that side, then the power will be to the resistance as P D to P B the height of the wedge. For P D and P B are to each other as the sines of the opposite angles, in the triangle P B D, that is, as the sines of half the vertical angle, and the angle which the direction of the resisting force contains with the side of the wedge.

From what has been demonstrated we may deduce the proportion of the power to the resistance it is able to sustain, in all the cases in which the wedge is applied.

First, when, in cleaving timber, the wedge fills the cleft, then the resistance of the timber acts perpendicularly on the sides of the wedge; therefore, in this case, when the power which drives the wedge is to the cohesive force of the timber as half the base to one side of the wedge, the power and resistance will be in equilibrio.

Secondly, when the wedge does not exactly fill the cleft, which generally happens because the wood splits to some distance before the wedge: let E L F represent a cleft, into which the wedge A B C is partly driven; as the resisting force of the timber must act on the wedge in directions perpendicular to the sides of the cleft, draw the line P D in a direction perpendicular to E L, the side of the cleft, and meeting the side of the wedge in D; then the power driving the wedge, and the resistance of the timber, when they balance, will be to each other as the line P D to P B, the height of the wedge.

Thirdly, when a wedge is employed to separate two bodies that lie together on a horizontal plane, for instance two blocks of stone; as these bodies must recede from each other in horizontal directions, their resistance must act on the wedge in lines parallel to its base C A; therefore, the power which drives the wedge will balance the resistance, when they are to each other as P A, half the breadth of the wedge, to P B its height; and then any additional force, sufficient to overcome the resistance arising from the friction of the bodies on the horizontal plane, will separate them from each other.

With respect to the inclined plane: let the line A B, (*fig.* 17.) represent the length of an inclined plane, A D its height, and the line B D we may call its base. Let the circular body G E F be supposed to rest on the inclined plane, and to be kept from falling down it by a string C S tied to its centre C. Then the force with which this body stretches the string will be to its whole weight as the sine of A B D, the angle of elevation, to the sine of the angle which the string contains with a line perpendicular to A B, the length of the plane. For let the radius C E be drawn perpendicular to the horizon, and C F perpendicular to A B, and from E draw E O parallel to the string, and meeting C F in O: then, as the body continues at rest, and is urged by three forces, to wit, by its weight in the direction C E, by the re-action of the plane in the direction F C, and by the re-action of the string in the direction E O; the re-action of the string, or the force by which it is stretched, is to the weight of the body as E O to C E; that is, as the sine of (the angle E C O, which is equal to) A B D, the angle of elevation, to the sine of the angle E O C, equal to S C O, the angle which the string contains, with the line C F perpendicular to A B, the length of the plane.

When, therefore, the string is parallel to the length of the plane, the force with which it is stretched, or with which the body tends down the inclined plane, is to its whole weight, as the sine of the angle of elevation to the radius, or as the height of the plane to the length. And in the same manner it may be shewn, that when the string is parallel to B D, the base of the plain, the force with which it is stretched is to the weight of the body as A D to B D, that is, as the height of the plane to its base. If we suppose the string, which supports the body G E F, to be fastened at S, and that a force by acting on the line A D, the height of the plane, in a direction parallel to the base B D, drives the inclined plane under the body, and by that means makes it rise to a direction parallel to A D: then, from what was proved in the third case of the wedge, it will appear, that this force must be to the weight of the body as A D to B D, or rather in a proportion somewhat greater; if it makes the plane move on and the body rise.

From this last observation we may clearly shew the nature and force of the screw; a machine of great efficacy in raising weights, or in pressing bodies closely together. For if the triangle A B D be turned round a cylinder whose periphery is equal to B D, then the length of the inclined plane B A will rise round the cylinder in a spiral manner, and form what is called the thread of the screw, and we may suppose it continued in the same manner round the cylinder, from one end to the other; and A D, the height of the inclined plane, will be every where the distance between two contiguous threads of this screw, which is called a convex screw. And a concave screw may be formed to fit this exactly, if an inclined plane every way like the former be turned round the inside of a hollow cylinder, whose periphery is somewhat larger than that of the other. Let us now suppose the concave screw to be fixed, and the convex one to be fitted into it, and a weight to be laid on the top of the convex screw: then, if a power be applied to the periphery of this convex screw to turn it round, at every revolution the weight will be raised up through a space equal to the distance between the two contiguous threads, that is, to the line A D, the height of the inclined plane B A; therefore, since this power applied to the periphery acts in a direction parallel to B D, it must be to the weight it raises as A D to B D, or as the distance between two contiguous threads, to the periphery of the convex screw.

The distance between two contiguous threads is to be measured by a line parallel to the axle; if we now suppose that a handspike or handle is inserted into the bottom of the convex screw, and that the power which turns the screw is applied to the extremity of this handle, which is generally the case; then as the power is removed farther from the axis of motion, its force will be so much increased, and therefore so much may the power itself be diminished. So that the power which, acting on the end of a handle, sustains a weight by means of a screw, will be to that weight, as the distance between two contiguous threads of the screw, to the periphery described by the end of the handle. In this case we may consider the machine as composed of a screw and a lever, or, as sir Isaac Newton expresseth it, *Cuneus a vecte impulsus.*

Professor Vince, premising that Dr. Hamilton's demonstration depends upon this proposition, that when a body is at rest, and acted upon by three forces, they will be as the three sides of a triangle parallel to the directions of the forces,

forces, allows this principle to be true, when the three forces act at any point of a body; but, conſidering the lever as the body, the three forces act at different points, and therefore the principle, as applied by the author, is certainly not applicable. If in this demonſtration we ſuppoſe a plane body, in which the three forces act, inſtead of ſimply a lever, then the three forces being actually directed to the ſame point of the body, the body would be at reſt. But in reaſoning from this to the caſe of the lever, the ſame difficulties would ariſe, as in the proof of ſir I. Newton. But admitting that all other objections could be removed, the demonſtration fails when any two of the forces are parallel. Another demonſtration is founded upon this principle, that if two nonelaſtic bodies meet with equal quantities of motion, they will, after impact, continue at reſt; and hence it is concluded, that if a lever which is in equilibrio be put in motion, the motions of the two bodies muſt be equal; and therefore the preſſures of theſe bodies upon the lever at reſt, to put it in motion, muſt be as their motions. Now in the firſt place, this is comparing the effects of preſſure and motion, the relation of the meaſures of which, or whether they admit of any relation, we are totally unacquainted with. Moreover, they act under very different circumſtances; for in the former caſe, the bodies acted immediately on each other, and in the latter, they act by means of a lever, the properties of which we are ſuppoſed to be ignorant of. When forces act on a body, conſidered as a point, or directly againſt the ſame point of any body, we only eſtimate the effect of theſe forces to move the body out of its place, and no rotatory motion is either generated, or any cauſes to produce it, conſidered in the inveſtigation. When we, therefore, apply the ſame propoſition to inveſtigate the effect of forces to generate a rotatory motion, we manifeſtly apply it to a caſe which is not contained in it, nor to which there is a ſingle principle in the propoſition applicable. The demonſtration given by Mr. Landen, in his Memoirs, is founded upon ſelf-evident principles, nor does our author ſee any objections to his reaſoning upon them. But as his inveſtigation conſiſts of ſeveral caſes, and is beſides very long and tedious, ſomething more ſimple is ſtill much to be wiſhed for, proper to be introduced in an elementary treatiſe of mechanics, ſo as not to perplex the young ſtudent either by the length of the demonſtration, or want of evidence in its principles. What the ingenious Profeſſor propoſes to offer will, he hopes, render the whole buſineſs not only very ſimple, but alſo perfectly ſatisfactory.

The demonſtration given by Archimedes would be very ſatisfactory and elegant, provided the principle on which it is founded could be clearly proved; *viz. that two equal powers at the extremities, or their ſum at the middle of a lever, would have equal effects to move it about any point.* Now, that the effects will be the ſame, ſo far as reſpects any *progreſſive* motion being communicated to the lever when at liberty to move freely, is ſufficiently clear; but there is no evidence whatever that the effects will be the ſame to give the lever a *rotatory* motion about any point, becauſe a very different motion is then produced, and we are ſuppoſed to know nothing about the efficacy of a force at different diſtances from the fulcrum to produce ſuch a motion. Beſides, the two motions are not only different, but the *ſame* forces are known to produce *different* effects in the two caſes; for in the former caſe the two *equal* powers at the extremities of the arms produce *equal* effects in generating a *progreſſive* motion; but in the latter caſe they do *not* produce *equal* effects in generating a *rotatory* motion. We cannot therefore reaſon from one to the other. The principle, however, may be thus proved.

Let A, C, (*fig.* 18.) be two equal bodies placed on a ſtraight lever, A P, moveable about P; biſect A C in B, produce P A to Q, and take B Q = B P, and ſuppoſe the end Q to be ſuſtained by a prop. Then as A and C are ſimilarly ſituated in reſpect to each end of the lever, that is, A P = C Q, and A Q = C P, the prop and fulcrum muſt bear equal parts of the whole weight; and therefore the prop at Q will be preſſed with a weight equal to A. Now take away the weights A and C, and put a weight at B equal to their ſum; and then the weight at B being equally diſtant from Q and P, the prop and fulcrum muſt ſuſtain equal parts of the whole weight, and therefore the prop will now alſo ſuſtain a weight equal to A. Hence if the prop Q be taken away, the moving force to turn the lever about P in both caſes muſt evidently be the ſame; therefore the effects of A and C upon the lever to turn it about any point are the ſame as when they are both placed in the middle point between them. And the ſame is manifeſtly true if A and C be placed without the fulcrum and prop. If, therefore, A C be a cylindrical lever of uniform denſity, its effect to turn itſelf about any point will be the ſame as if the whole were collected into the middle point B; which follows from what has been already proved, by conceiving the whole cylinder to be divided into an infinite number of laminæ perpendicular to its axis, of equal thickneſſes.

The principle, therefore, aſſumed by Archimedes is thus eſtabliſhed upon the moſt ſelf-evident principle, that is, that *equal* bodies at *equal* diſtances muſt produce *equal* effects; which is manifeſt from this conſideration, that when *all* the circumſtances in the cauſe are equal, the effects muſt be equal. Thus the whole demonſtration of Archimedes is rendered perfectly complete, and at the ſame time it is very ſhort and ſimple. The other part of the demonſtration we ſhall here inſert, for the uſe of thoſe who may not be acquainted with it.

Let X Y (*fig.* 19.) be a cylinder, which biſect in A, on which point it would manifeſtly reſt. Take any point Z, and biſect Z X in B, and Z Y in C; then, from what has been proved, the effects of the two parts Z X, Z Y to turn the lever about A is the ſame as if the weight of each part were collected into B and C reſpectively, which weights are manifeſtly as Z X, Z Y, and which therefore conceive to be placed at B and C. Now $AB = AX - XB = \frac{1}{2}XY - \frac{1}{2}XZ = \frac{1}{2}YZ$; and $AC = AY - YC = \frac{1}{2}XY - \frac{1}{2}ZY = \frac{1}{2}XZ$; conſequently $AB : AC :: \frac{1}{2}YZ : \frac{1}{2}XZ :: YZ : XZ ::$ the weight at C : the weight at B.

The property of the ſtraight lever being thus eſtabliſhed, every thing relative to the bent lever immediately follows. See Maclaurin's Account of ſir Iſaac Newton's Phil. Diſc. book ii. chap. 3. Hamilton's Phil. Eſſ. eſſ. 1. or Phil. Tranſ. liii. p. 116. Phil. Tranſ. vol. lxxxiv. art. v. p. 33, &c.

Mechanical is alſo applied to a kind of *reaſoning*, which of late has got great ground, both in phyſics and medicine; thus denominated, as being conformable to what is uſed in the contrivance, and accounting for the properties and operations of machines. See Medicine.

Mechanical is alſo uſed, in *Mathematics*, to ſignify a conſtruction or proof of ſome problem, not done in an accurate and geometrical manner, but coarſely and unartfully, or by the aſſiſtance of inſtruments; as are moſt problems relating to the duplicature of the cube, and the quadrature of the circle.

Mechanical *Arts*. See Arts.

Mechanical *Curve*. See *Tranſcendental* Curve.

Mechanical *Pathology*, the ſyſtem of medicine adopted by Borelli, Pitcairn, and others, at the end of the ſeventeenth and beginning of the eighteenth centuries, by which they endeavoured to explain the phenomena of diſeaſe upon the principles of mechanical philoſophy; principles which were very partially applicable to the operations of animal life;

life; the fyftem, therefore, was exploded by the more philofophical refearches into the laws of the fenforial power, or nervous energy, peculiar to living beings, by the pathologifts of fucceeding times. See MEDICINE, *Hiftory of*, near the end.

MECHELEN, in *Geography*, a town of France, in the department of the Lower Meufe, and chief place of a canton, in the diftrict of Maeftricht. The place contains 906, and the canton 7736 inhabitants, on a territory of 390 kiliometres, in 17 communes.

MECHLIN. See MALINES.

MECHOACAN, a province or large diftrict, in the domain of Mexico, bounded on the N. by part of Guafteca, or Panuco, and the provinces of Zacatecas and Guadalajara, on the E. by another part of Guafteca, and Mexico proper, and on the S. by the latter and the South fea, which, together with Xalifco or New Galicia, bounds it alfo on the W. and N.W. It extends about 210 miles along the coaft, and ftill further inland. The air is fingularly healthy, and the foil very fertile. In this province are mines of filver, and, as it has been faid, fome of gold and copper. Among its productions we may reckon maize and cotton, the cacao or chocolate nut, the root mechoacan, feveral odoriferous gums, and balfam, farfaparilla, ambergris, vanillas, caffia, honey, wax, &c. The natives, fince they have been incorporated with the Spaniards, have acquired the knowledge of feveral trades, and are curious in the manufacture of cabinets, weaving filk, and earthen pottery; and they particularly excel in making images of fmall feathers, equal to the moft exquifite painting. The country is infefted with foxes, fquirrels, lions, wild dogs, and tygers; but it has alfo a numerous breed of excellent horfes for the faddle or harnefs. The fea, as well as its lakes and rivers, fupply abundance of excellent fifh. In this province there are two confiderable lakes one of which gave name to the lake, implying "fifhery," as it ufed anciently to fupply the capital. This lake is fituated on the N. of Pafquaro, the capital of the province, while Valladolid, or Mechoacan, has only the bifhopric. According to Alcedo, it is about 12 leagues in circumference, probably about 40 Englifh miles, perhaps equalling that of Tezeuco, though reprefented in our maps as of far inferior fize. The fifh is exquifite; and many Indians dwell in picturefque iflets, occupied in fifhing, or bringing to the capital in canoes fifh, fruits, flowers, and pot-herbs. Mechoacan was formerly a kingdom, but the Spaniards have reduced it into a bifhopric, in which are about 200 towns of converted natives. As in this province there are fcarcely any harbours that deferve the name of ports, the greateft part of the trade is carried on by land.

MECHOACAN, or *Valladolid*, a city of Mexico, in the province of Mechoacan, and a bifhop's fee, fituated on a river near the W. fide of a lake, which abounds with fifh. It is large and well decorated; 108 miles W. of Mexico. N. lat. 20° 5'. W. long. 102° 11'.

MECHOACAN, *Mechoacanna*, called alfo *white jalap*, *white rhubarb*, and *American fcammony*, a medicinal root, taking its name from a province of Mexico, from whence it is brought in thin tranfverfe flices, like jalap, but larger and whiter. (See JALAP.) Mechoacan fcarcely yields one-fixth part fo much refin as jalap does. It is a fpecies of bindweed. See CONVOLVULUS.

Mechoacan was firft introduced about the year 1524, and ufed as a purgative before jalap, though the latter is now in more general ufe, as being found more efficacious: yet mechoacan is the milder and more gentle of the two, and on that account is preferable. The feat of its action is chiefly in the extreme parts; for which reafon it is accounted good in arthritic pains. It has the advantage of needing no preparation, or corrective; and of purging in its own proper fubftance, as it grows.

It purges ferous humours from all parts of the body; and helps the dropfy, jaundice, the rheumatifm, working with gentlenefs, and without griping; and, therefore, it is fit for weakly tender conftitutions; but by reafon that a larger quantity muft be given than moft people are willing to take, it is grown very much out of ufe. The dofe in fubftance is from one drachm to two or more.

M. Boulduc found, by analyfing it, that it contains twelve times as much falt as refin; but neither the faline nor refinous extract purge fo freely as the fubftance, even though taken in larger dofes; nor do they even purge fo eafily.

In the choice of mechoacan, prefer thofe pieces which are the browneft within, and whofe fubftance is the clofeft, and moft compact.

MECKENHEIM, in *Geography*, a town of France, in the department of the Rhine and Mofelle, feated on the Erfft; 7 miles S.S.W. of Bonn. N. lat. 50° 40'. E. long. 6° 57'.

MECKLENBURG, a town of the duchy of the fame name, anciently the capital of the Obotrites, and called by fome old hiftorians, probably on account of its extent, "Megapolis." Formerly it contained three convents, and in 1058 a bifhopric was founded. Since the founding of Wifmar, it has funk into a village; 2 miles S. of Wifmar.

MECKLENBURG, *Duchy of*, might formerly be faid to confift of three parts, *viz.* Schwerin, Güftrow, and Strelitz. But now only thofe of Schwerin and Strelitz are preferved, and the duchy of Mecklenburg Güftrow has fallen to the houfe of Schwerin, and, becoming incorporated with it, has loft its diftinctive name. Wifmar, which was formerly ceded to the Swedes, was afterwards purchafed of the king of Sweden, and now belongs to this branch of the houfe of Mecklenburg. This principality is bounded on the N. by the Baltic, on the E. by Pomerania, on the S. by Brandenburg, and on the W. by the territory of Lubeck and principality of Luneburg. When the Vandals, in a confiderable number, quitted this country in the fifth century, the Wends occupied their habitations, and became intermixed with the inhabitants that remained. Of thefe Wends, the moft confiderable tribe was that of the Obotrites, which had its own particular princes. From thefe defcended Prebiflau, who, in the 12th century, embraced the Chriftian religion, and rebuilt Mecklenburg, the ancient capital of the Obotrite princes, and took his name from it. His fon, Henry Borwin, was father of two princes, one of whom, *viz.* John, was the founder of the Mecklenburg line, and the other, *viz.* Nikolot, that of Wenden: but when this latter became extinct, the principality of Wenden devolved to the Mecklenburg branch, which was raifed to the dignity of duke by the emperor Charles IV. At the peace of Weftphalia, in 1648, Wifmar was ceded to the Swedes; but the diocefes of Schwerin and Ratzeburg were converted into temporal principalities. The Güftrow line failed, and, after fome difputes, a compromife took place at Hamburgh in 1701, on condition that the principality of Güftrow fhould be added to that of Schwerin, and that the principality of Ratzeburg, with fome other territories, fhould be annexed to that of Strelitz. At the fame time, the right of primogenitureihip, and the lineal fucceffion, were eftablifhed in both houfes, and the compact was ratified by the emperor Leopold. Two lines of the dukes of Mecklenburg are ftill fubfifting. The Schwerin line commenced in duke Frederic William; and the Strelitz line commenced in duke Adolphus Frederic II. The annual revenues of the Schwerin line are confiderable; and they were formerly rated

rated at 300,000 rix-dollars *per annum*. The duke of the Mecklenburg Strelitz line is faid to receive about 126,000 rix-dollars. The two duchies are divided into three circles, *viz.* Mecklenburg, Wenden, and Stargard.

The accounts of the foil and produce of this country are various and contradictory, even among the Mecklenburghers themfelves. According to the remonftrance of the nobility in 1718 to the imperial court againft the contribution exacted from them, the country was reprefented as full of lakes, which were almoft wholly unproductive, and as abounding with heaths, moors, woods, fens, and quarries. The foil was faid to be fandy, and capable of producing only a fmall quantity of rye and oats, and the paftures and meadows afforded but poor food for their fheep. The arable lands, even when well manured, produce for the moft part only barley, and very little wheat. The account given by Cluvier and Frank, who have defcribed the country, is very different. About $\frac{1}{8}$th of the country, they fay, is fandy, but the worft of the fandy land produces excellent rye, and, when fuffered to lie fallow, affords good fheep-walks; but the country in general is reprefented as incomparable, and not exceeded by Pomerania or Holftein. When well tilled and dunged, it yields barley and wheat, generally five, fix, or eight-fold. The country is interfperfed with delightful eminences, pleafant and profitable woods; nor is it deftitute of good fruit trees. Several forefts have been afforted, fens drained, and, together with the moors and quarries, improved into arable and pafture land. The commons and meadows, not inferior to thofe of Holftein and Pomerania, afford grafs in fuch plenty, that the country exports annually fome thoufands of cattle: the lakes and rivers, by their abundance of fifh, yield large revenues.

The principal rivers are the Elbe, Stor, Reckenitz, and Havel. In both duchies, exclufive of Roftock, are 45 great and fmall cities. The inhabitants of both duchies are Lutherans. In the country alfo there are fome congregations of Calvinifts; and in Schwerin the Roman Catholics are permitted the free exercife of their worfhip. The towns have German fchools, and Roftock has an univerfity. The country is not deftitute of woollen manufactures, tanners, leather-dreffers, tobacco-fpinners, and other trades. The exports of the country are corn, flax, hemp, hops, wax, honey, cattle, butter, cheefe, wool, and feveral kinds of wood.

MECKLENBURG, a county of Virginia, bounded S. by the ftate of North Carolina; containing 8332 free inhabitants, and 8676 flaves.—Alfo, a county of North Carolina, in the diftrict of Salifbury, bounded S. by the ftate of South Carolina; containing 10,317 inhabitants, of whom 1931 are flaves. Its chief town is Charlotte.

MECKLEY, a country of Thibet, occupying the fpace between Bengal and China, is bounded on the E. by China; on the S. by Ava, or the Birman empire; and on the W. by thick forefts, which feparate it from Bengal; it is about 350 miles in length, and 170 in breadth, fubject to the king of the Birman empire. N. lat. 22° 30′ to 27° 20′. E. long. 93° 20′ to 98° 40′. See ARRACAN.

MECKMUHL, a town of Wurtemberg, on the Jaxt; 32 miles N.N.E. of Stuttgart. N. lat 49° 20′. E. long. 9° 23′.

MECOBANISH, a lake of Canada. N. lat. 48° 58′. W. long. 83° 45′.

MECON, or MENAN, a large river of Afia, which rifes in the mountains of Thibet, between the 34th and 35th degrees of N. latitude, and purfuing a foutherly courfe bearing eaftward, it paffes through the Chinefe province of Yun-nan, the kingdom of Laos, Cambodia, &c., and runs into the Eaftern fea, about 200 miles S. of the city of Cambodia. At firft this river is called "Kiou-long," and retains this name till it enters Laos, when it takes the name of Mecon: when it enters Cambodia, it receives the name of the country, till at the city of Cambodia, it feparates into two branches, the eaftern of which is called Cambodia, or the Japanefe river, and the weftern Oubequeme.

MECONIUM, [illegible], from [illegible], *poppy*, in *Pharmacy*, is the juice of the heads or capfules of poppy, or papaver fomniferum, drawn by incifion, and dried.

Opium differs from the meconium, which, by the ancients, was made of the expreffed juice or decoction of the poppies, and it was deemed by them much more inactive in its operation than the opium. See OPIUM.

The college of London directs an extract of white poppy to be prepared by decoction of the poppy capfules in water, and fubfequent infpiffation. For this purpofe, take a pound of white poppy capfules bruifed, and a gallon of boiling water. Macerate for 24 hours; then boil down to four pints, ftrain the hot liquor, and evaporate it to a proper confiftence. This differs from opium, which is believed to be the concrete milky juice which exudes on making incifions into the frefh capfules, though probably fome additions are made to it. Six grains of this extract are about equivalent to one of opium; but much of the comparative narcotic power of the plant itfelf may depend upon the influence of climate. The feeds are firft to be feparated from the capfules, for they produce no narcotic effect; they yield oil and mucilage, and readily rub into an emulfion.

A decoction of poppy, decoctum pro fomento, P. L. 1787, fotus communis, P. L. 1745, is thus prepared: take of white poppy capfules bruifed four ounces, and of water four pints; boil for a quarter of an hour and ftrain. For various purpofes, efpecially fomentation, advantage is derived from the folution of the narcotic matter contained in poppy heads; this may, therefore, be confidered as an ufeful addition, and as reducing into form a decoction in very common ufe.

MECONIUM is alfo a black thick excrement, gathered in the inteftines of a child during the time of geftation.

In colour and confiftence it refembles pulp of caffia. It is alfo thought to refemble meconium, or juice of poppy; whence it takes its name. See INFANT.

MECRAN, or MEKRAN, in *Geography*, a large province of Perfia, extending to the Indian deferts, is bounded on the N. by Segeftan and Candahar; on the E. by Hindooftan; on the S. by the Indian fea; and on the W. by Kerman. This is the ancient Gadruftan, or Gedrofia. A chain of mountains croffes it, and divides it into two almoft equal parts. This province has been always unfertile, and full of deferts; and claffical geography, fays Pinkerton, here prefents only one mean town, called Pura, probably Borjian, on the moft W. frontier. The extenfive fea-coaft on the Indian ocean, far from being the feat of commerce, fcarcely prefents one harbour, being almoft an uniform line of fterility, inhabited by Arabs, like moft of the fouthern coafts of Perfia, which are divided by mountains and deferts from the fertile and cultivated land. Travellers in their journies are often ftopped, and fometimes overwhelmed by deep and moving fands. In this province water is fcarce, and it has few rivers. The capital is Kidge.

MECRINHOS, a town of Portugal, in the province of Tras los Montes; 24 miles S.E. of Mirandela.

MECZARA, a town of Africa, in the kingdom of Tambut.

MEDA, a town of Portugal, in the province of Beira; 20 miles N.E. of Pinhel.

MEDACO, a town of Africa, in the country of Meetka. N. lat. 14° 30'. E. long. 23° 20'.

MEDAL, Medalia, a ſmall figure, or piece of metal, in form of a coin, deſtined to preſerve to poſterity the portrait of ſome great man, or the memory of ſome illuſtrious action.

Scaliger derives the word from the Arabic *methalia*, a coin whereon is impreſſed the figure of a human head. Menage and Voſſius rather derive it from *metallum*. Du Cange obſerves, that the obolus was anciently called *medalia quaſi medietas nummi;* as being half of another coin.

Medals may be diſtinguiſhed by the metal of which they are made; which is commonly one of the three metals, *aurum*, *argentum*, and *æs*, ſignified by the three A's, which, on ſeveral coins, are placed after the name of the mint-maſter, *viz.* gold, ſilver, and copper, or braſs.

The moſt uſual purity of coined gold amounts to about 22 carats, two carats being deducted from the ſtandard of the utmoſt purity, which is fixed at 24 carats, and conſiſting of alloy. See Coin.

The moſt ancient gold coins exiſting, thoſe of Lydia and other ſtates in Aſia Minor, are not of the pureſt gold. Many of the earlieſt coins ſeem to be formed of the metal anciently called "electrum;" and conſiſting of gold and ſilver. But when Philip of Macedon coined the firſt gold of Greece, procured from the mines of Philippi in Thrace, the art of refining gold had attained great perfection, for his coins are of the utmoſt purity. They are rivalled, however, by thoſe of his ſon Alexander, and of other princes and cities within a few centuries of that age. The gold coins of the Egyptian Ptolemies are 23 carats three grains fine, with only one grain alloy. The Roman gold coinage is very pure from the earlieſt times, and remained in this ſtate till the reign of Severus. Pliny ſays, that moſt gold was found mixed with ſilver; of which the latter amounted to one-fifth. The metal was called "electrum." The moſt ancient ſilver is, like the gold, leſs pure than that of ſucceeding time, and this was particularly the caſe with that of the Greeks. The Roman ſilver was rather inferior to the preſent ſtandard, even from the beginning; but in the time of Severus very bad ſilver appeared, and continued till that of Diocletian. The braſs of the ancients, when pure, which is rather uncommon, conſiſted of two kinds; the red, or what the ancients called Cyprian braſs, which we call copper, and the yellow, or braſs. As medals of theſe metals are generally covered with patina, the difference has not excited attention; though in Roman coins braſs was double the value of copper; and the Greeks, it is ſuppoſed, followed the ſame rule.

The ancients had alſo numerous coins made of mixed metals. The firſt mixture was that of gold and ſilver, and called "*Electrum;*" which ſee. The next metal of value was Corinthian braſs, which was employed in the fabrication of vaſes and other ornamental toys; but it does not appear, according to Mr. Pinkerton, that they ever ſtruck a ſingle medal in this metal. The real fact is, that the coins, which ſome medallic authors have called Corinthian braſs, are only ſtruck as a modification of common braſs. The zinc which is mingled with the copper in the furnace for the manufacture of braſs, gives it a great variety of hues in proportion to the quality of the zinc, or of the copper. The beſt and fineſt of theſe hues belongs to what is now termed "Prince's metal," which ſeems to have been that which the firſt medalliſts called Corinthian braſs. Of Egyptian coins, ſtruck under the Roman emperors, ſome were at firſt of tolerable ſilver; but by degrees they degenerated into a metal, called by the French Medallic writers "Potin," being a mixture of copper and tin, with a little ſilver. Theſe coins are remarkably thick; but many of them are elegantly executed, in a peculiar ſtyle, with uncommon reverſes. There are, likewiſe, braſs coins of Egypt, of three ſizes, from the earlieſt Roman emperors there, and of a different fabrication. Some coins of that which is called large braſs, are of the mixtures now called pot-metal and bell-metal. After the time of Valerian and Gallienus coinage of braſs, with a ſmall addition of ſilver, is that authorized by the ſtate, being that of the "denarii aerii." The coins of lead or copper, plated with gold or ſilver, are thoſe of Roman forgers. Coins have been found in lead of undoubted antiquity. Some ſuch of Tigranes are mentioned as genuine by Jobert; but they are now well known to be forgeries. An ancient writer informs us, that tin money was iſſued by Dionyſius, one of the Sicilian tyrants; but no ſuch coins have been found. In Rome leaden coins muſt have been pretty ancient, for Plautus mentions them in one or two paſſages of his plays; and a few imperial ones have been found, but they are chiefly trial-pieces, in order to enable the artiſt to judge of the progreſs of the dye. Others are thoſe which have been plated by forgers, but the covering worn off.

It has been ſaid that there are alſo ſome medals compoſed of two different metals, not by melting them together, but either by plating over braſs or iron with ſilver; a ſort of falſe money, which had its riſe in the triumvirate of Auguſtus; or by laying a rim of a different metal round the edge of a medal. Thoſe of the latter ſort are called by antiquaries *contorniati*, from the French *contour*, which ſignifies the outline that defines a figure. See Contourniated.

It is conſidered as a certain rule in this ſcience, ſays Pinkerton, that none of the ancient money was caſt in moulds, except the moſt ancient and very large Roman braſs, vulgarly called weights, and other Italian pieces of that ſort. All other caſt coins are forgeries of ancient or modern times: for this was a manœuvre of the ancient forgers, as we learn from ſeveral Roman moulds which have been found, and which have led the unſkilful to imagine that the ancients firſt caſt their money in dyes, and then ſtamped it, to make the impreſſion more deep and ſharp. Dr. Jennings, in his "Introduction to the Knowledge of Medals, &c." 1764, 12mo., has fallen into this miſtake, beſides ſeveral others which are noticed by Mr. Pinkerton. The ancients, though ſtrangers to the art of impreſſing legends upon the edge of their money, like the "decus et tutamen" upon our crown pieces, and to the fine indentation obſervable on our gold, yet knew ſomething of crenating the edges of their coin. This they did by cutting out regular notches on the edges. Some of the Syrian coins, and of the Roman conſular, with a few other early ones, are ornamented in this manner. The former were caſt in this ſhape, then ſtruck; the latter was done by inciſion to prevent forgery, by ſhewing the inſide of the metal. They were anciently called "ſerrati," and Tacitus ſays, that the Germans preferred them to other Roman coins. But this was alſo imitated by the old forgers; and Mr. Pinkerton has in his poſſeſſion a ſerrated conſular coin, of which the inciſions, like the reſt, are plated with ſilver over copper.

Medals may again be diſtinguiſhed by their different ſizes. The ſize of the ancient medals is from three inches to one-fourth of an inch in diameter. Thoſe of the larger ſize or volume are called *medallions*. The others, which are very various, are ranked into three claſſes, *viz.* large, middle, and ſmall; and the claſs is determined, not ſo much by the breadth and thickneſs of the medal itſelf, as by the ſize of the

the head that is stamped upon it. The shape of medals is rather roundish than perfectly round. No Roman or Etruscan coins have been found of the globular form, or indented on the reverse, like the early Greek. The first Greek coins are small pieces of silver, while the Roman are large masses of copper. The former are struck; the latter are cast in moulds.

Medal, *the Parts of a*, are the two sides; one whereof is called the *face*, *head*, or *obverse*, the other the *reverse*.

On each side is the area, or field, which makes the middle of a medal; the rim, or border; and the exergue, which is beneath the ground whereon the figures represented are placed. (See Exergum.) On the two sides are distinguished the type, and the inscription or legend. The type, or device, is the figure represented; the legend is the writing, especially that around the medal; though, in the Greek medals, the inscription is frequently in the area. See Legend.

What we find in the exergue is frequently no more than some initial letters, whose meaning we are usually unacquainted with; though sometimes too they contain epochas, or words that may be accounted an inscription. The exergue contains sometimes the date of the coin, expressing in what consulship of the emperor it was struck: as cos III. upon the reverse of an Antoninus. Sometimes it signifies the place where it was struck, and to which the coin properly belonged, as S. M. AL. for *signa Moneta Alexandriæ*, upon the reverse of a Licinius. Sometimes the name of a province, the reduction of which the medal is designed to celebrate; as Judæa in the reverse of a Vespasian.

On the face of medals we have commonly the portrait of some great and illustrious person; usually, if not always, in profile. The coins of the kings of Macedon are the most ancient of any yet discovered on which portraits are found; and Alexander I., who began his reign about 500 years B.C. is the earliest monarch whose medals have yet been discovered. Then follow those kings and queens who reigned in Sicily, Caria, Cyprus, Heraclea, and Pontus. To these succeeds the series of kings of Egypt, Syria, the Cimmerian Bosphorus, Thrace, Bithynia, Parthia, Armenia, Damascus, Cappadocia, Paphlagonia, Pergamus, Galatia, Cilicia, Sparta, Pæonia, Epirus, Illyricum, Gaul, and the Alps. This series extends from the time of Alexander the Great to the birth of Christ, comprehending a period of about 330 years. The last series of ancient kings descends to the fourth century, and includes some of Thrace, the Bosphorus, and Parthia, those of Commagene, Edessa or Osrhoene, Mauritania, and Judæa. The portraits of the kings above enumerated are found on medals struck with Grecian characters.

The Roman emperors present a most distinct series from Julius, the first of them, to the destruction of Rome by the Goths, or even to a much later period, if the coins after this were not so barbarous as to destroy the beauty of the series while they add to its perfection. Of modern coins many proper serieses might be formed, consisting of the kings and other potentates of the different countries. Medals of illustrious men in modern times are not likewise wanting to form a collection.

The kings, upon Greek coins, have generally the diadem, without any other ornament. The side face is alway presented; though upon very ancient Greek coins of cities, and Roman consular coins, full faces are found of amazing relief and expression. Sometimes several heads are found on the same coin, either impressed on both sides, or only upon one. Thus the beautiful gold coin of Ptolemy Philadelphus, king of Egypt, bears his own head and that of Arsinoe, his queen, on one side; and those of his father and mother, Ptolemy I. and Berenice, on the other. Coins are found also of Antony and Cleopatra, Nero and Agrippina, Agrippina and Germanicus, and many others, both Greek and Roman. Sometimes two or more heads are found upon one side, while the other bears a reverse in the usual way. These heads are either *adverse*, that is, opposite to each other, face to face; or *joined*, and both looking one way. Of the adverse are coins of Licinius, father and son, and others. Joined heads are found on the finest Greek coins, as in that of Ptolemy above-mentioned, and in the Roman are Commodus and Marcia his concubine, and others. Sometimes real portraits are joined with ideal ones, as Carausius and Apollo, Posthumus and Hercules, &c. Sometimes three heads are found upon one side, as in that of Valerian, with his sons Gallienus and Valerian, &c. All such coins are very rare and valuable.

As for the ornaments of portraits, the chief is the diadem, or "vitta," which was a ribbon worn about the head, and tied in a floating knot behind, anciently the simple, but superlative, badge of kingly power. It is observable upon the Greek monarchic medals, from the earliest ages to the last; and is almost an infallible sign of the portrait of a prince. In the Roman coins it is seen on the consular one with Numa and Ancus; but never after, as Mr. Pinkerton apprehends, till the time of Licinius.

The Romans had such an abhorrence of this badge of kingly distinction, that their emperors had, for two centuries, wore the radiated crown, peculiar to the gods, before they dared to assume this tyrannic badge. However, in the family of Constantine the diadem became common, but divested of its ancient simplicity; being ornamented on either side with a row of pearls, and various other decorations. The radiated crown, at first, as in the posthumous coins of Augustus, a mark of deification, was, in little more than a century after, put upon most of the emperors' heads in their several medals. The crown of laurel, at first the honorary prize of conquerors, was afterwards commonly worn, at least in their medals, by all the Roman emperors from Julius, who was permitted by the senate to wear it always, in order to hide the baldness of his forehead. In the lower empire, the laurel is often held by a hand above the head, as a mark of piety. Agrippa appears on his coins with the rostral crown, a sign of naval victory or command, being made of gold, in resemblance of prows of ships tied together. He is likewise seen with the mural or turreted crown, the prize of first ascending the walls of an enemy's city. The oaken, or civic crown, is frequent on reverses, as of Galba and others; and was the badge of having saved the life of a citizen, or of many citizens. (See Crown.) Besides the diadem, the Greek princes sometimes appear with the laurel crown. The Arsacidæ, or kings of Parthia, wear a kind of sash round the head, with their hair in rows of curls like a wig. Tigranes, and the kings of Armenia, wear the tiara. Xerxes, a petty prince of Armenia, appears on a coin in a conic cap, with a diadem around it. Juba, the father, has a singular crown like a conic cap, all hung with pearls.

The successors of Alexander assumed different symbols of deity on the busts of their medals; such as the lion's skin of Hercules, surrounding the head of the first Seleucus; the horn placed behind the ear, an image of their strength and power, or of their being the successors of Alexander, called the son of Jupiter Ammon; the wing, placed in like manner behind the ear, symbolic of the rapidity of their conquests, quefts, or of their defcent from the god Mercury, &c. Pyrrhus, as Plutarch informs us, had a creft of goat's horns to his helmet; and the goat was a fymbol of Macedon. The fucceffors of Alexander might take this badge on that account. The helmet alfo appears on coins, as in thofe of Macedon under the Romans, which have Alexander's head, fometimes covered with a helmet. Probus has the helmet: and Conftantine I. has helmets of different forms, curioufly ornamented.

The Greek queens have the vitta or diadem. Moft queens of Egypt have the fceptre. The Roman empreffes never appear with the diadem, the variety of their head-dreffes compenfating the want of it. The remarkable part of the Roman head-drefs among the ladies was the "Sphendona," or fling, on the crown of the head, which was of gold, and fo prominent, as to be even remarkable on a coin. Sometimes the buft of an emprefs is fupported by a crefcent, denoting that fhe was the moon, as her hufband was the fun of the ftate. There are other fymbolic ornaments of the head obfervable on fome Roman coins. Such is the veil, or rather toga, drawn over the head, and feen on the bufts of Julius Cæfar, when Pontifex Maximus, and others. Latterly the veil was only a mark of confecration, and is common on coins of empreffes, as Fauftina and others. In the coins of Claudius Gothicus, it is firft found as a mark of the confecration of an emperor; and it was continued in thofe of Conftantius I., Maximian I., and Conftantine I. Thefe coins, fays Mr. Pinkerton, rank with thofe that are valuable for their rarity.

The "nimbus," or glory, now peculiar to the faints, was formerly applied to emperors. A nimbus appears round the head of Conftantine II., in a gold coin of that prince, and of Flavia Maxima Faufta, in a gold medallion; and of Juftinian in another. But the idea is as ancient as the reign of Auguftus. Havercamp gives a fingular coin, which has upon the reverfe of the common piece with the head of Rome, URBS ROMA, in large brafs. Conftantine I., fitting amid victories and genii, with a triple crown upon his head for Europe, Afia, and Africa: legend SECURITAS ROMÆ. This medal, fays Pinkerton, might haply have afforded a curious argument, in an ignorant age, for Conftantine's donation to the pope, and for the papal triple crown. But in fact the univerfal fpiritual power of the pope was totally unknown till the 12th century; before which time his election was obliged to be confirmed by the exarch of Ravenna, and afterwards by the emperor of Germany; and his temporal power is fo late as the beginning of the 16th century, only commencing in the crimes of Borgia. The buft alone is generally given on ancient coins; but fometimes half the body, or more; in which latter cafe the hands often appear, with tokens of majefty in them. Such is the globe, faid to have been introduced by Auguftus, to exprefs poffeffion of the world; the fceptre, fometimes confounded with the confular ftaff; the roll of parchment, fymbolic of legiflative power; and the handkerchief, expreffing that of the public games, where the emperor gave the fignal. Some princes hold the thunderbolt, fhewing that their power on earth was equal to that of Jupiter in heaven. Others hold an image of victory.

The reverfes of medals contain figures of deities at whole length, with their attributes and fymbols; public buildings and diverfions; allegorical reprefentations; ceremonies civil and religious; hiftorical and private events; figures of ancient ftatues; plants, animals, and other fubjects of natural hiftory: ancient magiftracies, with their infignia; and, in fhort, almoft every object of nature or art. Some reverfes bear the portrait of the queen, the fon, or the daughter of the prince who appears on the obverfe. Such are highly efteemed by antiquaries, not merely becaufe coins ftamped with portraits on both fides are valuable, but becaufe they identify the perfonage on the reverfe to have been the wife, the fon, or the daughter, of fuch a particular prince, and thus help in the adjuftment of a feries. Some medals with two portraits are very common; fuch are Auguftus reverfe of Caligula, and M. Aurelius reverfe of Antoninus Pius. The reverfes of the Roman coins have more of art and defign than the Greek; but the Greek have more exquifite relief and workmanfhip than the other. In the very ancient coins, no reverfe is found except a rude mark ftruck into the metal, as of an inftrument with four blunt points, on which the coin was ftruck. Afterwards, by degrees, we fee fome little image of a dolphin, or other animal, inferted into one of the departments of the rude mark, or into a hollow fquare. Then follows a perfect reverfe of a horfe, or the like, with a flight mark, and at length without any mark, of the hollow fquare. Some ancient Greek reverfes are ftruck in intaglio, not in cameo, hollow, not in relief. Such are thofe of Caulonia, Crotona, Metapontum, and fome other ancient cities of Græcia Magna. Thefe reverfes fometimes bear the fame type in intaglio, which the obverfe has in cameo; and fometimes they are quite different. When complete reverfes appear on the Greek coins, about 500 years B.C. they are of exquifite relief, minute finifh, and beauty. The very mufcles of men and animals are feen, and will bear infpection with the largeft magnifier, as ancient gems.

Of Roman coins, the reverfes are very uniform, the prow of a fhip, a car, or the like, till about 100 years B.C., when various reverfes appear on their confular coins in all metals. The variety and beauty of the Roman imperial reverfes are well known. The medallift much values thofe which have a number of figures, as the "Puellæ Fauftinianæ" of Fauftina, a gold coin no larger than a fixpence, which has twelve figures:—that of Trajan, "Regna adfignata," which has four:—the "Congiarium" of Nerva, with five:—the "Allocution" of Trajan, with feven; of Hadrian, with ten; of Probus, with twelve. Some Roman medals, to which no peculiar name has been appropriated by medallifts, have fmall figures on both fides, as the "Apolloni Sancto" of Julian II. Others have only a reverfe, as the noted "Spintriati," which have numerals I. II. &c. on the obverfe.

The figures of deities and perfonifications on the Roman coins, are commonly attended with their names, befides being diftinguifhed with their attributes. Thefe names, without an adjunct, are put down merely becaufe it was neceffary that the coin fhould have a legend. Thus, in a coin of Lucilla, Venus, though well known by the apple which fhe always holds in her hand, has neverthelefs the name round her, VENUS, without any addition. But an adjunct is moft commonly added, and this renders the infertion of the name very proper and neceffary, as in the inftance of a Neptune, with NEPTUNO REDUCI:—a Venus, with VENERI VICTRICI, and others fimilar. The like may be faid of the coins with a figure of Modefty, PUDICITIÆ AUGUSTÆ; of Virtue, VIRTUS AUGUSTI, &c.; for it is the legend which appropriates the virtue to the emperor or emprefs, and thus leaves no doubt as to the meaning of the reverfe.

In the Greek coins, a fuperior delicacy is obferved by not expreffing the name of the deity, but leaving it to the eafy interpretation of fixed fymbols. This remarkable difference is obfervable in the earlieft coins of the two countries, on which only the buft of the deity or perfonification is given. The

The Romans have almoſt always the name, as PIETAS, LIBERTAS, &c., while the Greeks content themſelves with giving Ceres with her wheaten garland; Jupiter with his mild countenance, laurel crown, and beard; Minerva with her helmet, &c. &c.

Mr. Pinkerton has given an account of the ſymbols found on the Greek coins, and alſo of thoſe very few on the Roman, which are not immediately illuſtrated by the legend of the medal. The principal deities ſymbolized in the Greek coins, as divided into male and female, are as follow: 1. JUPITER, in the firſt rank of gods, occurring frequently on reverſes of Alexander the Great, and eaſily known by his eagle and thunderbolt: when the buſt only occurs on obverſes of coins, it is known by the laurel crown, and placid bearded countenance. Jupiter Ammon is diſtinguiſhed by the ram's horn twiſting round his ear. 2. NEPTUNE ſeldom occurs on the coins of Greece; but when he appears, he is well known by the trident, or the dolphin, and is ſometimes drawn by ſea-horſes. His buſt has a trident behind. 3. APOLLO is frequently ſeen on the reverſes of the Syrian princes, and is known by the harp, the branch of laurel, or the tripod; ſometimes he has a bow and arrows. When the buſt only occurs, he has a fair young face, and is covered with laurel; and in the character of the ſun, his head is ſurrounded with rays. 4. MARS, often ſeen on Greek civic medals, is diſtinguiſhable by his armour, and ſometimes by a trophy on his ſhoulders. The buſt is known by the helmet and ferocious countenance. 5. MERCURY appears with the "caduceus," or wand twined with ſerpents, and the "marſupium," or purſe, which he holds in his hand. He is delineated as a youth, with a ſmall cap in his hand, and wings behind his ears and at his feet. The buſt is known by the cap, which reſembles a ſmall hat, and the wings. 6. ÆSCULAPIUS is remarkable on account of his buſhy beard, and his leaning on a club with a ſerpent twiſted round it. He is ſometimes ſeen with his wife Hygeia, or Health, and their little ſon Teleſphorus, or Convaleſcence, between them. 7. The attributes of BACCHUS are the tiger, the ſatyrs around him, the "thyrſus," or rod twiſted with ivy or vine, and the crown compoſed of one of thoſe plants. His buſt is known by the latter ſymbol, and by the diadem and horn. 8. The club, lion's ſkin, and ſinewy ſtrength, reveal HERCULES; with ſometimes the addition of a cup, denoting that wine inſpires courage, and the poplar tree, ſymbolic of vigour. He often appears as breaking the neck of the Nemæan lion, by cruſhing it in his arms. His buſt is common on the obverſe of coins of Alexander the Great, and other princes, and thoſe of Sicilian cities: it is that of a youth without a beard; with the lion's ſkin wrapped around it; and on the coins of Alexander has been erroneouſly taken for the portrait of that prince. He is ſometimes drawn with a beard, and called Hercules; without it he is denominated the young Hercules. 9. SERAPIS, one of the fantaſtic gods of Egypt, is known by his buſhy beard, and the meaſure upon his head. APIS appears as a bull, with a flower of the λῶτος, lotos, the water-lily of the Nile. Macrobius ſays it was a ſymbol of creation; and Jamblichus ſays that Oſiris was ſuppoſed to have his throne in it. (See LOTOS and LOTUS.) 10. HARPOCRATES, the god of ſilence, is known by the familiar token of putting his finger to his mouth. He has ſometimes the "ſiſtrum" in his left hand, which is a ſymbol common to moſt of the Egyptian deities. 11. CANOPUS is very common on the coins of Egypt, in the ſingular ſhape of a human head, placed upon a kind of pitcher. (See CANOPUS.) 12. To the above-mentioned ſymbolized gods we may ſubjoin the ΙΕΡΑ ΣΥΝΚΛΗΤΟΣ, and ΙΕΡΟΣ ΔΗΜΟΣ, the holy ſenate, and holy people, ſo frequent on Greek imperial coins. Theſe ideal perſons are commonly ſeen in the ſame image of an ancient bearded head, crowned with laurel: ſometimes both appear as youths.

Among the female deities, the firſt in dignity is, 1. JUNO known by the peacock, a bird ſacred to her from the fable of Argus. As the goddeſs of marriage, ſhe is veiled to the middle, and ſometimes to the toes. Her buſt is that of a beautiful young woman, ſometimes without any badge, which ſufficiently diſtinguiſhes her, as the reſt of the goddeſſes have badges; and ſometimes with a diadem. 2. The ſymbols of MINERVA conſiſt in her armour, with a ſpear in her right hand, and the "ægis," or ſhield with Meduſa's head, in the other; an owl commonly ſtanding by her. Her buſt is diſtinguiſhable by the helmet, which ſhe always wears: this is very common on the gold coins of Alexander the Great. 3. DIANA is manifeſt by the creſcent, by her bow and arrows, and often by her hounds. The Epheſian Diana, common upon Greek imperial coins, appears with a number of "mammæ," being ſuppoſed the ſame with univerſal nature; ſhe is ſupported by a couple of deer, and bears on her head a pannier of fruit. The buſt of Diana is known by the creſcent on her brow, and ſometimes by the bow or quiver engraven on one ſide. 4. VENUS is declared by the apple in her hand, the prize of beauty. Sometimes ſhe may be known by her total want of dreſs, without any other ſymbol. Her buſt is diſtinguiſhable by her ſupreme beauty, and is often adorned with pearls around the neck. We may here mention that CUPID ſometimes appears on the Syrian coins, in half-length, as the painters call it, and is known by his infancy and wings. 5 CYBELE has the turreted crown and lion; or is ſeen in a chariot drawn by lions. Her buſt is known by the firſt mentioned attribute. 6. CERES has the torches in her hands, with which ſhe is fabled to have gone in ſearch of her daughter Proſerpine. She has ſometimes two ſerpents by her, and is ſometimes drawn in a chariot by them. Her buſt is readily known by the wheaten garland, and is moſt common on coins of Sicily, an iſland celebrated for its fertility. Her daughter, Proſerpine, is alſo common with the name ΚΟΡΗ, or the *girl*. 7. ISIS, an Egyptian goddeſs, has the ſiſtrum in her hand, and a bud, or flower, on her head, ſymbolic of the eternal bloom of the inhabitants of heaven. The flower is ſaid to be that of the ἀβρότονον, or ſouthern-wood; but moſt probably it is a ſpecies of amaranth. 8. ASTARTE, a Sidonian goddeſs, appears on a globe, ſupported by a chariot of two wheels, and drawn by two horſes.

Mr. Pinkerton enumerates other deities that are leſs frequent on Greek coins; ſuch are Saturn with his ſcythe, or his buſt with a hook on thoſe of Heraclea:—Vulcan's head, with his tongs:—Adranus, a Sicilian god, with his dog:—Anubis of Egypt, with his dog's head:—Atis, in the Phrygian bonnet:—Caſtor and Pollux, with a ſtar on the head of each:—Dis, having an old face with diſhevelled hair and beard, and a hook:—Flora, crowned with flowers, on coins of Marſeilles:—Nemeſis, with a wheel:—and Pan with ſmall horns and brutes' ears. Some ſymbols are figurative of perſons or circumſtances: ſuch are vaſes, with ſprigs of plants iſſuing out of them, ſymbolic of ſolemn games:—the ſmall cheſt, or hamper, with a ſerpent leaping out of it, exhibiting the myſtic rites of Bacchus, coins with their image being called "Ciſtophori:"—the anchor, on Seleucian medals, aſcertaining their having been ſtruck at Antioch, where an anchor was found in digging the foundation of the city, though at a conſiderable diſtance from the ſea:—Apollo ſitting upon a ſingular ſeat, reſembling a hamper inverted, perhaps a tripod with a covering of network,

work, on different coins of the princes of Syria:—the bee, a mark of Aristeus, son of Apollo and Cyrene, much worshipped in the isles of the Adriatic and Ægean seas:—the laurel of Apollo:—ivy and grapes of Bacchus:—the poppy of Ceres and of Proserpine:—corn of Ceres:—owl and olive of Minerva:—dove of Venus:—and torch of Diana, Ceres, and Proserpine. The μυδρος, *mudrus*, or conic stone, was a token of the Sun, of Belus, and of Venus.

The most remarkable symbols of countries and cities on Greek coins are the flowers of the pomegranate for Rhodes:—owl for Athens:—pegasus for Corinth:—wolf's head for Argos:—bull's head for Bœotia:—minotaur's head, and the labyrinth, for Crete:—horse's head for Pharsalia:—lion for Marseilles:—tortoise for Peloponnesus:—sphinx for Scio:—three legs joined for Sicily:—and a horse for Thessaly. The badge of Byzantium was the crescent, which appeared early on the coins of Byzantium, with the legend ΒΥΖΑΝΤΙΝΗ ΣΩΤ.; the preserver of Byzantium. The occasion was this; when Philip of Macedon besieged Byzantium, and was proceeding to storm it in a cloudy night, the moon shone out, and discovered his approach, so that the inhabitants observed and repulsed him. The Turks, upon entering Constantinople, found this ancient badge in many places; and suspecting some magical power in it, assumed the symbol and its power to themselves; so that the crescent is now the chief Turkish ensign. (See CRESCENT.) The bull is very frequent on Greek coins, signifying, as Mr. Pinkerton suggests to be the most probable opinion, a river, on which the country or town was situated: accordingly, the river Achelous is called Βουκρανος, or bull-headed, by Sophocles in Trachin, v. 13: and Cephisus is said to have ταυρομορφον ομμα Κηφισου πατρος by Euripides, Ion. v. 1261. The Latin poets peak of the horns of rivers; thus Horace describes the Aufidus, "Sic tauriformis volvitur Aufidus." The bull was a token of fertility, but the horns seem to allude to the force of the stream, &c. See CORNUCOPIA.

On Roman coins the deities and personifications have not only attributes, but their names likewise in the legend of the medal, so that it is not necessary to dwell upon the explanation of them. Some, however, it may not be improper to mention. On the reverses of Roman colonial coins, easily distinguished by their rude fabric, and the name of the colony on them, commonly beginning with COL., when an ensign stands alone, and without any persons, it shews a colony drawn from one legion; but when the ensigns or banners appear in the like circumstances, they evince the colony to have been drawn from as many legions as there are ensigns. A bull on these coins often represents Apis as a symbol of strength and security: such was, probably, the bull upon the reverse of the common coin of India, with two stars over him, and the legend SECURITAS REIPUB. The caduceus marks peace and concord; the cornucopia, abundance; the pontifical hat, the priesthood. They all appear upon a reverse of Julius, and are symbols of the concord of the empire, and the plenty which attended his power: the last symbol merely denotes that Cæsar was Pontifex Maximus. The "parazonium" on Roman coins was a baton of command, and not a pointless dagger, as it has been described by many antiquaries. In later times the globe on an altar, with three stars, is supposed to typify the world preserved by the gods for the three sons of Constantine I. The fort and the gate are symbols of security. The altar is a well-known mark of piety: the tripod was a portable altar, used in temples for liquid offerings, as the altar was for solid sacrifice. A dolphin is sometimes twined among the legs of the tripod; the dolphin was sacred to Apollo, as appears from Servius on the 3d Æneid. The "lectisternia" also appear on medals. (See LECTISTERNIUM.) The instruments of sacrifice appear on many Roman coins: such are the "secespita," or oblong hatchet, or large knife for killing the victim:—the "aspersorium," a vessel for holy water, with which the priest sprinkled the assistants:—the "simpullum," or vessel for pouring wine on the sacrifice:—the "patina," or "patera," a dish for the fat, and other portions sacred to the gods:—and the "acerra," or little coffer for incense. The "lituus," or wand twisted round at the top, somewhat like the episcopal staff, is a badge of the augurship, as the "apex," or cap with strings, and terminating with a tuft, is of the pontificate. (See LITUUS.) The "thensa," or divine chariot, which carried the image of a deity in sacred processions, (improperly termed "carpentum" by some,) is a badge of consecration of an empress; as is also the peacock, which was the bird of Juno, the queen of heaven. These sometimes appear without the legend "consecratio," as the thensa on a coin struck under Tiberius for the consecration of Livia, the wife of Augustus, called Julia, S. P. Q. R. IULIÆ AUGUST.; and the peacock on that most rare gold coin of Julia, the daughter of Titus, the front of which has her bust, IULIA AUGUSTA, and the reverse a peacock, DIVI TITI FILIA. The eagle is the sign of consecration of an emperor.

The palm-tree, on both Greek and Roman coins, is symbolic of Phœnicia, where that tree flourished; as the silphium is of Cyrene, from the earliest times down to those of the Roman empire. Pinkerton's Essays, vol. i.

The titles are generally found upon the face of the medal. These are titles of honour, as Imperator, Cæsar, Augustus, given to all the Roman emperors after Octavianus; Dominus, first assumed by Aurelian, and used by his successors (see DOMINUS): other titles are ascribed to particular persons on account of their virtues, as Pius to Antoninus, assumed also by Commodus, with the addition of Felix; Pater Patriæ, first bestowed on Cicero for discovering and defeating the conspiracy of Cataline, and afterwards assumed by the emperors; Justus, the title of Pescennius; Beatissimus and Felicissimus of Dioclesian; Optimus and Clemens, decreed to Trajan by the senate; Maximus, assumed by Constantine; and Invictus, by Victorinus. In the lower empire, Stauracius first, and then Michael Ducas, and others, assumed the proud addition of ΒΑΣΙΛΕΥΣ, or king; which was followed by that of ΔΕΣΠΟΤΗΣ, or despot. Other titles are the names of offices; as COS. for consul, with a number annexed to it, signifying how many times the person had been thus elected: Tribunitia potestas, with the year of the tribuneship commonly expressed after the title, as TRIB. POT. X. or XVI. &c. The office of Pontifex maximus, expressed by P. M. was assumed by the emperors, and generally expressed among their titles, from Augustus to Constantine, by whom it was refused: it was re-assumed by Julian, and laid aside by Gratian. Julius Cæsar assumed the title of Dictator perpetuus; Claudius, that of Censor; and Domitian made himself Censor perpetuus.

The large early copper coins only bear ROMA in the reverse. Afterwards we find the names and titles of the Quæstor or Director of the public treasury, the Triumviri who managed the mint, the Prætor, the curule Edile, the Edile of the people, the Præfect of the city, the Pontifex Maximus, Augur, Quindecimvir sacris faciundis, Flamen Martialis and Quirinalis, Septemvir Epulonum, and latterly, Triumvir Reipublicæ constituendæ, and ad Frumentum emundum. Of the great magistrates out of Rome, who had moneyers with them, in order, from bullion and the spoil of the enemies, to coin money for paying the troops engaged in foreign service, we have the names and titles of Imperator, Proconsul, Proconful, Propraetor, Legatus, Legatus pro Praetore, Quaeftor, Proquaeftor, Legatus Claffis, Triumvir Coloniae deducendae, or reficiendis facris aedibus. All thefe titles appear on the reverfes of what are called confular coins; while the obverfe bears the head of a deity, generally without a legend. In time the magiftrates put the head of fome illuftrious anceftor on the coins, with his name; as Numa, Ancus Martius, Quirinus or Romulus, Brutus, Ahala; Caius Coelius Caldus, obverfe of Caldus III. vir, and the like. This led the way to Caefar, who firft put his own head on his coins, when made perpetual Dictator; with the legend of names and titles on the obverfe, and not on the reverfe as before. The infcription VOT. V. MVLT. X. VOT. X. MVLTIS XX. occurs on many reverfes of Roman medals, and moft commonly marked on a fhield, or within a crown of laurel. This Du Cange interprets to refer to the artifice of Auguftus, who pretended to lay down his power, and refume it for 10 years longer as at the requeft of the fenate. This term, he fays, was by fucceeding emperors fhortened to five; and folemn vows were entered into by their fubjects for their fafety to the end of that period; nay, that the double of that period might be allotted to their reign, again to be prolonged, on the wifhes of their people, to a future date. This infcription is alfo found upon coins of Crifpus, and other Caefars, or heirs of the empire; and it hence appears, that the honour of fuch folemnities was alfo conferred on them, who created Caefars. The "Vota Decennalia," as on coins of Pertinax and of Papianus, were only vows to perform the Decennalia, if the emperor fhould reign 10 years; whereas "Primi Decennales," or "Secundi Decennales," imply thefe games to have been actually performed; and the emperor to have reigned 10, or 20 years. On coins of Lucilla, Hadrian, Severus, Caracalla, and others, we find VOTA PVBLICA, with a facrifice; fhewing that the vows were undertaken, with that rite, as they were afterwards performed with folemn games and rejoicings. Coins of Conftantine II., and of Conftans, only bear SIC. X. SIC. XX. to exprefs the wifhes of the people, that, as the emperors had happily reigned 10 years, fo they might reign 20. There were alfo "Vota Quinquennalia" for the emperor reigning five years, and games called "Quinquennalia" performed when he had accomplifhed that period. From Aurelius Victor, in his life of Gordian III., it appears that Nero introduced this practice; which is mentioned by Tacitus, and by Lampridius in his life of Diadumenus. There were alfo "Vota Novi Anni," as appears from Spartian's life of Hadrian, and from Dio, l. 58; and there is a coin of Antoninus with S. P. Q. R. A. N. F. F. OPTIMO PRINCIPI, Senatus populufque Romanus annum novum fauftum felicem, &c. *i. e.* the fenate and people of Rome wifh a profperous and happy new year to the beft of princes. See LEGEND.

MEDALS, *Greek*, claim that place in a cabinet from their antiquity, which their workmanfhip might enfure to them, independently of that adventitious confideration. The invention of coinage, as we have elfewhere obferved, is afcribed by Herodotus to the people of Lydia, upwards of 1000 years before the Chriftian era. The abbé Barthelemy, cited by Mr. Pinkerton, arranges the following ftages of the progrefs of coinage. 1. Coins without any impreffion. 2. Thofe with a hollow indented mark or marks on one fide, and impreffion in relief on the other. This clafs, it is fuggefted, feems to extend from about the year 900 before our era, to about 700. 3. Such as have an indented fquare divided into fegments, with a fmall figure in one of the fegments, the reft being vacant; and impreffions on the obverfe, as ufual. Thefe may extend to the year 600 B.C. 4. Thofe which are ftruck hollow on the reverfe, while the obverfe is in relief commonly with the fame figure; which coins may be confidered as of equal age with thofe in the laft clafs. 5. Coins in which a fquare dye is ufed, either on one or both fides. Thefe were difcontinued about the year 420 B.C. 6. Complete coins both in point of obverfe and reverfe. Some of thefe occur in Sicily, where this art was carried to a perfection unknown in any other country, fo early as the time of Gelo, who began his reign in the year 491 B.C. Coins of moft remote antiquity, fays Froelich, quoted by Pinkerton, may be diftinguifhed by thefe infallible marks. 1. Their oval circumference, and globous fwelling fhape. 2. Antiquity of alphabet. 3. The characters being retrograde; or the firft divifion of the legend in the common ftyle, while the next is retrograde. 4 The indented fquare. 5 The fimple ftructure of the mintage. 6. Some of the very old coins are hollowed on the reverfe, with the image impreffed on the front. 7. The drefs, fymbols, &c. are often of the rudeft defign and execution. The coins of Pofidonia, Crotona, Sybaris, and two or three other cities, bear thefe marks of profound antiquity. Some Perfian pieces, with the archer upon one fide, and the hollow fquare upon the other; and feveral coins of the firft kings of Macedon, are examples. In the Britifh Mufeum, there is a medal of filver afcribed to Lefbos, of this defcription. In a fhort time the Greeks affumed great elegance; and it is obferved by Mr. Pinkerton, that innumerable of the medals of cities, which, from the character, we muft judge to be of the higheft antiquity, have a furprifing ftrength, beauty, and relief, in their impreffions. About the time of Alexander the Great, the art feems to have attained to its very higheft perfection. Of the Greek medals, thofe of cities are the moft ancient. The civic medals are generally ftamped on the obverfe, with the head of the genius of the city, or fome favourite deity; while the reverfe often prefents fome fymbol ufed by the city, at the time when the piece was ftruck. The legend contains the initials, monogram, or whole characters of the name of the city. Some connoiffeurs prefer the regal coins of Greece; others the civic. The former intereft by their portraits; the latter by their variety. The former are perhaps more important to ancient hiftory; and the latter to ancient geography. The civic coins are interefting, as they prefent us with a view of the cuftoms, religion, &c. of ancient cities; they likewife afford a kind of political barometer of the wealth and power of each city and country. *E.G.* The numerous and beautiful gold coins of Cyrene, a country, from its remote fituation, little known in hiftory, afford fufficient proofs of its great power and wealth. The fmall civic coins of gold, electrum, and filver, ftruck in Afia Minor, are perhaps fome of the earlieft; though if we judge from workmanfhip, thefe coins are fo exquifite, that the coins of Greece, from their rudenefs, feem to claim priority of era; and Mr. Pinkerton fuggefts, that it is dubious whether Greece or Lydia firft invented coinage.

The Greek monarchic coins are often of the fame conftruction with the civic; only that they bear the name of the prince on the reverfe; many fuch occur with the buft of fome deity in front, for one which prefents the image of the prince. The moft ancient feries is that of Macedon, commencing, as we have obferved already, with Alexander I., who began his reign 501 years before our era. With Philip, the Macedonian coins begin to be beautiful. Thofe of Alexander the Great are wonderful. The head of Minerva on his gold, affords a variety of exquifite faces; and the coins of Alexander and his father, exceed all that were ever executed, except thofe of Sicily, Graecia Magna, and the ancient ones of Afia Minor. Sicilian coins are famous for

for workmanſhip, even from Gelo's time. The coins of the Syrian kings, ſucceſſors of Alexander, almoſt equal his in beauty. Thoſe of Antiochus VI. are peculiarly exquiſite, both for the beauty of the coin and that of the king. The Egyptian Ptolemies have fine relief, but do not equal the Syrian in delicacy and finiſh. The family coin of Ptolemy Philadelphus, before mentioned in this article, is extremely fine and intereſting. There is a coin of Alexander, ſon of Neoptolemus, king of Epirus, with a head of Jupiter Dodonæus, crowned with oak, of miraculous workmanſhip, and thought to be done in Magna Græcia, when he came to aſſiſt the Tarentines. This has been engraven by Bartolozzi. Even the earlier Parthian coins of the Arſacidæ are worthy of the Grecian workmen, whoſe they are, as is evident from the Greek legends impreſt on them, in many of which theſe monarchs aſſume the title of ΦΙΛΕΛΛΗΝΟΣ, or lover of the Greeks. It is to the Greek coins that were ſtruck before the Roman empire ſwallowed up the Greek cities and ſovereignties, that the high praiſe beſtowed by good judges upon the Greek mint, muſt be chiefly confined; for the Grecian imperial medals are not equal to the former, though they do not always yield to the Roman.

In the ſeries of Grecian imperial coins, we meet with very uncommon portraits and reverſes. In attention to the fair ſex, the people of Mitylene, the chief city of Leſbos, and the birth-place of Sappho, have peculiarly diſtinguiſhed themſelves. Thoſe Greek coins of cities, which have the head of an emperor or empreſs, are called Imperial Greek coins; but thoſe which have no ſuch impreſſions are claſſed with Grecian civic coins, though ſtruck under the Roman power. Of imperial Greek coins none occur in gold; but there are thoſe of ſilver of Antioch, Tyre, Sidon, Tarſus, Berytus, Cæſarea, and one or two other trading cities in that opulent and commercial region. Thoſe of Antioch preſent, now and then, the genius of the city ſitting, with the river Orontes flowing beneath her feet, as on coins of Syrian monarchs. Syrian ſilver coins ſometimes bear the club of Hercules, the founder, or the famous Tyrian ſhell-fiſh, whence the Tyrian purple, our crimſon, was derived. Sidon gives the car of Aſtarte, or a head of the goddeſs: Tarſus has ſometimes only a monogram, expreſſing the name of the city. Cæſarea, in Cappadocia, abounds in ſilver of various ſizes; and ſilver coins of Lycia appear to be of good work, and good metal; the reverſe having two harps and an owl ſitting on them. Silver coins of Gelon, a town of Sarmatia, much reſemble the Syrian; and have the ΔΗΜΑΡΧ. ΕΞΟΥΣΙΑΣ, with an eagle holding a ſtag's foot. The Greek imperial braſs coins are ſo abundant, that it is hardly neceſſary to ſpecify any of them. Thoſe of Antioch, generally with a Latin legend on the obverſe, and Greek on the reverſe, are ſo numerous as to furniſh a ſeries of almoſt all the emperors; being apparently ſtruck for the purpoſe of paying the forces in the Eaſt. Thoſe of Ceretapa, in Phrygia, are diſtinguiſhed by their good workmanſhip, as alſo are thoſe of Bithynia and Phrygia. On thoſe of Tarſus are curious views of objects, almoſt in perſpective; and there is a ſingular coin of Gangra in Paphlagonia, with a view of two caſtles and houſes between them. This is in the late Dr. Hunter's collection. The coins of Egypt under the Roman emperors, being marked with Greek legends, range with the Greek imperial medals; they are remarkable for thickneſs, and baſeneſs of metal. Thoſe of the ſilver ſeries are at firſt about the ſize of an half crown, but three times as thick; after the time of Commodus, they declined both in ſize and baſeneſs, and became reduced to the ſize nearly of a ſixpence, and the metal is only bad braſs waſhed with ſilver. The ſilver coins of Egypt are not ſo well done from Auguſtus to Nero, as afterwards. From Nero to Commodus, they are often admirable, and of a ſtyle of workmanſhip that can be called neither Greek nor Roman. The reverſes are extremely various and ſingular, exhibiting the capricious religion and manners of the people. From Commodus the Egyptian ſilver gradually declines till the reign of Conſtantius I., when it ends. The ſeries conſiſts of 1000 coins, or more. Many ſcarce portraits of emperors and of empreſſes decorate the ſeries. The Egyptian braſs coins of the Roman period claim notice. Until Veſpaſian there are only two ſizes, equal to the ſecond and third Roman braſs. Veſpaſian indulged the Egyptians with the privilege of iſſuing large braſs, as uſed in Rome itſelf. All the Egyptian Othos, the moſt common coins of that prince in braſs, are of the ſecond ſize; and bear for reverſe an head of Iſis, or Serapis, with L.A. or year firſt. Some have names of towns, and in Dr. Hunter's cabinet, there is a fine one of Cebennutus in firſt braſs, of Domitian, who appears decorated with a wheaten, as Gallienus does in Roman gold. On the braſs coins of Egypt, a female figure, with part of a ſhip in her hand, and the Pharos behind, is very common, probably expreſſive of Alexandria. One of Antoninus Pius, in third braſs, preſents to us Iſis ſitting on the flower of the lotus. With this emperor very fine work begins in the Egyptian braſs. The 12 coins of this prince, with the 12 ſigns are very curious, and publiſhed by Barthelemy, Mem. de l'Acad. xli. The laſt braſs coins of Egypt, are of Marcia Otacilia Severa, wife of Philip the Elder, A.D. 244. The genuine braſs coins of Egypt are thinner than the ſilver, and of a diſtinct fabric.

MEDALS, *Roman.* It was in the reign of Servius Tullus that the firſt Roman coins appeared, which were large pieces of braſs, rudely impreſſed, only on one ſide, with the figure of an ox, a ram, or ſome other animal, whence, it is ſaid, money was denominated "pecunia." Theſe ſymbols were derived from the Tyrrheni or Etruſcans, a people of Italy, originally Lydians. In proceſs of time the impreſſion of the *as* was changed to that of a buſt of Janus, upon the front, and the prow of a ſhip on the reverſe; and for more general uſe, pieces of inferior weight and value were coined. See As and MONEY.

The Roman coins, conſidered as medals in a cabinet, comprehend the two grand diviſions of *conſular* and *imperial* coins. The Roman *conſular* coins ſeldom or never bore the names or titles of conſuls till towards the cloſe; nevertheleſs they are not improperly called conſular, becauſe they were ſtruck in the conſular times of Rome. They are alſo called coins of families; and are always arranged alphabetically in families, according to the names which appear on them. The braſs conſular coins are rather unintereſting; as they conſiſt chiefly of large unwieldy pieces, with types of inſipid ſimilarity. Few of them have any imagery or ſymbol. The large ancient pieces are generally kept in boxes apart, by thoſe who are verſed in them. (See As.) The next coinage to that of braſs was that of ſilver, which took place, according to Pliny, in the 485th year of Rome, that is, about 300 years after the firſt braſs coinage, and 266 years B.C. The denarius was the firſt and the laſt form which it aſſumed, for the other ſizes are ſo ſcarce, that it is certain very few were ſtruck. (See DENARIUS.) Until the age of Julius no portrait of a living perſonage appears upon any Roman medal; Cæſar was indeed the firſt who aſſumed that high honour, and a competent judge aſſerts, that the plan of engraving on coins the names of great men and magiſtrates was only introduced about the time of Marius and Sylla. The reverſes of ſome few conſular medals are fraught with much erudition and curious matter. On a coin of the family of Æmilia, we have this legend, M. LEPIDUS PONT. MAX. TVTOR REGIS, cus, and Lepidus appearing in the dreſs of a conſul, and putting the crown on the head of young Ptolemy, whom his father had left to the tutorage of the Roman people. On the obverſe is the turreted head of the city of Alexandria in Egypt, with ALEXANDRIA. In the ſame family there is a medal, with a youth on horſeback, carrying a trophy, with this legend, M. LEPIDUS ANNORUM XV. PRÆTEXTATUS HOSTEM OCCIDIT CIVEM SERVAVIT. Again, L. Æmilius Paulus, on a coin of the ſame family, appears dedicating a trophy for his victory over Perſeus, who, with his two children, ſtand by, their hands being tied behind their backs. Portraits of Bacchus, Jugurtha, the laſt Philip of Macedon, the 1ſt and 2d Brutus, Metellus, Marcellus, Regulus, Sylla, Pompey, Caldus, and others appear on conſular coins. Rome and Italy are perſonified; Victory crowns Rome; with other ſpecimens of that fine perſonification afterward diſplayed on the imperial coins. Gold was firſt coined at Rome, 62 years after the application of the mint to ſilver. The general gold coin is the *Aureus*, which ſee. The conſular coins, whoſe number is eſtimated at 200 in braſs, and 2000 in ſilver, extend not to above 100 in gold, of which moſt are curious. The beautiful Pompey with his ſons on the reverſe, and the Brutus with his brother Lucius, commonly claſſed with imperial coins, ſhould rank with the conſular. Moſt of the gold conſular coins are of great beauty and high value. Of conſular medals father Joubert reckons about fifty or ſixty of gold; two hundred and fifty of copper; and near a thouſand of ſilver. Goltzius has deſcribed them in a chronological order, according to the Faſti Conſulares; and Urſinus has diſpoſed them genealogically, according to the order of the Roman families. M. Patin has collected an entire ſeries of them, in the ſame order with Urſinus; and only computes one thouſand and thirty-ſeven conſulars, which relate to one hundred and ſeventy-eight Roman families. M. Vaillant, and M. Morel, have alſo publiſhed on the ſame ſubject. See the ſequel of this article. The Roman *imperial* coins claim our attention from a variety of conſiderations; and more particularly from the extent of the Roman empire, and from our own connection with it. The Roman coins may be called thoſe of the emperors of Europe, and intereſt us like thoſe of our own country. Some have diſtinguiſhed the imperial coins into thoſe of the *upper* and *lower empire;* the upper empire commenced under Julius Cæſar, and ended about the year of Jeſus Chriſt two hundred and ſixty; the lower empire comprehends near one thouſand two hundred years; *viz.* till the taking of Conſtantinople. It is the cuſtom, however, to account all the imperial medals, till the time of the Palæologi, among the antique; and yet we have no imperial medals of any conſiderable beauty, later than the time of Heraclius, who died in 641.

After the time of Phocas and Heraclius, Italy became a prey to the Barbarians; ſo that the monuments we have remaining of thoſe two emperors, finiſh the ſet, or ſeries of imperial medals. To theſe are added the medals of the lower empire, and of the Greek emperors; whereof a ſeries may be made as low as our times, taking in the modern ones. M. Patin has made an ample collection of the imperial medals, till the time of Heraclius.

The Gothic medals make part of the imperial ones; they are ſo called, as having been ſtruck in the times of the Goths, and in the declenſion of the empire, and ſavouring of the ignorance and barbarity of the age.

Cæſar, who begins the imperial ſeries, was conqueror of Gaul; Claudius of Britain. As to the braſs coinage it has been already obſerved, that at the time of Marius and Sylla, about 50 years before that of Cæſar, ſome elegance and variety commence in the Roman coinage. In the times of Julius Cæſar this elegance was carried to a great height. In the family of Marcia, there is a beautiful As, with the heads of Numa and Ancus; the reverſe Victory in a porch, and the prow at her feet. Indeed it is only in the half ounce As that variety can be found. Sylla, as we are informed by Cicero, and by gold coins remaining, introduced great confuſion into the coinage; and it is not improbable, that the braſs had its ſhare, by alteration of ſizes and types. The imperial braſs is of three ſizes, *large*, *middle*, and *ſmall*. The *large* braſs form a ſeries of ſurpriſing beauty and vaſt expence. In this ſeries the various colours of the patina have the fineſt effect; and the great ſize of the portraits and figures conſpires to render it the moſt important of all the Roman coinage. It even exceeds the gold in value.

The ſeries of the *middle* braſs exceeds the former in number; but doth not preſent ſuch elegance of work, or of types. Many coins are common in ſecond braſs, which are rare in firſt; but very few examples occur to the contrary. Hence this ſeries yields much to the former in price, as well as in dignity. However, many rare and curious coins occur in this ſeries. There is a Tiberius, with this inſcription on the reverſe, TRIB. POT. XXXVIII. A Gallienus, obverſe with his head, bearing a laurel over a turret on his forehead, GENIUS P. R. reverſe with this inſcription ANT. URB. S. C. Coins of Fauſtina the elder are common in this ſize; but thoſe without DIVA are very ſcarce, and always bear ANTONINI PII AUG.; a circumſtance, which ſeems to indicate, that moſt of theſe coins were ſtruck by her good huſband, after her death. In the firſt and ſecond braſs there are many coins, which particularly intereſt us as Britons, becauſe they relate to the hiſtory of this iſland. Such are the triumphal arch of Claudius, inſcribed DE BRITANN., alſo occurring in gold and ſilver; the ADVENTUI AUG. BRITANNIÆ, and EXERC. BRITANNICUS of Hadrian; the coins of Antoninus Pius, Commodus, Severus, with a victory, VICTORIA BRITAN., but eſpecially thoſe perſonifying the country *Britannia*.

The *ſmall* braſs ſeries abounds with curious coins. Till the times of Valerian and Gallienus, they are generally ſcarce; but afterward extremely common. In the former period portraits of the emperors are rare in ſmall braſs, but in the latter many are found which occur in no other ſeries, as moſt of the uſurpers, Zenobia, Vaballathus, and many others. All real braſs coins have the S. C. till the time of Gallienus; as the ſenate alone had the power of ſtriking braſs, while the emperor himſelf had that of gold and ſilver. When the S. C. therefore is wanting, the coin was certainly once plated. With Pertinax A.D. 192, there is a temporary ceſſation in the ſmall braſs; nor after him do any princes occur in that ſeries till Valerian, A.D. 254, excepting Trajanus Decius A.D. 250, only. After Valerian, the ſeries is continuous, and common. The braſs coinage declined in ſize from the time of Severus, and Trajanus Decius in vain attempted to reſtore it; and Valerian and Gallienus were forced to iſſue denarii ærei of billon, and ſmall aſſaria. The ſeries of large and of middle braſs are of two fixed and known ſizes; the former about that of our crown, and the latter of our half-crown, till after Severus they gradually leſſen. But the ſmall braſs takes in all the parts of the As, and every braſs coin not larger than our ſhilling in ſize belongs to this ſeries. Our limits will not allow our enumerating the coins of this ſeries, but we refer to Pinkerton's Eſſ. vol. i. p. 272, &c. The ſeries in ſmall braſs extends from the beginning to the cloſe of the Roman empire, nay, far into the Byzantine, cloſing with Conſtantine Pogonatus, A.D. 670.

The ſilver imperial coins are very numerous and various. This ſeries is as complete as any, and of far cheaper purchaſe, very few emperors being ſcarce in ſilver. Moſt types

even

even of the large brafs and gold are found in the filver, which thus unites the advantages of all metals. Sometimes the filver and gold coins, as being of one fize, are ftruck from the fame dye, as the young Nero, reverfe a votive fhield EQUEST. ORDO PRINC. JUVENT. and others. One of the rareft filver coins is that of Gneius Pompey, fon of the great Pompey, in Dr. Hunter's collection. It is fuppofed to have been ftruck in Spain, before the battle of Munda, foon after which he was flain.

The imperial gold forms a feries of wonderful beauty and perfection; but it is only attainable by men of princely fortunes. In thefe the workmanfhip is carried to the greateft height; and the richnefs of the metal furpaffed by that of the types. As gold refufes ruft, the coins are generally in the fame ftate as they came from the mint. The number of Roman gold imperial coins may amount to 5000; the filver to 10,000; and the brafs to 30,000. The whole of the different ancient coins may amount to about 80,000; but the calculation cannot be very accurate.

Before we clofe this account of Roman medals, the *colonial* ought to be mentioned. As Roman colonies were fettled in various parts of the empire, their coins have fometimes Greek, fometimes even Punic legends; though generally that on one fide of fuch is Latin. But thofe with Latin legends only are far more numerous. Some of thefe coins are elegant, though moft are rude and uninterefting. The colonial coins only occur in brafs; thofe in firft brafs are very rare till the time of Severus. They begin with Julius and Antony. The Spanifh colonial coins ceafe with Caligula, who took away this privilege from Spain. The colonial coins of Corinth are the moft various and beautiful; prefenting triumphal arches, temples, gates, ftatues, baths, and figures of gods and goddeffes. Other remarkable colonial coins are of Emerita, of Illice, of Tarraco. The coins of Caffandria in Macedon are generally fmall brafs, with the head of Jupiter Ammon on the reverfe, and furnifh that feries with many fine heads of emperors, with Latin legends, from Claudius to Severus, but always with the fame reverfe. Many fcarce portraits are found in colonial coins of that fize; as the two Agrippinas, Agrippa, Cæfar, Drufus Cæfar, Octavia Neronis, Cæfonia, Meffalina, and others. It is remarkable, that while Spain had perhaps 50 colonies, Camalodunum is the only one in Britain of which there are coins. There is one of Claudius, reverfe a team of oxen, COL. CAMALODON. AUG. The fmalleft imperial filver alone are quinarii, the gold being femiffes and trientes, and the brafs at firft fmall parts of the As, and latterly only the half affarion. Thefe, inftead of being denominated quinarii, might, more properly, be called "minimi;" as including the very fmalleft coins of all metals and denominations. The Roman coins have had a moft extenfive fpread; fome of them have been found in the Orkneys; and they have likewife been found in numbers in the moft remote parts of Europe, Afia, and Africa, at that time difcovered.

As for the medals of other ancient nations, befides Greece and Rome, fome notice fhould be taken of them; premifing that by *ancient* coins, all preceding the ninth century, or age of Charlemagne, are meant; and all pofterior to that period are *modern*. No coins are found which can even be imagined to belong to Affyrian, Median, or Babylonian kings. The oldeft coins found in their empire are palpably Perfian and fimilar to the Greek. The Phœnicians do not appear to have coined money, till after the Greeks had fet the example. No Phœnicians were ever found of much antiquity; and not one, without both obverfe and reverfe, nor are any of them older than about 400 years before our era. Weight alone was ufed in the famous cities of Tyre and Sidon, as we learn from fcripture; and in Egypt coinage was unknown, not a coin with a hieroglyphic being found; and in the mouths of the mummies there are only thin broad pieces of unftamped gold, to pay Charon's fare. India appears to have no claim to an early ufe of coinage. No Indian or Chinefe coins exift till within a late period; and thofe of both countries are fo rude as hardly to deferve being collected. Upon the whole the Lydian coins feem to be the moft ancient in Afia. Next to thefe are the Perfian, well known from the archer on them, and from Mithras the Perfian deity, the drefs of the princes and other marks. None of thefe coins can be older than 570 years before our era, when the Perfian empire began. The famous darics were iffued by Darius Hyftafpes, who began to reign 518 or 521 years B.C. See DARIC.

Of Perfian coins, there is a fecond feries, that of the Saffanidæ, beginning about 210, when Artaxerxes overturned the Parthian monarchy. The Parthian coins have all Greek legends, but thofe later Perfian bear only Perfian characters: they are large and thin, with the king's buft on one fide, and the altar of Mithras on the other, generally with a human figure on each fide. The letters on Perfian coins feem to partake of the ancient Greek, Gothic, and Alanic. The later Perfian coins extend to the year 636, when Perfia was conquered by the Arabian caliphs.

The Hebrew fhekels are of filver, and originally didrachms, but, after the Maccabees, about the value of the Greek tetradrachm; and the brafs coins, with the Samaritan characters, are moft of them later than the Chriftian era, and generally the fabrications of modern Jews. F. Souciet has a differtation on the Hebrew medals, commonly called Samaritan medals, in which he diftinguifhes between the genuine and the fpurious: and fhews, that they are true Hebrew coins, ftruck by the Jews, on the model of the ancients; and that they were current before the Babylonifh captivity. The fame impreffion of a fprig on one fide, and a vafe upon the other, runs through all the coins of this nation. The Phœnician coins are of Phœnicia, and the Punic of Carthage; and they are rendered interefting by the ancient civilization and great power of the Phœnicians and Carthaginians. The alphabets, which are nearly allied, have been illuftrated by their relation to the Syriac, Chaldaic, and Hebrew. The fame may be faid of the Palmyrene coins and infcriptions. (See PALMYRA.) The Etrufcan coins are infcribed with the Etrufcan character, which is fatisfactorily explained by its connection with the Pelafgic, or oldeft Greek and Latin. The Spanifh coins are infcribed with two or three different alphabets allied to the old Greek, or to the Punic. The ancient coins of Spain are numerous, and evidently not all ftruck by the Punic colonies, for the legends are in different characters. The ancient coins of Gaul are alfo numerous, and many of them in bafe gold, but unhappily the moft ancient have no legends at all.

In fpeaking of the coins of Britain, Cæfar fays of the natives, "they make ufe of brafs inftead of gold coin, or iron rings reduced to a certain weight inftead of (our brafs) coins." Mr. Pinkerton underftands his meaning to be, that our anceftors ufed brafs, apparently coined, as a fuperior metal, in like manner as more advanced nations ufed gold: and that *pro nummis*, inftead of the brafs coinage of Rome, (*nummus* being a peculiar name of the brafs feftertius,) they ufed iron rings, examined and reduced to a certain weight. Rude coins of copper, much mingled with tin, are frequently found in England, and may perhaps (as Pinkerton intimates) be the copper coins ufed by our anceftors; for Cæfar's expreffion merely infers, that their copper was in in the form of coins. These pieces are of the size of a didrachm, the common form of the "nummus aureus" among the ancients. We have many coins of Cunobelin, who was king of the Trinobantes, and educated, as it has been said, in the court of Augustus. He is mentioned by Suetonius and Dio. These coins of Cunobelin are the only ones apparently British. Most of them yet found have CVNO on one side, with an ear of wheat, a horse, a kind of head of Janus, or some such symbol, and often CAMV, thought to be the initials of Camudolanum, on the other side, with a boar and tree, and a variety of other badges. They have likewise frequently the word TASCIA upon them, which has not yet been satisfactorily explained; but it has absurdly, as Mr. Pinkerton conceives, been thought to be the name of the Moneyer, as the putting of the name of the Moneyer on coins was a late practice, unknown till the sixth century, and gradually introduced a century after the Roman mints had ceased in Europe, with the empire, and when private persons contracted with the kings for the little mints, and put their names to identify the mintage. In old German *tasg* is a purse: and the figure thought to be the mock moneyer *Tascio* is Vulcan making a helmet. All the kings of France down to Charlemagne range in this division. Liuva I. who began his reign in the 567th year of our era, and the other kings of the West Goths in Spain, appear upon their coins encircled with Roman characters. Other Gothic kings, who reigned in Italy and other countries, after the fall of the Roman empire in the West, likewise use the Roman language in their coinage. They most commonly occur in the size of medals termed small brass. Many coins also occur with legends, which, though meant for Latin characters, and in imitation of Latin coins, are so perverted as to be illegible. Such are in general termed *Barbarous* medals. Pinkerton's Ess. vol. i.

MEDALS, *Conservation of*, is a matter among medallists of peculiar importance. When a medal is in the least defaced in figures, or in legend, the true judge will reject it, hardly excepting even the rarest coins. Nothing contributes so much to the conservation of brass or copper coins as that fine rust, sometimes called "ærugo," appearing like varnish, which their lying in a particular soil occasions. Gold admits no rust but iron mold, when lying in a soil impregnated with iron. Silver takes many kinds; but chiefly green and red, which yield to vinegar. In gold and silver the rust is prejudicial, and ought to be removed; whereas in brass and copper it is preservative and ornamental; a circumstance remarked by the ancients, as the "pocula adorandæ rubiginis" of Juvenal may prove, and that exquisite Greek phrase, which terms "patina" χαλκου ανθος, the flower of brass. "This fine rust," says Pinkerton, "which is indeed a natural varnish not imitable by any effort of human art, is sometimes a delicate blue, like that of a turquoise; sometimes of a bronze brown, equal to that observable in ancient statues of bronze, and so highly prized; and sometimes of an exquisite green, a little on the azure hue, which last is the most beautiful of all. It is also found of a fine purple, of olive, and of a cream colour, or pale yellow: which last is exquisite, and shews the impression to as much advantage, as paper of cream colour, used in all great foreign presses, does copper-plates and printing. The Neapolitan patina is of a light green; and when free from excrescence or blemish, is very beautiful. Sometimes the purple patina gleams through an upper coat of another colour, with as fine effect as a variegated silk or gem. In a few instances a rust of deeper green is found; and it is sometimes spotted with the red or bronze shade, which gives it quite the appearance of the East Indian stone called blood-stone. These rusts are all, when the real product of time, as hard as the metal itself, and preserve it much better than any artificial varnish could have done; concealing at the same time not the most minute particle of the impression of the coin." Medals are subject to various blemishes. Sometimes the letters are displaced, as is commonly the case in those of Claudius Gothicus; sometimes the coins, for want of being well fixed in the dye, so as to have slipped at every stroke of the hammer, present a double or treble image. Of these last many are found, in which the portrait is deranged, while the reverse is distinct, and others have the portrait perfectly well struck, while the reverse confuses the eye by its double or triple contours. Ancient coins are subject to another blemish, which rather recommends them to the curious than otherwise. It is when, after having struck a coin, the workmen, through forgetfulness, put another into the dye, without withdrawing the first. Hence, the portrait of the other piece being commonly upward, and in the upper part of the dye, the second coin is impressed with it by the dye, and at the same time made hollow on the other side with the form of the portrait already stamped on the former medal. Some coins are found with a small stamp impressed on a part of them, bearing sometimes a minute head, or some letters, as AVG. or N. PROB. or the like. Such are called "countermarked" by medallists; and being very rare are the more valued, so that such must not be rejected or blemished. These countermarks are thought to infer, that an alteration had been made in the value of the coin; as was the case with the countermarked coins of Henry VIII. and of Mary of Scotland in modern times. Other coins are found with holes pierced through them; and sometimes with a small ring fastened. Such were worn as ornaments of the head, neck, and wrist; either by the ancients themselves, as bearing images of favourite deities, or in modern times, when the Greek girls thus decorate their persons. Coins of genuine antiquity are often found split on the edges, or even in the middle, by the force of the hammer. This, so far from being regarded as a fault, is looked upon as a great merit by the collector; being considered as a proof that the coin is undoubtedly of ancient fabric. Silver coins often acquire a particular yellow tarnish, giving them the appearance of having been gilt; but it is merely owing to their being deposited in a soil, whence a peculiar vapour arises, or some similar circumstance. Mr. Pinkerton has given the following hints concerning the method of cleansing coins from any prejudicial rust. "Gold is cleaned by any acid: spirit of nitre eats every thing but gold, and is therefore an effectual cleanser of that metal. The green, blue, or red rust, may be removed from silver, by steeping in vinegar for a day or two: but a more effectual way is to boil with a mixture of three parts tartar, and one sea-salt in water. On gold and silver the rust is always in spots, and never forms an entire incrustation, as on brass and copper; whence it is always regarded as a blemish in the former metals. Very different is the case with brass and copper, and they are never to be cleansed, for coins in these metals would be disesteemed if rendered bright, and would be full of small holes, occasioned by the rust. But sometimes brass and copper coins are found wholly obscured with rust; and one of the best ways of clearing them, if used by a skilful hand, is a graver. Another way is to boil in water for twenty-four hours, with three parts tartar, and one part alum, (not sea-salt as in silver,) and then cleanse with bran. But it is a dangerous business to cleanse coins; and ought always to be committed to a skilful hand, or let alone."

See

See Joubert des Medial. sect. viii. Act. Erud. Lipf. 1694, p. 226.

Some authors imagine, that the ancient medals were ufed for money. M. Patin has a chapter exprefs to prove, that they had all a fixed regular price in payments, not excepting even the medallions. F. Joubert is of the fame opinion. Others, on the contrary, maintain, that we have no real money of the ancients; and that the medals we now have, never had any courfe as coins. Between thefe two extremes there is a medium, which appears by much more reafonable than either of them. See MONEY.

MEDALS *and Coins, Modern,* as contradiftinguifhed from thofe that are denominated *ancient*, comprehend, as we have already obferved, all thofe that have been ftruck fince the time of Charlemagne, or the commencement of the 9th century. Mr. Pinkerton, of whofe valuable "Effay on Medals" we have been allowed to avail ourfelves in the compilation of this article, has divided the fubject into "Modern Coins" and "Modern Medals." He obferves, that down to the revival of literature in the beginning of the 16th century, modern coins are fo very rude, that curiofity fuggefts the fole inducement to examine them. Without dates or epochs they cannot ferve one purpofe of utility. The very portraits found on them are fo uncouth, that the human face divine is hardly difcernible. The reverfes always bear a moft beautiful crofs garnifhed with pellets, or a difh of fome fuch exquifite flavour. Yet fuch is the luft of curiofity, of completing a feries, or of felf-love indulged in the extreme, by poffeffing a bauble which nobody elfe does, that ten or twenty guineas are often given for one of thefe pretty little things. To us, however, as Britons, the ftudy of thefe coins may be regarded as peculiarly interefting, as they furnifh monuments illuftrating, or relating to, perfons or actions, in the glory of which the common paffion of national vanity warmly interefts our affections. Thus, the noble of Edward III., on which he appears in a fhip, as afferting the Britifh dominion of the ocean, would, though uncouth in the execution, which it by no means is, juftly command our higheft regard and attention; and doubtlefs any patriot, or any Briton, would, even in thefe days, place moft juftly a higher value upon this coin, than upon the moft perfect medal which Grecian fkill has produced. Upon the fame principle, the coins of Edward the Black Prince are interefting; and, indeed, the whole Englifh feries muft be interefting to every one who feels himfelf particularly concerned in Englifh hiftory.

In this place modern coins are regarded merely as they appear in a cabinet; but for their commercial value, we refer to other articles, fuch as COIN, MONEY, &c. Beginning with the moft eaftern part of Afia, the coins of *Japan* firft attract notice. Thefe are thin plates of gold and filver, large and oval, ftamped with little ornaments and characters. The only coins of *China* are in copper, about the fize of a farthing, with a fquare hole through the middle, in order to their being ftrung for the convenience of enumeration or of carriage. They bear an infcription in Chinefe characters, expreffing the year of the prince's reign, without his name, diftinguifhed as the "*Happy* year," "*The Illuftrious* year," and the like. It is faid, that Canghi, the emperor, who died in 1722, after a reign of 61 years, formed a complete cabinet of Chinefe coins, and appointed a Mandarin to keep it. The coins of *Tartary*, which are pofterior to Genghis-Khan, are rude, and generally prefent only infcriptions. In *Thibet*, *Pegu*, and *Siam*, the coins are various; but evidently of late origin, and generally bearing infcriptions on both fides. Such alfo are thofe of many fmaller ftates in Eaftern Afia. In the country fo celebrated anciently by the name of *India* the Mahometan faith is predominant, as it is in moft countries of Weftern Afia. The precept of Mahomet, which forbids the reprefentation of any living creature, has had a pernicious effect upon the arts. It is doubtful whether or not any Indian coins exift before the time of the Moguls, or the 13th century. Some old coins have been found near Calcutta, of gold, filver, copper, and tin, all mingled in one bafe mixed metal. On one fide they bear a warrior with a fword, and on the other an Indian female idol. The later coins of India are well known, fuch as the pagoda, rupee, and cafh, the moft common copper, whence our word. All thefe coins are very thick, like the old Egyptian. On one remarkable fet of rupees, are prefented the twelve figns, a lion on one of them, a bull on another, &c. &c. The Portuguefe, Englifh, French, and Dutch, fometimes ftruck coins in their fettlements with Perfian infcriptions on one fide and Latin on the other. Rupees and cafh are known of Elizabeth, of Charles II., of the year 1730, and of other periods. The coins of *Perfia* have continued on the Arabian model, even after the Arabian caliphs loft their dominion in that country, and bear on both fides pious infcriptions from the Koran. The Perfian copper, however, has the fun and lion, the arms of Perfia, on one fide. Of Mannus, and fome other petty kings in *Arabia,* we have coin during the imperial period of Rome. The brafs coins of Haroun Al Rafchid, the Charlemagne of Afia, and his contemporary, and of other powerful princes who refided at Bagdad, have an Arabic infcription on the reverfe; the obverfe is a mere tranfcript of any old Greek or Roman coin that fell in the way of the Moneyer. The gold and filver coins have many infcriptions. The later Arabian coins, which are filver, bear the name and titles of the prince on one fide, and fome fentence from the Koran, or the like, upon the other. The more modern are in the fhape of a fifh-hook, with Arabic infcriptions. The coins of *Turkey* refemble thofe of Perfia and Arabia, having merely infcriptions on both fides. The coins of Africa, comprehending Morocco, Fez, Tripoli, Algiers, &c. are upon the Mahometan plan of mere infcriptions. Paffing over Abyffinia, and the interior kingdoms of Africa, as little known, and the civilized empires of America, Mexico on the N., and Peru on the S., where coinage was not practifed, we fhall proceed to the coins of Europe. In *Italy*, when the Roman empire in the weft ceafed with Romulus, in the year 476, the Gothic kings ftruck coins till Teias, the laft of them, was conquered in 552 by Narfes, the general of Juftinian. Then the exarchs of Ravenna, viceroys for the Byzantine emperors, iffued copper with FELIX RAVENNA, &c.; but the gold and filver of the Greek emperors fufficed for Italy. After Charlemagne, about the year 780, made a great revolution in Italy, there are coins of him ftruck in Rome and Milan. In the next century the modern coins of Italy begin with the filver pennies of various ftates. The papal coins originate with Hadrian I. 772—795, to whom Charlemagne gave leave to coin money. The filver pennies continued till a late period, with the name of the pope on the one fide, and SCUS PETRUS on the other. On thefe coins there are rude portraits of fome of the popes. Afterwards, when the pope ceafed to have power in Rome, from Pafchal II. till Benedict XI. in 1303, there are pennies of the Roman fenate and people, bearing on one fide Peter, ROMAN. PRINCIPE, on the other Paul, SENAT. POPUL. Q. R. In the middle ages the chief bifhops of Italy, France, and England, ftruck coins, as well as the pope. The firft gold coin is of John XXII. 1316. The coins of Alexander VI., Julius II., and Leo X. are remarkable for elegance.

elegance. The coins of *Milan* begin with Charlemagne, a croſs, reverſe the monogram of Carolus, with MEDIOL., and they are found of the other emperors to the 13th century. Theſe coins are of ſilver. In *Naples* there are coins of duke Sergius, 840, and biſhop Athanaſius, 880: and they are followed by thoſe of ſeveral others. The coinage of *Venice* begins in the 10th century, with ſilver pennies, marked VENECI. In 1280 the firſt Venetian gold appears; and the firſt copper in 1471. The ſilver groats are as old as 1192. *Florence* ſurpaſſes all the cities of Italy in the dignity of her coinage. Some ſilver pieces occur from the 12th century, or an earlier period; but in 1252, the famous gold coins, called Florins, from the flower of the lily upon them, appeared; and were imitated by the popes, France, and England, as being the firſt gold coins ſtruck in Europe, after the eighth century, for during five centuries no gold worthy of notice was ſtruck in Europe. The florins of Florence have on one ſide St. John the Baptiſt ſtanding, S. IOHANNES. B. on the other a large fleur-de-lis, FLORENTIA; and the coins of the popes, France, and England reſembling them, have the ſame types, but different legends. They weigh a drachm, and are no leſs than 24 carats fine, according to Italian writers; being intrinſically worth about 12*s.* The firſt coins of *Genoa* are of Conrad the emperor, 1129, DUX IANVÆ. Thoſe of the dukes of *Savoy* begin in the ſame century. The patriarchs of *Aquileia* iſſued coins from 1204 till 1440. *Ferrara* has coins of marquiſes from 1340. In France, the coins of the firſt race from Clovis 490, till its termination in 751, are chiefly gold trientes, well wrought, with the heads of the kings. Some ſolidi and ſemiſſes alſo appear. Theſe coins, which properly belong to the claſs of *antient* coins, have on the obverſe the king's head and name, but ſometimes the name of the Moneyer; the reverſe has a croſs with the name of the town. The coins of the ſecond race, beginning with Pepin in 750, and extending to Hugh Capet in 987, commence the *modern* claſs. Theſe are no leſs barbarous than the others are elegant: they are almoſt all ſilver pennies, and very ſeldom bear the head of the king. Thoſe of Charlemagne have only CAROLUS in the field, while the reverſe bears R. F. or ſome ſuch inſcription. One piece alone, ſtruck at Rome, has a rude buſt of him. The third race, beginning with Hugh in 987, and extending to the revolution, are unfortunate in their coins, till the time of St Louis, in 1226, when the groat appears, and the coinage began to improve. The groat, or groſſo, ſo called in compariſon with the penny, paſſed from Italy to France, Germany, and England. In the time of St. Louis, deniers of billon were iſſued, and were followed by other pieces of the ſame metal, as the liard or hardi of three deniers, the maille or obole of half a denier, the pougeoiſe or pite of one quarter. In the time of Henry III. 1574, copper was firſt uſed in French coinage. Other remarkable coins of France are the blancs, or billon groats, firſt iſſued in 1348; the ecus a la couronne, or crown of gold, the moſt famous French coin, ſo called from the crown on one ſide, and begun by Charles IV. in 1384; the teſton, or piece with the king's head, of Louis XII.; the elegant Henri of Henry II. which has Gaul ſitting in armour, with a victory in her hand, OPTIMO PRINCIPI; exergue GALLIA. The firſt Louis d'or is of 1640. *Spain* vies with France in the elegance of her early ſeries, which conſiſts almoſt wholly of trientes of gold finely executed. On one ſide they bear the head of the king, with his name, and on the other a croſs with the name of the town. While the Moors, or Arabs, poſſeſſed Spain, from the eighth to the 13th century, and Granada in particular till the end of the 15th, ſuch was the influence of the Mahometan faith, that the Moreſque coins of Spain only preſent us with inſipid inſcriptions on both ſides: they are chiefly in gold; and the inſcriptions are in the old Arabic character, uſed in Mahomet's time, called the Cuphic. From Charlemagne the coinage of *Germany* commences; and the ſeries of emperors is thought to be nearly complete. The coinage of *Denmark* begins with Canute the Great, in 1014. After Canute, we find coins of Harold and Hardicanute, then of Magnus Bonus in 1041, with Runic reverſes and of neat workmanſhip. But without enumerating thoſe of Sueno II., which rarely have the buſt, with an arched crown, and on the reverſe curious ornaments of a teſſellated form running acroſs the field, with the IIIII on either edge of the ornaments; and thoſe of Harold I. in 1074, with generally two heads; the rude coins of Nicolas or Niel, of Waldemar I. and of his ſucceſſors; thoſe of Olaf in 1376, bearing a grinning full face, with a crowned O on the other ſide; and the billon coins of Eric in 1426:—we paſs into *Sweden*, which is ſaid to have begun her coinage under Biorno in 818, on the plan of that of Charlemagne; theſe coins have a croſs, though Biorno was not a Chriſtian; the next coins are of Olaf, OLVF REX SVEVORVM, &c. &c. the ſeries proceeding till Margaret in 1387. From her time to that of Guſtavus Vaſa, in 1520, the coins are of Daniſh monarchs, ſtruck for Sweden. Of Guſtaf Waſe, or Guſtavus Vaſa, and his ſucceſſors, there are many fine coins. In 1634 ducats were coined with the buſt of Guſtaf Adolf, who died in 1632; reverſe the arms of Sweden, with the chymic types of mercury and ſulphur. In 1716, and the two following years, the ſmall copper coins with Saturn, Jupiter, Mars, &c. were iſſued by Charles XII. to paſs for dollars, on account of his want of money. The coins of *Norway* begin with Olaf, in 1066, and are followed by thoſe of Magnus, Harald, &c. &c. Of Denmark, Sweden, and Norway there are alſo eccleſiaſtic coins, as of Germany, France, &c. ſtruck by the chief biſhops. *Bohemia*, the moſt weſterly Slavonic kingdom, boaſts the earlieſt coinage; the firſt coins are thoſe of duke Boleſlaus I. in 909, with his head and name. The coinage of *Poland* is nearly as ancient as that of Bohemia; and it may be obſerved in general, that the coinage of the Slavonic kingdoms follows the model of the German. The coins of *Ruſſia* are of very late date. None of her coins ſeem to be more ancient than the 13th century. The firſt Ruſſian coins have rude figures of animals on one ſide; and a man, ſtanding, with a bow or ſpear, on the other. Some have St. George and the dragon, and various other types. Such are all kopeks, or ſilver pennies. The rouble or dollar, and its half, begun under Ivan or John in 1547. Thoſe of the falſe Demetrius, in 1605, are very ſcarce. In 1230, the knights of the Teutonic order, having conquered the Pagan inhabitants of *Pruſſia*, coined ſilver pennies on the German plan, at Culm. In the next century were ſtruck ſhillings, groats, and ſchots, the laſt being the largeſt and very rare; they have the Pruſſian ſhield, an eagle ſurmounting a croſs, within a roſe-ſhaped border, MONETA DOMINORUM PRUSSIE; reverſe a croſs fleurie, within a like border, HONOR MAGISTRI JUSTITIAM DILIGIT. In the ſame century gold coins were ſtruck. In 1525 the money was ſo debaſed, that 12 or 13 marks were worth but one mark of ſilver. The coins of Brandenburg and Poland are the later coins of Pruſſia.

We ſhall now proceed to give a brief enumeration of the coins of *Britain*. The Heptarchic coins are only of two ſorts; the ſilver ſkeatta or penny, and the copper or billon ſtyca; the latter being known only in Northumbria, and being a very ſmall piece, worth about half a farthing. The ſilver penny may be regarded as the general heptarchic coin. The ſkeattas were ſtruck in Kent, and the other ſtates of the Heptarchy

Heptarchy from the ſixth to the eighth century, or from about the year 500 till 700. No heptarchic pennies occur till after the year 700; but ſkeattas, which Dr. Combe, by cauſing two plates of them to be engraved, has brought into notice, are found with the name of Ethelbert I., king of Kent, A. D. 560—616, and of Egbert, alſo king of Kent, A. D. 664. The heptarchic pennies are, therefore, almoſt all of the eighth century, or from 700 till 832, when Egbert terminated the ſeven kingdoms. The coins of the chief monarchs preſent almoſt a complete ſeries, from Egbert 832 to Edgar 959. Of Ethelbald 857, and Edmund Ironſide, A. D. 1016, there are no coins. Moſt of them bear rude portraits, and the reverſes have views of cathedrals and other buildings, &c. The inſcriptions are alſo ſometimes curious. Eccleſiaſtic coins alſo appear of the archbiſhops of Canterbury, Wulfred, A. D. 804, Ceolnoth, 830, and Phlegmund, 889. The Norman conqueſt in 1066 made no alteration in the Engliſh penny, the only coin. The old Engliſh penny, or anglicus, Mr. Pinkerton obſerves, was a coin celebrated all over Europe in the middle ages, and almoſt the only money known in the northern kingdoms. In neatneſs of fabric, and in purity of metal, it is ſuperior even to the Italian and French coins of that period. The ſeries of Engliſh pennies extends almoſt without any failure from Egbert to the preſent reign. The kings wanting are John and Richard I. The Rev. Mr. Southgate, generally learned and peculiarly ſkilled in medals, has in his cabinet as neat and complete a ſeries of this knid as is perhaps to be found. Several uniques, or almoſt ſuch, are found there in the beſt preſervation; ſuch as the French penny of Richard I., the penny of Richard III, the full-faced penny of Henry VIII. in fine ſilver, and others. The firſt Engliſh pennies weigh $22\frac{1}{2}$ grains troy: toward the cloſe of Edward III. the penny weighs but 18 grains, and in the reign of Edward IV. it fell to 12. In Edward VI's. time, 1551, the penny was reduced to eight grains, and after the 43d of Elizabeth to $7\frac{23}{31}$ grains, at which weight it continues to this day. The next coins in antiquity, purſuing the ſilver coinage, are the halfpennies and farthings, firſt ſtruck by Edward I. about 1280, ſome having been previouſly iſſued in Ireland by John. The firſt were continued down to the commonwealth, ſince which time none have been ſtruck in ſilver: the farthings ceaſed with Edward VI. To theſe ſucceeds the groat, from Fr. gros, a large piece, introduced by Edward III. in 1354. The half-groat, or two-pence, is of the ſame date. Next to the groat is the teſtoon, or ſhilling, firſt coined by Henry VII., in 1503. The appellation of teſtoon was derived from the teſte, tête, or head of the king upon it. The ſhilling was at firſt a German appellation, ſchelling; coins of that name having been ſtruck at Hamburgh in 1407. The crown was publiſhed by Henry VIII. in ſilver, whereas it had before appeared only in gold; whence the old phraſe "crowns of gold;" and the half-crown, ſixpence, and three-pence, by Edward VI. Elizabeth, in 1558, coined three-halfpenny, and in 1561 three-farthing pieces, but they were dropped in 1582. From the 43d of Elizabeth, 1601, the denominations, weight, and fineneſs of Engliſh ſilver remain the ſame to the preſent time. It was about the year 1257 that Henry III. formed the deſign of a gold coinage, and ordered it to be current in the kingdom: however, no more than two ſpecimens of it have reached us. It is called a gold penny, but larger than a ſilver one. But it is from Edward III. that the ſeries of gold coinage commences, for no more occurs till 1344, when that prince firſt ſtruck florens, ſo called from the beſt gold then coined at Florence. The floren was then worth 6*s.*, but is now intrinſically worth 19, from the increaſed value of gold, and diminution of ſilver coins. The half and quarter of the floren were ſtruck at the ſame time, and of the ſame proportional value. In the ſame year the noble was announced, of 6*s.* 8*d.* value, and conſequently forming half a mark, being then the moſt general ideal mode of money. This was attended by its half and quarter; the proportion of ſilver to gold being then 1 to 11. This coin, together with its ſubdiviſions, continued the only gold coins till the angels of Edward IV. 1465, ſtamped with the angel Michael and the dragon, and the angelets, half the angel, or 3*s.* 4*d.* was ſubſtituted in their place. Henry VIII. in 1527, added to the gold denominations the crown and half-crown, at their preſent value; and, in the ſame year, gave ſovereigns of 22*s.* 6*d.* and ryals of 11*s.* 3*d.*, angels of 7*s.* 6*d.*, and nobles at their old value of 6*s.* 8*d.* In 1546, the ſame ſovereign, making the value of ſilver to gold as 1 to 5, ſtruck ſovereigns of the former value of 20*s.*, and half-ſovereigns in proportion. The gold crown of Henry VIII. is about the ſize of our ſhilling, and the half-crown of a ſixpence, but thin, as all hammered money was in modern times. His gold coin, like his ſilver, is much debaſed. Theſe coins continued, with a few variations, till Charles II. eſtabliſhed the preſent ſorts of gold coin. Till Edward VI. our monarchs appear upon their gold coin at full, or three quarters, length; that prince being the firſt whoſe buſt only is ſeen. Silver, which had been to gold for ſome time as 1 to 4, was again reduced in 1551 to its old proportion of 1 to 11. Upon the union of the crowns, James I. of England gave the ſovereign the name of unite, it being then of 20*s.* value. Of him are likewiſe roſe ryals of 30*s.* and ſpur ryals of 15*s.* angels of 10*s.* and angelets of 5*s.*; till his ninth year, when gold was raiſed in the proportion of 1*s.* in 10*s.* Silver, which had fallen in its proportion to gold from the degree of 1 to 12, now ſunk further, as 1 to $13\frac{1}{2}$ in weight. The gold crown and half-crown continued to this prince incluſive, and the crown to his ſucceſſor. The ſovereign, which had been commonly termed the broad-piece, under the commonwealth aſſumed the uninvidious name of the twenty-ſhilling piece, which it retained till it was ſupplanted by that of the guinea. The commonwealth likewiſe ſtruck ten-ſhilling and five-ſhilling pieces in gold. Oliver publiſhed none but forty-ſhilling and twenty-ſhilling pieces, and very few even of theſe; the former in particular being moſtly patterns. The guinea, ſo called from the Guinea-gold out of which it was firſt ſtruck, was proclaimed in 1663, and to paſs for 20*s.*; but it never went for leſs than 21*s.* by tacit and univerſal conſent. It is only twenty-two carats fine, and two alloy, which is the ſtandard of our gold coinage to this day. Charles II. likewiſe iſſued half-guineas, double-guineas, and five-guinea pieces, which have been all continued through every reign to the preſent time, though the latter two are not in common circulation. Geo. I. publiſhed quarter-guineas, an example imitated by his preſent majeſty; but theſe laſt of George III. were found ſo troubleſome and apt to be loſt, that they were ſtopped within a year or two when received at the bank of England, and thus ſilently annihilated. Pieces of 7*s.* were likewiſe coined, and have been continued: they are known by the lion above the helmet. The laſt coinage is that of copper. The firſt money coined in ancient Britain ſeems to have been copper. But the Saxons never thought of coining except in the inſtance of the ſtyca. While copper coin continued to be wanting in the Engliſh authoriſed money till the year 1672, with a few ſmall exceptions after the time of Elizabeth, we need not much wonder that in more remote periods its deficiency was not at all felt. The known averſion of that queen,

queen, and of the nation in general, to a copper coinage, was owing to the counterfeit money called "black money," being always of copper mixed or washed with about a fifth part of silver. The term of "black money" evidently arose from contradistinction to "white money," which is yet a name for that pure silver which it was made to imitate. When it is considered, therefore, that the base money was always of copper, it is no wonder that the idea of a copper coinage should be confounded with that of an imposition of authorised bad money. In 1594, when the practice of coining tokens, upon the returning which to the issuer, current coin, or value was obtained, had got to a great length, government had serious thoughts of a copper coinage; and a small copper coin was struck, of about the size of a silver two-pence, with the queen's monogram on one side, and a rose on the other, the running legend being THE PLEDGE OF—A HALF-PENNY. The queen, however, retaining her aversion to a copper coinage, the scheme proved abortive; nor was it revived till the succeeding reign, when, on the 19th of May 1613, king James's royal farthing tokens commenced by proclamation. They are mostly of the same size with the above, and have upon one side two sceptres in saltier, surmounted with a crown, and the harp upon the other. Their legend is the king's common titles running upon each side. These pieces, which were issued merely as pledges or tokens, for which government was obliged to give other coin if required, were not favourably received; but continued in a kind of reluctant circulation through this reign and the beginning of the next. In 1635 Charles I. struck those with the rose instead of the harp. But their currency was stopped by the number of counterfeits and the king's death in 1648; and then the tokens of towns and tradesmen again took their run, and increased prodigiously till 1672, when farthings, properly so called, were first published by government. After many trials for improving the copper coinage, and the issuing of many copper farthings, current half-pence and farthings first began in 1670 to be struck at the Tower; but they were not proclaimed till August 1672. These continued till the last year of Charles II., 1684, when disputes arising about the copper, tin farthings were coined with a stud of copper in the centre, and inscribed round the edge as the crown pieces, with NUMMORUM FAMULUS, 1685 or 1686. Half-pence of the same kind were issued in 1685, and tin continued to be coined till the year 1692. But in 1693 the tin was called in, and the copper coinage commenced anew. All the farthings of the following reign of Anne are trial pieces, except that of 1714, her last year. They are beautifully executed; but the one whose reverse is Peace in a car, PAX MISSA PER ORBEM, is the most esteemed. It is observable with regard to the copper coinage, that the intrinsic worth of the metal is not one-half of its currency. The pound of copper, worth 10*d.*, yields 46 half-pence, or 23 pence, when coined. Hence forgeries even of good metal yield a large profit, and the whole kingdom swarms with counterfeit copper, insomuch that not a fiftieth part of that currency is legitimate; an evil which requires remedy. Before we close this subject of the English coinage, we shall mention the Portcullis coins of Elizabeth, issued in rivalship of the Spanish king, for the service of the East India company, in their settlements abroad. They are of different sizes from the crown downward, and are easily distinguished by the portcullis on the reverse. To them succeeded the various siege pieces of Charles I. in gold and silver, some of the latter being so large as to be of 20*s.* value.

The coinage of Scotland did not commence till a late period. There is room to believe, says Mr. Pinkerton, that silver pennies exist of Alexander I., 1107, as some are found with that name, apparently of ruder and more ancient fabric than those of Alexander II., 1214. Of David, 1124, there are coins. Those of William, 1165, are numerous, with LE REI WILAM, or WILAM RI, or RE; the last word used in Scandinavia for king, or perhaps a various spelling of the old French *Rei*. A large hoard of William's pennies was found near Inverness in 1780. The Scottish money continued to be the same with that of England in size and value till the time of David II., 1355, whose vast ransom drained the Scottish coin, and occasioned the size of that which remained to be diminished. After this ransom, the Scottish coin gradually diminishing, in the first year of Robert III. it passed only for half its nominal value in England; and at length, in 1393, Richard II. ordered that it should pass only for the weight of the genuine metal in it. It sunk by degrees, till, in 1600, it was only a twelfth part value of English money of the same denomination, and so remained till the union of the kingdoms cancelled the Scottish coinage. In silver, we have only pennies of Alexander II., who reigned till 1249; but Alexander III., who reigned till 1293, coined half-pence. Of Robert I., 1306, and David II., there are silver farthings. The groat and half-groat, introduced by David II., completed the denominations of silver money till the reign of Mary, when they all ceased to be struck in silver. In 1544, the second year of Mary, Scottish money was a fourth of that of England. About the year 1553, shillings or testoons were first coined, bearing the bust of the queen, and the arms of France and Scotland on the reverse: they were then worth 4*s.* Marks of 13*s.* 4*d.* Scottish were also struck, worth 3*s.* 4*d.* English. In 1565 the coin was to the English as 1 to 6; the silver crown being then first struck, weighing an ounce, and passing for 30*s.* Scottish; and lesser pieces of 20*s.* and 10*s.* were struck in proportion; and these have the marks upon them xxx, xx, x, to express their value. In the time of James VI., 1571, the mark and half-mark Scottish were struck, the former being worth about 22 pence and the latter 11 pence English. In 1578 the famous NEMO ME IMPUNE LACESSET occurs first upon the coin; the invention of which is ascribed to Buchanan. The Scottish silver, coined after the union of the crowns, it is hardly necessary to mention.

The gold coinage of Scotland resembled the English; Edward III. having given the first currency in this metal in 1344. About 30 years afterwards, Robert II. issued his. The gold coins of Scotland, however, are of much smaller model than the English. They were first called St. Andrews, from the figure of that tutelar saint upon his cross, who appears upon them, with the arms of Scotland, a lion in a shield, on the reverse. The lion was another name for the largest gold coin, from the Scottish arms upon it; next was the unicorn under James III.; and the chief gold pieces of James V. were the bonnet pieces, so called from the bonnet in which that king's head appears upon them. The last gold coinage of Scotland is the pistole and half-pistole, coined by William III. in 1701, worth 12*l.* and 6*l.* Scottish. They have the sun under the head.

The copper coinage of Scotland, though more current than that of England, is not of so early a date as some would ascribe to it. Buchanan speaks confusedly of copper coinage in Scotland before James III.; but in this he is mistaken. During the reign of James III., says Pinkerton, the copper coinage began, and speedily increased in its pieces. The old Scottish coins of copper stood thus:

A Penny	=	$\frac{1}{12}$ of a penny English.
A Bodle	=	2 pennies.
A Hardie	=	3 pennies, the farthing English.

A Plack	=	4 pennies.
A Baw-bee	=	6 pennies.
An Atkinſon	=	8 pennies.

N. B. The penny has a little dot behind the lion; the bodle, alſo called two-penny piece and turner, has two dots. This coinage continued the ſame through the reigns of Charles I. and II. The Scottiſh pennies of Charles II. are not very uncommon; they weigh only 10 grains. In Scotland there are no eccleſiaſtical coins; though they occur in Denmark, Norway, and almoſt all other kingdoms.

With reſpect to the coins of Ireland it may be obſerved, that, from their form and fabric, the old made pennies found in this country were ſtruck by the Danes there. Of Anlaf, 930, and Sihtric, 994, there are coins ſtruck at Dublin, ON DVFLI, or DYFLI, Duflin or Dyflin being the real Daniſh original name of this fine city, as of towns in Scandinavia. Coins of Donald, an Iriſh monarch, probably Donald O'Neal, 956, are publiſhed by Simon. Other Daniſh and Iriſh kings have coins. The pennies ſtruck by Engliſh monarchs in Ireland are remarkable: ſuch, with the name of Dublin, occur of Ethelred, 866; Edred, 948; Edgar, 959; and one of Canute, 1017. The Iriſh coins from John to Henry V. are known by the triangle encloſing the king's head, and by the names of Iriſh towns on them: after Henry V. they are only diſtinguiſhed by the names of Iriſh cities where they were ſtruck. The harp is never ſeen upon Iriſh coin till the reign of Henry VIII. The difference between the Iriſh coin and the other money ſtruck by the kings of England begins in the time of Henry VIII., who coined ſix-pences for Ireland, only worth four-pence in England. Mary iſſued baſe ſhillings and groats for Ireland; and Elizabeth's baſe money for Ireland is notorious. In 1601, copper pennies and half-pence were coined for Ireland by Elizabeth, though ſhe would not conſent to a copper coinage in England. In 1635 a mint was eſtabliſhed in Dublin by Charles I.; but the maſſacre and diſturbances in that country put a ſtop to it, and the plan was never reſumed. After that maſſacre, 1641, the Papiſts ſtruck what are called St. Patrick's half-pence and farthings, known by the legends FLOREAT REX, reverſe ECCE GREX; and the farthing QUIESCAT PLEBS. In Cromwell's time, copper tokens were ſtruck by towns and tradeſmen, as in England. In 1680, half-pence and farthings were given by authority, with the harp and date. James II., arriving in Ireland from France in 1689, inſtituted a mint, and iſſued ſhillings and half-crowns, ſtruck of all the refuſe metal which could be procured: for this purpoſe ſome braſs guns were uſed, ſo that the coinage is generally called gun-money. Pennies and half-pennies of lead mixed with tin were publiſhed in 1690; and other crowns of gun-metal, of the ſize of half-crowns, without the mark of the month, in the ſame year. The crowns of white metal, which are very ſcarce, have James on horſeback, with titles no longer his; and on the reverſe the arms, CHRISTO VICTORE TRIVMPHO, with this legend on the rim, MELIORIS TESSERA FATI ANNO REGNI SEXTO. The patent of William Wood, eſq., acquired from George I, for coining half-pence and farthings, occaſioned great diſcontent, on account of the great loſs that attended it. Theſe coins are of very fine copper and workmanſhip, and have the beſt portrait of George I., perhaps, any where to be found. Sir Iſaac Newton, then at the head of the mint, ſaid they were ſuperior to the Engliſh in every thing but ſize. In 1737, 10th of George II., Iriſh half-pence and farthings were again coined of juſt ſize and weight, with the harp only on the reverſe; and the like are continued to this day. As they have no mint in Ireland, they are all coined here, and ſent to that kingdom. In 1760 the ſcarcity of copper coin in Ireland was relieved by a ſociety of Iriſh gentlemen, who obtained leave to coin half-pence; which appeared with a very bad portrait of George II., and VOCE POPULI round it. Since the abolition of the mint erected by Charles I., which happened about 1640, no gold or ſilver coins have been ſtruck with the Iriſh badge, but copper only. See COIN, COINAGE, and MONEY.

Modern Medals.—In the middle ages medals were quite unknown. Till the 15th century no medals appear of any country in Europe, if we except Scotland, which can boaſt of gold medals of David II. 1330—1370, ſtruck in England during his captivity. In the next century medals appeared in Italy, and from that time ſucceſſively in moſt countries of Europe. The gold medal of the council of Florence, 1439, is one of the earlieſt of theſe medals. Some indeed have mentioned, that of the famous reformer, John Huſs, in 1415, as the firſt. Vittore Piſano, a painter of Verona, is celebrated as perhaps the chief reſtorer of this branch of art. His medals, however, have no ſimilarity to thoſe of antiquity, being very large, and all caſt: they were firſt modelled in wax, then a mould was taken from the model in fine ſand and other ingredients. When a good caſt was procured, it was touched up, and made a model for the reſt. Vaſari, in his lives of the painters, gives us a catalogue of the medals done by Piſano. The papal medals are not only the moſt elegant, but the moſt ancient ſeries in modern Europe. Paul II., created pope in 1464, is the firſt pontiff who has medals of his own time. After Paul II., coeval medals are found of all the popes. In the time of Alexander VI., 1492—1503, the elegance of the papal medals begins to dawn; but his ſucceſſors Julius II, Leo X, Hadrian VI., and Clement VII., were ſingularly fortunate in having many of their medals deſigned by Raffaele, Julio Romano, and other great painters; and executed with correſponding workmanſhip. The medal of Julius II., with Saul, CONTRA STIMULUM NE CALCITRES, is the firſt medal, according to Venuti, that was ſtruck, not caſt. The medal of Julius III., reverſe a Ganymede ΦΕΡΝΗ ΖΗΝΟΣ ΕΥΦΡΑΙΝΕΙ, the dower of Jove delights, the deſign of which is aſcribed to Michael Angelo, is denied to be genuine by the pontifical writers. But there is a fine medal, deſigned by Parmegiano, of Gregory XIII., upon the correction of the calendar; reverſe a ſerpent, with his tail in his mouth, and a ram's head for the ſign Aries, in the centre, ANNO RESTITUTO, M.D. LXXXII. marked I. PARM. beneath the pope's buſt, in the obverſe. Beſides the papal medals, there are many of the various ſtates in Italy. Next to Italy, France is the moſt remarkable country for medals. But the French medals are neither fine nor numerous, till the reign of Louis XIV., who has exceeded all modern princes in this way. In Denmark, there are medals of Chriſtian II. 1516, and of Frederic and Sophia, 1532. Of Frederic II. and Chriſtian IV. there are many medals. The elephant of the houſe of Oldenburg is very frequent on Daniſh medals. In Sweden there are many fine medals of Guſtaf Waſe, or Guſtavus Vaſa. Chriſtina appears on ſeveral, ſtruck chiefly at Rome after her abdication. Of Charles XII., there are ſeveral curious medals. The medallic hiſtory of Holland begins in the year 1566. In the Spectator a Dutch medal is quoted as Engliſh; namely, that on the defeat of the Spaniſh armada, a fleet, FLAVIT ET DISSIPATI SUNT, 1588. Many Dutch medals are remarkable for maps and plans. The Spaniſh medals begin, as Mr. Pinkerton ſuggeſts, with Conſalvo, the great captain, in 1503; and many of them are curious and intereſting. Germany and Spain were as one empire under Charles V., of whom there are many medals. But

But the German ones begin with Frederic III., of whom there is one struck at Rome 1453; next is Maximilian 1504, who appears in the bonnet, worn before hats were invented about 1560, and a wheel on the reverse, PER TOT DISCRIMINA. There is a curious medal upon the death of Louis, king of Hungary, at Mohatz, 1526, when he fell fighting against the Turks; obverse his head, and that of his queen, face to face; reverse a battle. The medals of John of Leyden, leader of the Anabaptists, 1534, 1535, are singular monuments of folly and fanaticism. They bear his bust, with German inscriptions and legends. Amongst other curious medals, there is one of Sebastian, king of Portugal, famous for his unfortunate expedition in Africa, 1578, with his bust, full face, and three quarters length, SEBASTIANUS D. G. REX PORTUGALLIÆ, ARABIÆ, INDIÆ, ET AFRICÆ ANNO ÆTATIS XVI., reverse a shell-fish in the sea, the moon and seven stars, SERENA CELSA FAVENT. There is another singular medal of Catherine of Medici, queen of France, notoriously addicted to astrology. It represents her naked, between Aries and Taurus, with the name EBULLA ASMODÆA, over her head; she holds a dart in one hand, and a heart in the other; in the exergue is OXIEL.

As soon as medals began to revive, they became satiric; a quality almost unknown to the ancient mint. Medals among the moderns have been the chief article of satire, till the printshops took up the trade. The first satiric medal, it is believed, was struck by Frederic, king of Sicily, in 1501, against his enemy, Ferdinand, king of Spain. It bears the head of Ferdinand, FERDINANDUS R. AR. VETUS VULPES ORBIS; reverse a wolf carrying off a sheep, JUGUM MEUM SUAVE EST ET ONUS MEUM LEVE. It is said that in 1588, Elizabeth, queen of England, struck a medal, with the Spanish and English fleets, HESPERIDUM REGEM DEVICIT VIRGO. Philip, king of Spain, caused medals of the same impression to be distributed in England; but with this addition, NEGATUR, EST MERETRIX VULGI. The queen suppressed them, and published another medal, with this legend,

> "Hesperidum regem devicit virgo Negatur,
> Est meretrix vulgi, Res eo deterior."

Above all nations, the Dutch have most distinguished themselves for satiric medals; and have paid dearly for this kind of presumption. A great number of medals have been struck for private men of eminent learning or talents, and in this respect modern medals are superior to the ancient.

Mr. Pinkerton closes his account of modern medals with a comparison between these and the ancient medals. The most surprising difference between the ancient and modern works of art lies in the portraits. The ancient artists, even of the lowest class, marked the character, and exhibited the life and spirit of the person whom they represent; while the moderns only produce a kind of model, with very faint features of the character. The ornaments of the portraits have also this effect; the ancient being simple and picturesque in real life; whereas ours are discordant and ungraceful. The reverses of ancient medals, when consisting of human figures, or detached objects, exceed the modern in every view of strength, elegance, or taste. But in landscape, and all that belongs to perspective, the modern excel the ancient to a prodigious degree. A great fault of modern reverses, as of modern portraits, is that the manners of the time and country are very often totally perverted in them. Personifications are of all ages and countries and languages; but what title have heathen gods or goddesses to exist on our medals, and attract the adoration of our connoisseurs? Mr. Pinkerton, taking advantage of Dr. Coningham's tract on modern medals, makes some remarks on the legends. But for the different kinds of legends that are confined, we refer to the article LEGENDS, in which the reader is desired to correct the error of the press in the name of Coningham.

The first English medal is in the duke of Devonshire's cabinet. It is in brass, of a large size, upon the plan of the early Italian medals, being done without doubt in Italy; and bears on one side a bust IO. KENDAL RHODI TVRCVPELLE-RIVS, reverse the arms of Kendal, TEMPORE OBSIDIONIS TVRCORUM. MCCCCLXXX. The next English medal is that of Henry VIII. struck in 1545; it is of gold, larger than a crown-piece, and has the king's head full-faced on the obverse, with three legends within each other, of his titles and other matter. The reverse contains two inscriptions, declarative of his being head of the church, &c. the first in Hebrew, the other in Greek. This was imitated in all points by his successor Edward VI. in his coronation medal, being the first we have. Elizabeth presents us with a good number of medals, one or two of which are tolerable, but the rest very poor, inferior to those of Philip and Mary, two of whom in silver by Trezzo are of high relief, and good execution. Decent medals appear of James I. and his queen; and a very large one of Charles I. and Henrietta, in 1636, deserves notice for its fine workmanship. The reverse represents Justice and Peace, kissing, aukwardly enough; but the execution of the king's bust, and that of his lovely queen, is very masterly. The medals of Charles I., who was a lover of the arts, are various and curious; but we cannot enlarge in the enumeration of them. The commonwealth and Oliver Cromwell, were singularly fortunate in having the celebrated Simon for their artist in this line. The medals and coins of Simon are deservedly regarded as the most admirable which modern times have produced. Of Charles II. there are several good medals, as on his leaving Holland, his restoration, and coronation. The short reign of James II. has several medals, the most remarkable of which are the NEMO ME IMPUNE LACESSET; that with his queen, FORTES RADII SED BENIGNI; those on the Pretender's birth, FELICITAS PUBLICA. William III. gave occasion for many interesting medals. Those after his accession to the English crown, have generally his head and Mary's joined, as the MAJUS PAR NOBILE; ATAVUM PRO LIBERTATE; NEC LEX EST JVSTIOR VLLA; NISI TU QUIS TEMPERET IGNES; and others. Many medals also occur of James II., after his abdication, and of the other pretenders, done in foreign countries by eminent artists. Queen Anne has several fine gold, silver, and copper medals; of the first only two or three different pieces were struck; but in the other medals of this princess, we have a series of all the great events with which Marlborough illuminated her reign. About 1740, and for some years before and after, Dassier, a native of Geneva, settling in London, engraved a series of medals of all the English kings, with great taste and spirit. They are struck upon fine copper, and amount to thirty-six in number. He likewise gave medals of many illustrious men of this and other nations, which, says Pinkerton, deserve considerable praise. The various medals of eminent private persons in England are very numerous. Those who wish for fuller information of English medals than our limits allow, and the preceding extracts furnish, may consult Pinkerton's Essay so often cited, and Mr. Snelling's plates of them.

Of medals, of Scotland, which are numerous, we can only mention some of the principal. The fine gold pieces of David II. 1330—1370, which we have already noticed, are certainly medals. Another Scottish medal occurs of James III. 1478; it is of gold, weighing near two ounces, and its diameter is $2\frac{1}{5}$ inches. The obverse bears a beardless efs king, with long hair, fitting on a throne, holding in one hand a naked fword, in the other a fhield with the Scottifh arms. On the borders of the canopy, above the throne, is a Gothic infcription, IN MI DEFFEN, in my defence: the legend of the obverfe in Gothic letters is, MONETA NOVA IACOBI TERTII DEI GRATIA REGIS SCOTIÆ. The reverfe bears St. Andrew and his crofs, SALVVM FAC POPVLVM TVVM DOMINE. Another remarkable Scottifh medal is that inaugurative of Francis II. of France and Mary of Scotland, ftruck upon their coronation as fovereigns of France, and prefenting bufts of them face to face, with three legends, the outermoft of which contains their titles, and the middle one this fingular fentence, HORA NONA DOMINUS IHS EXPIRAVIT HELLI CLAMANS: the innermoft legend is the name of the city of Paris. The fine crown of Mary and Henry, 1565, is fo rare as to be efteemed a medal of the higheft value; it is fuppofed to be worth 40 or 50 guineas. Henry and Mary appear on it face to face, with their titles, and the reverfe bears the arms of Scotland, with this legend, QVOS DEVS CONIVNXIT HOMO NON SEPARET. Another remarkable medal of Mary gives her portrait full-faced, and weeping, O GOD GRANT PATIENCE IN THAT I SVFFER VRANG. The reverfe has this infcription in the centre, QVHO CAN COMPARE WITH ME IN GREIF—I DIE AND DAR NOCHT SEIK RELEIF; and this legend around, HOVRT NOT THE (figure of a heart) QVHAIS IOY THOV ART. The laft Scottifh medal, which we fhall mention, is the celebrated coronation medal of Charles I., when he underwent his inauguration at Edinburgh, 18th June, 1633. It was executed by Briot, an eminent French artift; and was the firft piece ftruck in Britain with a legend on the edge, being, it is fuppofed, the only one ever coined of gold found in Scotland. On the front is the king's buft, crowned and robed, with his titles. The reverfe bears a thiftle growing, HINC NOSTRÆ CREVERE ROSÆ. Around the edge is EX AVRO VT IN SCOTIA REPERITVR BRIOT FECIT EDINBVRGI, 1633. Few of thefe were ftruck on the Scottifh gold, three only being known to exift, of which one is in the mufeum. The piece is not uncommon in filver, in which metal it wants the legend on the edge, which conftitutes its chief curiofity and merit. It was in rivalfhip to this that Simon gave his fine medal of Oliver, the reverfe of which is an olive tree, NON DEFICIENT OLIVÆ.

MEDALS, *Hiftory of,* and *Account of Writers on this Subject.* The ftudy of medals affords fuch a variety of amufement and of inftruction, that we may naturally fuppofe it to be almoft as ancient as medals themfelves; and yet ancient writers do not furnifh us with a fingle hint of collections of this kind. In the days of Greece, a collection of fuch coins as then exifted would not be regarded as an acquifition of any great value, becaufe it muft have confifted only of thofe that were ftruck by the innumerable little ftates, which then ufed the Greek characters and language, and of courfe it would be regarded as a fort of domeftic coinage, precluded from extenfion by the narrow limits of the intercourfe that fubfifted between different provinces and countries. As foon as any communication was opened between the Romans and the Greeks, the Grecian coins were imitated by the Roman workmen, and preferved in the cabinets of their fenators among the choiceft treafures. In a more advanced period of the Roman empire, individuals muft have formed feriefes of Roman coins: for we find, in fact, that a complete feries of filver was lately found in our ifland, containing, inclufively, all the emperors down to Caraufius. From the decline of the Roman empire, moft branches of fcience were enveloped in great darknefs, till the revival of literature towards the end of the 15th century. When literature began to be cultivated in Italy, the ftudy of medals, connected with that of ancient erudition, began to engage attention. Accordingly Petrarch, who in modern times was amongft the firft perfons in Europe that afpired to the celebrity of learning and of genius, was likewife the firft to conftitute an example of the fcience of medals. This eminent writer, being defired by the emperor Charles V. to compofe a book that fhould contain the coins of illuftrious men, and to place him in the lift, with a noble pride anfwered, that he would comply with his defire, whenever the emperor's future life and actions deferved it. Availing himfelf of this circumftance, he fent that monarch a collection of gold and filver coins of celebrated men. "Behold," fays he to the emperor, "to what men you have fucceeded! Behold whom you fhould imitate and admire! To whofe very form and image you fhould compofe your talents! The invaluable prefent I fhould have given to nobody but you; it was due to you alone. I can only know or defcribe the deeds of thefe great men. Your fupreme office enables you to imitate them."

In the next age Alphonfo, king of Arragon, caufed all the ancient coins, that could be difcovered throughout all the provinces of Italy, to be collected, which he placed in an ivory cabinet and always carried with him; that he might be excited to great actions by the prefence, as it were, of fo many illuftrious men in their images. Anthony, cardinal of St. Mark, nephew of Eugene IV., who afcended the pontifical chair in 1431, had a vaft collection. Soon afterwards Cofmo de Medici began the grand mufeum of the family of the Medici at Florence; the moft ancient, as well as the moft noble, in the univerfe. Among a profufion of other monuments of ancient art, coins and medals were not neglected. About the fame period Matthias Corvinus, king of Hungary, formed a noble collection of coins, along with ancient MSS. and other valuable reliques of antiquity. The firft perfon who feems to have examined medals, and adduced them as vouchers of ancient orthography and cuftoms, was Agnolo Poliziano, or Angelus Politianus. Maximilian I., emperor of Germany, formed a cabinet of medals, by means of which Joannes Huttichius was enabled to publifh a book of the lives of the emperors, enriched with their portraits, delineated from ancient coins. M. Grollier, treafurer of the armies of France in Italy during part of the 16th century, had a great collection of coins in all metals. When, after the death of Grollier, thefe were about to be fent into Italy, the king of France bought them at a high price for his own cabinet of antiquities. Befides medals of brafs, this collection contained an affortment of gold and filver. Guillaume du Choul, a contemporary of Grollier, had alfo a good collection of medals, many of which were publifhed in his treatife on the religion of the ancient Romans, printed at Lyons in 1557. From the letters of Erafmus we learn that the ftudy of medals was begun, in the Low Countries, about the beginning of the 16th century. About the middle of that century, Goltzius, a printer and engraver, travelled over a great part of Europe in fearch of coins and medals, for works relating to them, which he propofed to publifh. At this time, as he informs us, there were in the Low Countries 200 cabinets of medals, 175 in Germany, more than 380 in Italy, and about 200 in France: to which we may add about 500 for our own country, which Goltzius did not vifit. The greater number, however, of thefe cabinets were of that clafs called cafkets of medals, including from 100 to 1000, or 2000 in number. If we except Italy, there are few countries, in which more ancient coins are found

found, than in Britain. Mr. Pinkerton suspects, that Camden was one of the first, if not the very first, of our writers, who produced medals in his works, and who must have had a small collection. In the 17th century, Speed's Chronicle, published in 1610, was illustrated with coins from sir Robert Cotton's cabinet. Henry, prince of Wales, bought the collection of Gorlæus, amounting, as Joseph Scaliger says, to 30,000 coins and medals, and left it to his brother, Charles I. Archbishop Laud bought 5500 coins for 600*l.* and gave them to the Bodleian library. Thomas, earl of Arundel and Surry, earl marshal of England, had, in his exuberant collection of antiquities, a rich cabinet of medals, gathered by Daniel Nilsum. The dukes of Buckingham and Hamilton, sir William Paston, sir Thomas Fanshaw, sir Thomas Hanmer, Ralph Sheldon, esq. Mr. Selden, and many more, are enumerated by Mr Evelyn, as having collections. To this number we may add the earl of Clarendon, the historian, and Charles I. The fine cabinet of this unhappy monarch was dissipated and lost in the civil commotions. Oliver Cromwell had also a small collection; and that of Charles II. is mentioned by Vaillant. We may add, that his present majesty possesses a tolerable collection of ancient gold coins. Since the time of Mr. Evelyn, many noble cabinets have been formed in this country, which we cannot recount. At present, the chief cabinets in Britain are those of the duke of Devonshire, the earl of Pembroke, earl Fitzwilliam, formerly the marquis of Rockingham's, the Hon. Horace Walpole, the Rev. Mr. Crachrode, the Rev. Mr. Southgate, Mr. Townley, Mr. R. P. Knight, Mr. Edward Knight, Mr. Tyson, Mr. Barker, Mr. Brown, Mr. Bootle, Mr. Hodsul, Mr. Austen; with Mr. Ord's Egyptian, Mr. Douce's small brass, and Mr. Jackson's British.

The museum, lately enriched by some of those abovementioned, and the universities, have also collections; and also the Lawyer's library, and one or two colleges in Scotland; to which might be added private collections both there and in Ireland. But that of the late Dr. Hunter deserves notice, as the greatest in Europe, if we only except that of the late French king. From the middle of the 17th century down to these times, almost every year has produced some new work, or new discovery, in the science of medals.

Of writers in this department of science, Mr. Pinkerton has enabled us to mention the following: in Italy, Enea Vico published, in 1548 or 1555, his "Discourses on the Medals of the Ancients." His example was imitated in France by Antoine le Pois, who in 1579 gave his "Discourse on the Coins and Seals of the Ancients." In 1665, Charles Patin published his "History of Medals, or Introduction to that Science." The last edition appeared in 1695. In 1692, Pere Jobert, or Joubert, presented to the public his "Science des Medailles," the best edition of which is that of 1739, by M. le Baron Bimard de la Bastie. In the year in which Jobert published his book, a work somewhat similar to it was published in the English language, entitled "The Greek and Roman History illustrated by Coins and Medals, representing their Religion, Rites, &c. by O. W. (Obadiah Walker,) London 1692, 12mo." In 1695, a translation of Jobert's work appeared under the title of "The Knowledge of Medals," ascribed to Walker. The "Numismata, or Discourse on Medals, ancient and modern," by Mr. Evelyn, was printed in 1697, fol. In 1720, Nicolas Haym, an Italian musician, published at London his "Tesoro Britannico," or British Treasury, in Italian and English. They who wish to proceed in this science, says Mr. Pinkerton, may peruse the most excellent and useful work of Froelich, entitled "Notitia Numismatum antiquorum illorum, quæ Urbium Liberarum, Regum et Principum, ac Personarum illustrium, appellantur," Viennæ, Pragæ, et Tergesti 1758, 4to.; and afterward such books of medals as they please, in chronological order as published, from Goltzius down to Pellerin and Combe. The following list of the best authors is given by Mr. Pinkerton For the general science he recommends Vico's work, and Patin's already mentioned. The study of the Greek coins may be begun with Goltzius "Historia Siciliæ et Magnæ Græciæ ex antiquis Numismatibus," Antwerpiæ 1644, fol. Recourse may then be h d to Gessner's "Thesaurus Numismatum," Tiguri 1738, two vols. fol. The productions of Pellerin, Paris 1762, and following years till 1778, making, with all the supplements, 10 vols. 4to., ought next to be perused Dr. Combe's publication of Dr. Hunter's coins of Greek cities, London, 1782, 4to., as it is the last, so it is the very best of the kind ever yet given. Of the Greek monarchic coins Gessner's is the most ample assemblage. The Roman consular coins will also be found in full detail in Gessner; and descriptions may be found in Vaillant's "Nummi Antiqui Familiarum Romanarum," Amst. 1703, two vols. fol, or the "Thesaurus Morellianus," Amst. 1734, two vols. fol., a later and a better work. The imperial coins of Rome are likewise amply displayed by Gessner; with whom, for the rare coins, should be read Vaillant's "Numismata Imperatorum Romanorum," published by Baldini at Rome, 1743, three vols. 4to., and Khell's "Numismata Imperatorum Romanorum," Vindobonæ 1767, 4to., a supplement to the Roman edition of Vaillant; Banduri's "Numismata Imp. Rom. a Trajano Decio usque ad Palaeologos," (or to the termination of the Byzantine empire) Lutetiæ, 1718, two vols. fol.; Occo's "Numismata Imp. Rom." The best edition is the second of Occo himself.

Of books on modern coins and medals, the first which ought to be perused by a British subject are those relating to his own country. He should begin with Mr. Clarke's "Connection of the Roman, Saxon, and English Coins," London 1767, 4to.; Mr. Lowndes's excellent "Report, containing an Essay for the Amendment of Silver Coins," Lond. 1695, 8vo.; Snelling's "Views of English Money," Lond. 1763, and following years, 4to.; and Folkes's "Tables of English Coin," Lond. 1763, 4to. Ducarel's "Letters on Anglo-Gallic Coins" are very considerable. English medals are published by Snelling and in Vertue's Account of Simon's works. On the Scottish coins the only books are those of Anderson and Snelling. The Irish are well displayed by Simon, in his "Historical Essay on Irish Coin," Dublin, 1749, 4to., with the supplement by another author 1767, 4to. For the account of the sources of information with regard to other modern countries, we must refer to Mr. Pinkerton's preface. The second edition of Mr. Pinkerton's "Essay on Medals" will supersede the necessity of constant reference to other works, not easily procured; and the reader will find, that the author has cited original authors, and availed himself of an examination of many of the coins themselves, which he has described. This elaborate work, in two small volumes, Lond. 1789, will afford to the student in this branch of science ample satisfaction. This edition, besides many corrections and additions, that very much contribute to the increased value of the work, is illustrated with prints of coins, engraven exactly of the form and size of the originals, forming specimens of all the principal sorts. In the advertisement to this new edition, the author expresses himself in terms of high commendation concerning Monaldini's "Istituzione antiquarion Numismatica," printed at Rome, 1772, 8vo., which, he says, is much superior to Jobert's "La Science des Medailles."

MEDALS, *Utility of the Study of.* Medals are of great importance to the ftudy of hiftory. They, indeed, furnifh the principal proof of hiftoric truth, as their evidence reaches to the moft remote ages and the moft remote countries. Vaillant fet the firft example, in his learned hiftory of the Syrian kings, printed at Paris in 1681, of fixing the dates, and arranging the order of events in ancient hiftorians, by means of thefe infallible vouchers. Thus he was enabled to afcertain, in a very great degree, the chronology and progrefs of events of three of the moft important kingdoms of the ancient world, *viz.* thofe of Egypt, of Syria, and of Parthia. Father Hardouin, Noris, and Bayer, have purfued the fame plan; and to them we may add Froelich, Corfini, and Cary. The ftudy of the Roman medals has a fuperior advantage to that of the Greek coins, as they ferve not only to illuftrate the chronology of reigns, but to aid us in the interpretation of particular events. To this purpofe, befides the portrait of the prince, and date of his confulfhip, or of his tribunitian power, we have a reprefentation, or poetical fymbol, of fome grand event on the reverfe. In a word, the feries of Roman coins prefents the very beft fuite of documents of the Roman hiftory, which the art of man could have invented. Befides its fervice to hiftory, the fcience of medals is without doubt of confiderable ufe to geography, to natural hiftory, to the illuftration of ancient writers, to architecture, and to the knowledge of a connoiffeur, or that of ancient monuments, bufts, ftatues, ceremonies, and the like; in all which views its utility is well illuftrated by examples in Pinkerton's valuable work. He has alfo evinced the connection of the ftudy of medals with the fine arts of poetry, painting, fculpture, and architecture. In the firft refpects, he has greatly improved upon Mr. Addifon's "Dialogues on the Ufefulnefs of ancient Medals." On this very interefting fubject, which Mr. Pinkerton has rendered no lefs amufing than inftructive, we cannot forbear making a few extracts. The Roman coins to a man of poetical imagination are very entertaining by means of the fine perfonifications and fymbols, which are to be found on their reverfe. *Happinefs* has fometimes the caduceus or wand of Mercury, which Cicero tells us was thought to procure the gratification of every wifh. In a gold coin of Severus, fhe has heads of poppy, to exprefs that our prime blifs lies in oblivion of misfortune. *Hope* reprefented as a fprightly damfel, walking quickly and looking ftraight forward. With her left hand fhe holds up her garments, that they may not hinder the rapidity of her pace; while, in her right hand, fhe holds forth the bud of a flower, an emblem infinitely more fine than the trite one of an anchor, which is the fymbol of Patience, not of Hope. *Abundance* is imaged as a fedate matron, with a cornucopia in her hands, of which fhe fcatters the fruits over the ground; but does not hold up her cornucopia, and keep its contents to herfelf, as many poets and painters make her do. *Security* ftands leaning on a pillar, indicative of her being free from all defigns and purfuits; and the pofture itfelf correfponds to her name. The emblems of *Piety*, *Modefty*, and the like, are equally appofite and poetical. The happinefs of the ftate is pictured by a fhip, failing before a profperous breeze; an image of which Gray has admirably availed himfelf in his "Bard." The different countries of the then known world are alfo delineated with great poetical imagery. To a Briton, it affords peculiar fatisfaction to fee his native ifland often reprefented upon the earlieft imperial coins, fitting on a globe, with a fymbol of military power, the "labarum," in her hand, and the ocean rolling under her feet. Coins alfo prefent us with countries and rivers, admirably perfonified. On the reverfe of a colonial coin, rude in execution, of Auguftus and Agrippa, infcribed IMP. and DIVI. F., the conqueft of Egypt is reprefented by the appofite metaphor of the crocodile, an animal almoft peculiar to that country, and at that period efteemed altogether fo, which is chained to a palm-tree, at once a native of the country and fymbolic of victory. Moreover, a cabinet of medals, of which Rubens is faid to have had a very fine collection, may be confidered as forming the claffic erudition of a painter. We may add, that almoft all the ufes which connect the fcience of medals with painting, render it alfo fubfervient to the art of the fculptor, who cannot lefs than profit by the ftudy of the Greek coins in particular. The connection of the ftudy of ancient coins with architecture, confifts in the views of many of the ancient edifices, which are found in perfect prefervation on medals. Froelich obferves, that the coins of Tarfus are very remarkable for a kind of perfpective in the figures. On others are found triumphal arches, temples, fountains, aqueducts, amphitheatres, circufes, hippodromes, palaces, bafilicas, columns and obelifks, baths, fea-ports, pharofes, and the like.

MEDALS *and Coins, Rarity of.* The fcarcity of coins, bearing any particular impreffion, muft be principally owing to the few that were ftruck with that impreffion, or their being called in, and iffued from the mint in another form. The firft is the cafe with the copper of Otho, and gold of Pefcennius Niger; the latter with the coinage of Caligula. Sometimes coins, formerly efteemed almoft fingular, will, in later times, become much more common in confequence of the high price at which they are rated, fo that they are brought to market as hoards of them are found. The firft was the cafe with the farthings of queen Anne; fome of which, formerly fold at five guineas, would not now fetch five fhillings; the latter with refpect to the coins of Canute, king of England, which were very rare till a large hoard of them was difcovered in the Orkneys. The coins of Greek cities are efteemed to be more common in copper than in filver; double the number exifting in the firft metal: thofe of Greek princes the reverfe, with a few exceptions, thofe of filver being more numerous. Of the Greek monarchic coins, the tetradrachms of the Syrian kings, the Ptolemies, the princes of Bithynia and Macedon, excepting Alexander the Great and Lyfimachus, are all rare. Thofe of Cappadocian kings are not found, except of fmall fize, and are fcarce. Of the kings of Numidia and Mauritania, Juba, the father, is common, the fon and nephew Ptolemy are fcarce. The kings of Sicily, in large filver, are rare: as are alfo thofe of Parthia. The kings of Judæa are rare; thofe of Arabia and Commagene only occur in brafs, and are fcarce; and likewife the kings of Bofphorus, who appear in electrum, and a few in brafs. The kings of Pontus, and Phileterus, king of Pergamus, are all rare. All didrachms, both of kings and cities, are fcarce, except Corinth and her colonies. The gold coins of Macedon, Alexander the Great, or Lyfimachus, are common: the others very rare. All filver tetradrachms of kings are accounted medallions, and bear a high price. One of the fcarceft of the fmall filver coins of the Greek princes is the didrachm of Alexander the Great. The Grecian monarchic money of copper may, in moft inftances, be confidered as rare.

Of the Roman coins, the confular ones reftored by Trajan are the rareft of their clafs. The gold confular coins are the moft rare, and the filver the moft common; excepting the coin of Brutus, with a cap of liberty between two daggers, EID. MART. which is fcarce, and a few other inftances.

Among the Roman imperial coins, we fhall only mention that

that of Otho in brafs; the fcarcity of which is owing to the fhortnefs and tumult of his reign. The fcarcity of other imperial coins is largely ftated by Mr. Pinkerton in his tables. The Roman coins in lead are all extremely rare. The heptarchic coins of Britain are moftly rare: the money of Alfred, bearing his buft, is rather fcarce; his other coin is very rare. The coins of Hardicanute are very fcarce. Of kings after the conqueft no Englifh coins of John are found, except Irifh only, and of Richard I. only French. In the Scottifh feries Alexander II. is rather fcarce. Coins of John Baliol are rare, and none of Edward Baliol are found. The gold money of Scotland has always been fcarce. See farther on this fubject the Appendix to Pinkerton's Effay on Medals.

In the fale of medals, thofe that are rare are fold feparate, but the common ones are put into large lots, fo that they are feldom bought but by dealers. The gold coins of Greek cities are generally very fmall; and not above a dozen ftates have thofe in gold: of thefe only Carthage, Cyrene, and Syracufe are rather common, and worth but double their intrinfic value. The other gold civic coins are worth from 5*l.* to 30*l.* The only two gold coins of Athens known to exift are in Dr. Hunter's collection, and if they were fold, they might bring the very higheft price a coin can bear. The filver coins of Greek cities are many of them extremely fcarce; the common ones are priced according to their fize, for the largeft are always the rareft. Thofe of Syracufe, Dyrrachium, Maffilia, Athens, and a few other ftates, are common; drachmas, and leffer fizes, might bring 5*s.* each; didrachms and tridrachms from 5*s.* to 10*s.* according to their beauty and prefervation. The tetradrachms, which are always moft valued, may, when belonging to cities whofe coins are common, bring from 7*s.* 6*d.* to 1*l.* 1*s.* Civic coins of filver that are rare are not eafily valued. Ten guineas have been given for one, and competition might triple that value. The common Grecian civic coins in fmall brafs bring from 3*d.* to 1*s.* 6*d.*, according to their prefervation. Others belonging to cities, which have not above two or more coins that are known, and thofe of brafs, bring much higher prices. With refpect to the gold coins of the Greek princes, thofe of no rarity in the coinage of Philip of Macedon, and Alexander the Great, bear but from 5*s.* to 20*s.* above the intrinfic value. But thofe of the other princes are rare, and bring from 3*l.* to 30*l.* a-piece, or more. Of the filver monarchic money, with Grecian legends, the tetradrachms, which are deareft, fell from 5*s.* to 50*s.*, and thofe that are very rare from 3*l.* to 30*l.* The drachmas may bring half thefe prices, and that of other denominations in proportion. The copper coins of the Greek kings are, generally, fcarcer than the filver, and ought to bring a high price. Ancient Roman Afes, with their divifions, bring from 2*s.* to 2*l.*, according to the fingularity of their devices. Confular gold coins are worth from 1*l.* to 5*l.*: the Pompey, with his fons, 21*l.*, and the two Bruti, 25*l.* The filver rate univerfally from 1*s.* to 2*s.* 6*d.*, except that with the cap of liberty and daggers, and a few others, which, if genuine, may bear from 10*s.* to 5*l.* The confular copper, though rarer than the filver, may be put at an equal price. The confular filver coins, reftored by Trajan, bear 1*l.* a-piece. Among the Roman imperial coins, with uncommon reverfes, we may reckon a filver piece of Auguftus, which will fetch from 4*s.* 6*d.* to 1*l.* 11*s.* 6*d.*; that with the legend C. MARIVS TROGVS bears 3*l.* 3*s.* Common gold coins of Trajan are not worth above 1*l.* The medals, with unknown characters, are fcarce and dear. Saxon pennies of the heptarchic princes are generally rare, and worth from 10*s.*, to 10*l.* each, according to fcarcity and prefervation. Thofe of the kings of all England, which are rare, are worth from 10*s.* to 2*l.* 2*s.*; excepting one or two very fcarce ones, fuch as Hardicanute, which would fetch 10*l.* 10*s.* Of Englifh medals, the gold ones of Henry, 1545, and of Edward's coronation, are worth 20*l.* each: the Mary of Trezzo, 3*l.* The deareft of Simon's works are his head of Thurloe, in gold, 12*l.*; his oval medal, in gold, upon Blake's victory at fea, 30*l.*: his trial piece, if brought to fale, would bring a larger fum. Queen Anne's medals in gold, intrinfically worth about 2*l.* 12*s.* 6*d.*, bear about 3*l.* a-piece. The filver, of about the fize of a crown-piece, will bring 10*s.* each; the copper from 5*s.* to 10*s.* The Scottifh coins are on a par with the Englifh, excepting that the gold fell higher. The fhilling of Mary, with the buft, is very rare, and brings 30*s.*; the half, 3*l.*; the ryal, 5*l.* 5*s.* The French teftoon of Francis and Mary brings 10*l.* 10*s.*; the Scottifh one of Mary and Henry would bring 50*l.*; as would alfo the medal of James IV. The coronation medal of Francis and Mary is worth 20*l.* Briot's coronation medal in gold fold only for 2*l.* 2*s.* at Dr. Mead's fale in 1755, but would now bring 20*l.* The Englifh coins ftruck in Ireland, or appropriated to that kingdom, are moftly of the fame price as the other Englifh coins. The St. Patrick's halfpence and farthings are rather fcarce. The gun-money of James II. is quite common. The rare crown of white metal brings about 4*l.* All other Irifh coins are very common. See the Appendix to Pinkerton's Effay.

MEDALS, *Counterfeit*, are forged imitations of ancient coins; the art of doing which is faid to have arifen at the beginning of the 16th century, and has fince prevailed to an aftonifhing degree. Thefe counterfeit medals are diftributed into fix claffes: 1. Medals known to be modern imitations of the ancient; but which being executed by mafters, fuch as the Paduan, &c. have their value. 2. Medals caft from thefe modern mafterly imitations. 3. Medals caft in moulds taken from the antique. 4. Ancient medals which are retouched, and the obverfes or reverfes altered. 5. Medals which are impreffed with new devices, or which are foldered. 6. Counterfeit medals which have clefts, or which are plated. For the method of diftinguifhing thefe counterfeits from the true, in which the poffeffors or purchafers of medals are particularly interefted, we refer to Mr. Pinkerton's Effay, vol. ii. p. 167, &c.

MEDALS, for the manner of ftriking, fee COINAGE.

MEDALS, *Academy of*. See ACADEMY.

MEDALS, *Cabinet of*, may be divided into three diftinct fizes: 1. The large and complete cabinet, containing, or intended to contain, every iffue of the mint, in every age and every country. The late king of France had the moft richly furnifhed cabinet of this kind in exiftence, and which is calculated to have coft near 100,000*l.* fterling. That of the late Dr. Hunter was, perhaps, one of the beft private cabinets ever formed in this ftyle; and coft about 21,000*l.* 2. The fmaller cabinet, the collector of which, confining himfelf to the forming of five or fix fequences, as of middle and fmall Roman brafs only, of Englifh pennies, or of groats, or any other particular feriefes, confiders other medals as out of his line of collecting, though he may purchafe a few defolate ones, or fuch as belong to other fets, in order to give variety to his collection. Such a cabinet may incur an expence of from 200*l.* or 300*l.* to 1000*l.* 3. The leaft cabinet, or cafket of medals, which may include all little collections of coins, from 100 to 1000 or 2000. In this not above one or two fequences can well be formed; but the amateur pleafes his fancy by the mifcellaneous infertion of any article which curiofity or other motives may incline

cline him to procure. In the formation of the large cabinet, it is to be obferved, that in the grand divifion of ancient coins, as diftinct from the modern, the Greek medals, of every denomination, can never be arranged by the metals, or fizes, like the Roman; for no feries of any one metal, or fize, can be found of this clafs in the moft opulent cabinet. On this account the civic coins of all metals and fizes, are digefted in alphabetical order, and the monarchic in chronological. The fame rule is to be obferved in the Roman confular medals, which are arranged in alphabetical feries of the families, like thofe of the Greek cities. The proper divifions of a grand and complete cabinet, comprehending the part allotted to ancient coins, are ftated by Mr. Pinkerton as follows: 1. The coins of cities and free ftates, in alphabetical order; whether ufing Greek, Roman, Punic, Etrufcan, or Spanifh characters. 2. Kings in chronological feries, both as to foundation of empire and feniority of reign. 3. Heroes, heroines, and founders of empires, and of cities. 4. Other illuftrious men and women. 5. Roman *Afes*. 6. Coins of families, commonly called confular. 7. Imperial medallions. 8. Imperial gold. 9. Imperial *minimi*, of all metals. 10. Imperial filver. 11. Imperial firft brafs. 12. Second brafs. 13. Third brafs. 14. Colonial coins, which are all of brafs. 15. Greek cities under the emperors, of all metals and fizes. In a fmaller cabinet they may be put with the Roman, according to their metal and fize. Thofe without the emperor's head go to clafs 1, though ftruck in Roman times. 16. Egyptian coins ftruck under the Roman emperors, of all metals and fizes. They are moftly of a bafe metal, called by the French writers "potin," being a kind of pot-metal, or brittle brafs. 17. "Contorniati," or ticket medals. 18. Coins of Gothic princes, &c. infcribed with Roman characters. 19. Coins of fouthern nations, ufing unufual alphabets; as the Perfian, Punic, Etrufcan, Spanifh. 20. Coins of northern nations, ufing unufual characters; as the Runic and German.

In the modern part no feries can be found of copper that will go back above two centuries; but fequences of gold and of filver may be arranged of all the different empires, kingdoms, and ftates, fo far as their feveral coinages will allow. Thofe of England and France will be the moft perfect. Modern filver is commonly arranged in three fequences; the dollar fize, the groat fize, and the penny fize. The metals of each modern country ought of courfe to be feparated; though it is beft to arrange each fet in chronological order, whatever be their fize or the metal.

The formation of a cabinet of the fecond clafs will admit of obferving the directions for the former, fo far as this is meant to extend. But as it includes only a few complete fequences, either of ancient or mordern coins, fome particular inftructions may be neceffary. If, *e.g.* the collector means to form a feries of the large brafs, he will find the coins of four or five emperors fo fcarce as not to be attainable in that feries, even at any price. He muft, therefore, fupply their places with a middle brafs, as is allowed with regard to Otho even in the beft cabinets, there not being above three coins of that emperor in large brafs known in the world, whereas of the middle brafs two or three hundred may exift. If this be allowed in one inftance, why not in others? Why may not Tiberius or Pertinax appear in the middle brafs as well as Otho? In cabinets of the fecond clafs the collector may mingle the middle with the large brafs as he thinks proper; and in like manner the fmall with the middle. In the fmall fequences there can be no harm in his mixing gold, filver, and brafs, as chance or curiofity may lead him to purchafe any of thefe metals. In like manner, if, in the modern part of the fmaller cabinet, any coin of a feries is of high price, or of bad impreffion, there can be no impropriety in putting another of the fame reign which is cheaper, or better executed, though of a different denomination, and a little larger fize. In fhort, the collector has no rules, but in the Greek cities and Roman families to obferve alphabetical order, and chronology in every thing elfe. The management in a cafket of medals may be conducted by the obfervations already made upon thofe of the two higher defcriptions.

MEDALS, *Caft,* are thofe which are not ftruck, but caft in a mould.

MEDALS, *Contourniated.* See CONTOURNIATED.

MEDALS, *Covered* or *Plated,* are thofe which have only a thin filver leaf over the copper, but which are ftruck fo artfully, that the cheat does not appear without cutting them; thefe are the leaft fufpected.

MEDALS, *Countermarked,* are thofe which have marks cut either on the fide of the head, or of the reverfe. Thefe countermarks ferve to denote the change of their value; and this kind is much inquired for by the curious. See MEDALS, *fupra.*

MEDALS, *Dipt,* are ftruck of pure copper, and afterwards filvered. This is a contrivance that the curious have frequent recourfe to, in order to complete their filver fets.

MEDALS, *Grained* or *Indented,* are thofe whofe edges are cut, or notched like teeth, which is a fign of purity and antiquity. They are common among the confulars, but we have none later than Auguftus. There are feveral of them, however, among thofe of the kings of Syria.

MEDALS, *Impreffions* or *Cafts of.* A very eafy and elegant way of taking impreffions or cafts of medals and coins is this: melt a little ifinglafs glue, made with brandy, and pour it thinly over the medal, fo as to cover its whole furface; let it remain on for a day or two, till it is thoroughly dry and hardened, and then taking it off, it will be fine, clear, and hard as a piece of Mufcovy glafs, and will have a very elegant impreffion of the coin. In order to render the relief of the medal more apparent, a fmall quantity of carmine may be mixed with the melted ifinglafs; or the medal may be previoufly coated with leaf-gold by breathing on it, and then laying it on the leaf, which will by that means adhere to it; but the ufe of leaf-gold is apt to impair a little the fharpnefs of the impreffion. Impreffions of medals may be likewife taken in putty of the true kind, made of calx of tin and drying oil. Thefe may be formed in the moulds, previoufly taken in plaifter or fulphur; or moulds may be made in its own fubftance, like thofe of plaifter. Thefe impreffions will be very fharp and hard; but the greateft difadvantage attending them is their drying very flowly, and being liable in the mean time to be damaged.

Sulphur is fometimes ufed to take off impreffions of medals, coins, &c. The method is this: having made a ledge of clay about the work whofe impreffion is defired, and carefully oiled the whole, gently pour brimftone melted in a covered veffel, to prevent its firing, upon the metal. About the edge of this mould make a border of clay, as before, and lightly oil the internal furface of both; then gradually put into it, to the thicknefs of about a quarter of an inch, a mixture made up with calcined alabafter and water, to the confiftence of ftiff honey. This foon growing hard, may be taken out of the mould, and gives figures of the coin or medal. Boyle's Works, abr. vol. i. p. 151. A method fomewhat different is defcribed under the article BRIMSTONE.

The brittlenefs of fulphur is a great objection to this method, and the plaifter of Paris, which is often ufed for

taking

taking impressions, is too soft: however, a coat or layer of thin metal, formed over the plaister, would be a considerable defence. This is the cheapest and most convenient metal for this purpose: let thin tin-foil, such as is used for silvering looking-glasses, be laid over the medal or coin intended to be taken off, and then rubbed either with a brush, the point of a skewer, or a pin, till it has received perfectly the impression of the medal; then pare off the tin-foil round the edge of the medal, till it is brought to the same circumference; afterwards the medal must be reversed, and the tin-foil will drop off into a chip-box, or mould ready to receive it; the concave side of the foil, or that which is laid on the face of the medal, being uppermost; upon this pour plaister of Paris, made in the usual manner, and when dry the cast figure may be taken out of the box or mould, with the tin-foil sticking on the plaister, the convex side being now uppermost, in which position it is to be kept in the cabinet after it becomes dry. To have an impression very perfect, the thinnest tin-foil should be made use of. The impressions taken in this manner almost equal silver medals in beauty, and are very durable. If the box or mould be rather larger than the impression of tin-foil, the plaister, when poured on, runs round its edges, and forms a kind of white frame, or circular border round the foil, whence the new made medal appears more neat and beautiful. If this tin-foil is gilt with gold-leaf, by means of thin isinglass glue, the medal will resemble gold.

Casts of medals may be made likewise with iron, prepared in the following manner: Take any iron bar or piece of a similar form; and having heated it red-hot, hold it over a vessel containing water, touch it very slightly with a roll of sulphur, which will immediately dissolve it, and make it fall in drops into the water. When a sufficient quantity of iron is thus dissolved, pour the water out of the vessel, and pick out the drops formed by the melted iron from those of the sulphur which contain little or no iron, and will be distinguishable from the others by their colour and weight. The iron will, by these means, be rendered so fusible, that it will run with less heat than is required to melt lead; and may be employed for making casts of medals, and many other such purposes, with great convenience and advantage.

We have an easy method of procuring the true impression or figure of medals and coins, by Mr. Barker in the Philos. Trans. N° 472. sect. 13. vol. xliii. p. 77.

Take a perfect and sharp impression on the finest black sealing-wax, of the coin or medal you desire. Cut away the wax round the edges of the impression; then with a preparation of gum-water, of the colour you would have the picture, spread the paint upon the wax impression with a small hair-pencil, observing to work it into all the sinking or hollow places, these being the rising parts of the medal; and the colouring must be carefully taken from the other parts with a wet finger. Then take a piece of very thin post-paper, a little larger than the medal, and moisten it quite through. Place it on the wax impression, and on the back of the paper lay three or four pieces of thick woollen cloth or flannel of about the same size. The impression, with its coverings, should be placed between two smooth iron plates, about two inches square, and one-tenth of an inch thick.

These must be carefully put into a small press, made of two plates of iron, about five inches and a half long, one inch and a half wide, and half an inch in thickness, having a couple of long male screws running through them, with a turning female screw on each, to force the plates together. These being brought evenly together by means of the screws, will take off a true and fair picture of the medal; which, if any deficiencies should appear, may easily be repaired with a hair-pencil or pen, dipped in the colour made use of.

If a relievo only be desired, nothing is necessary but to take a piece of card, or white paste-board, well soaked in water, then placing it on the wax-mould, without any colouring, and let it remain in the press for a few minutes, a good figure will be obtained.

This method of taking off medals, &c. is convenient, and seems much more so than the several inventions usually practised in sulphur, plaister of Paris, paper, &c. wherein a mould must be formed, either of clay, horn, plaister, or other materials, which requires time and trouble.

Some take impressions on paper from the medals themselves, by passing them through the rolling-press, and colouring them afterwards; but this is not only more difficult, but does great injury to the medals, by impairing the sharpness of their most delicate and expressive strokes: whereas wax does not hurt the finest medal in the least degree; and though a brittle substance, yet it effectually resists the force of a downright pressure.

Red seems the best colouring, and therefore black wax is directed to be used; but if the pictures are chosen in black and white, to resemble copper-plates, the wax should be red; for the wax and paint ought to be of different colours, in order to distinguish when the colour is laid on properly, or rightly cleared away.

The substance of medals, being metalline, is liable to be corroded; and the figures being raised, are also liable to be effaced by friction. Hence it is rare to find any perfectly preserved. Gems are not subject to these inconveniencies. See GEM.

MEDALS, *Mutilated*, are those that are not entire, or are much defaced.

MEDALS, *Redintegrated*, are those wherein we find the letters rest, which shew that they have been restored by the emperors.

MEDAL, *Repairing a*. See REPAIRING.

MEDALS, *Restitution of*. See RESTITUTION.

MEDALS, *Votive*. See VOTIVE.

MEDALS *without Reverse*. See REVERSE.

MEDALETS, a name given by Mr. Pinkerton to those small coins or missilia, scattered among the people on solemn occasions, those struck for the slaves in the Saturnalia, private counters for gaming, tickets for baths and feasts, tokens in copper and lead, and the like. Baudelot, in his curious and entertaining work, "L'Utilite des Voyages," has produced many singular specimens of medalets; for some of which see Pinkerton's Essay on Medals, vol. i. p. 227, &c.

MEDALLION, or MEDALION, a medal of extraordinary size.

The word is formed from the French *medaillon*, or Italian *medaglion*, which signify the same, or a large medal; and which were originally formed from *metalliones*, a name by which these pieces are frequently called in ancient Latin writers.

Medallions were never any current coins, as some medals probably were: they were struck purely to serve as public monuments, or to be presented by the emperor to his friends, and by the mint-makers to the emperor, as specimens of fine workmanship.

They were struck upon the commencement of the reign of a new emperor, and other solemn occasions; and frequently, the Greek medallions in particular, as monuments of gratitude, or of flattery. Sometimes they were trial or pattern-pieces, "testimonia probatæ monetæ;" and such abound after the reign of Maximian, with the "Tres Monetæ"

netæ" on the reverse. It is observed, that all Roman pieces in gold, exceeding the denarius aureus; all in silver, superior to the denarius; and all in brass, superior to the sestertius, or what the medallists term large brass, are comprehended under the description of medallions. Mr. Pinkerton, however, thinks that the gold medallions, weighing two, three, or four aurei only, passed in currency as the Greek gold didrachms, tridrachms, or tetradrachms, according to their size. The like may be said of the silver, which are commonly of the value of a Greek tetradrachm, which went in currency for four denarii. But it is not of much moment whether any of the pieces called medallions passed as coin with the ancients; it is sufficient to know what kind of coins passed under that denomination. The brass medallions, which are the largest, are commonly of the most exquisite workmanship, and uncommon device. Many of them are composed of two sorts of metal, the centre being copper, with a ring of brass around it, or the contrary. The inscription of such sometimes bites upon both metals, and at other times runs upon one. Medallions of this kind are inimitable, and of undoubted antiquity. Medallions from the time of Julius to that of Hadrian are very uncommon, and of very high price; from Hadrian to the close of the western empire they are, generally speaking, less rare. The types of the Roman medallions are often repeated upon common coin: hence they appear of less importance than the Greek, impressions of which are frequently most uncommon, and no where else to be found. A remarkable distinction between the Greek and Roman medallions lies in their different thickness; the Roman being often three or four lines thick, while the others seldom exceed one. By the Greek medallions we mean those struck in the imperial periods; for few Greek medallions are found prior to the emperors of Rome. Of Greek medallions, preceding the Roman empire, few are known. Some occur of Rhodes; and there is a fine one struck at Syracuse, upon the defeat of Icetas by Timoleon. The medallion is of silver, with the head of Ceres upon one side, and upon the other a female figure, perhaps representing Sicily or Syracuse, in a car, a victory crowning her, and spoils in the exergue. Its workmanship is fine, but not eqnal to the gold coin of the same Icetas, struck at Syracuse, ΕΠΙ ΙΚΕΤΑ, under Icetas, which is a perfect gem, surpassing all description. Syracuse also affords a most remarkable medallion on another great occasion. The only one perhaps existing formerly belonged to Dr. Combe, and was engraven by his order. It is exquisitely wrought, in high relief, and perfect preservation; of copper, and about two inches in diameter. Upon one side is a female head, covered with a helmet, on which is a caduceus, and ROMA. Upon the other is a man's head, with a helmet wreathed with laurel, and M. M. Dr. Combe thinks this fine piece, now in Dr. Hunter's cabinet, was struck by Syracuse, in honour of Marcus Claudius Marcellus, who besieged and took that city, 210 years B.C. This medallion is most remarkable for its being unique; for its beauty, for its preservation, and for the portrait of this great man. These are perhaps the only Greek medallions prior to the Roman empire. Many Roman medallions have S. C., as being struck by order of the senate; others have not, as being by order of the emperor. Of Augustus a noble medallion was found in Herculaneum, and Khell published a dissertation upon it. There are medallions of Augustus and Tiberius, struck in Spain; and one of Livia, at Patræ in Achaia: one in brass of Antony and Cleopatra; reverse, two figures in a car, drawn by sea-horses. Of Tiberius there are many, and also of Claudius. There are also some of Agrippina, Nero, Galba, Vespasian, and Domitian. Those of Trajan and Hadrian have generally a very broad rim, beyond the legend, with indented circles; and of Hadrian, Baldini gives no less than 47. There are fine medallions of Commodus, and his famous mistress Marcia; their heads are joined, and she wears a helmet. One of Pertinax bears, for reverse, that emperor sacrificing, with VOTIS DECENNALIBUS. There are many of Severus, Gordian III., and Philip; afterwards they are numerous of Gallus, Valerian, Gallienus, Aurelian, Probus, Diocletian, Maximian I., Constantius I., Constantinus I. and II., Constans, and Constantius II. Of other emperors they are scarcer. In Dr. Hunter's cabinet, among many others, there is one of Otacilia. The Greek medallions of Roman emperors are far more numerous than the Roman. All medallions, one or two instances excepted, are very rare, and of princely purchase. Even in the richest cabinets, 20 or 30 medallions are esteemed of great weight. In the 17th century, however, queen Christina was so fortunate as to procure about 300; and the king of France's cabinet was possessed of about 1200 medallions. Dr. Hunter's cabinet contains about 400, exclusive of Egyptian. There are also Latin medallions, of a size between first and second brass, or larger than our half-crown, easily distinguishable by their thickness, and uncommon neatness and manner. These are, by Italian medallists, called "Medaglioncini," or little medallions. In Dr. Hunter's collection is a fine one of Alexander Severus and Julia Mammæa, face to face; reverse their figures, with FELICITAS TEMPORVM. Pinkerton's Essay on Medals, vol. i.

MEDALLION, in *Architecture*, is any circular tablet on which are imbossed figures or bustos.

MEDAMA, in *Geography*, a town of the island of Ceylon; 16 miles N. of Candi.

MEDAMPE, a town of the island of Ceylon; 36 miles N. of Columbo.

MEDANIPEK, a town of Servia, on the river Ipek; 22 miles S.W. of Orsova.

MEDARD, ST., a town of France, in the department of the Lot; 8 miles N.W. of Cahors.

MEDAUAR, a town of Arabia, in the province of Yemen; 28 miles N.W. of Dsjebi.

MEDAUSO, a town of Africa, in the country of Bergoo; 150 miles S.W. of Wara.

MEDE, JOSEPH, in *Biography*, a learned divine, was born in 1586, at Berden in Essex, and in 1602 entered of Christ's college, Cambridge, where he studied with intense application, was chosen fellow, and proceeded to his degree of bachelor in divinity. He refused several preferments, particularly the provostship of Trinity college, Dublin, which was repeatedly offered him by archbishop Usher. He died in 1638. His works have been collected into one volume folio. The principal is his Commentary on the Apocalypse; in explaining which, his plan has been followed by bishop Newton, and a number of other great divines. Biog. Brit.

MEDEA, in *Geography*, a town of Algiers, in the province of Titterie, surrounded with mud walls, anciently "Lamida;" 32 miles S.W. of Algiers. N. lat. 26° 5'. E. long. 2° 50'.

MEDEA, *El*, *Mehdia*, or *Mehedia*, a town of Africa, in the kingdom of Tunis, on a peninsula, on the east coast, formerly a place of great strength and importance. The port, which was an area of nearly 100 yards square, lies within the walls of the city, with its mouth opening towards Cap-oudia; but at present not capable of receiving the smallest vessel; 80 miles S. of Tunis. N. lat. 35° 20'. E. long. 11°.

MEDEBACH,

MEDEBACH, a town of Westphalia; 32 miles W. of Cassel. N. lat. 51° 10′. E. long. 8° 48′.

MEDELLIN, a town of Spain, in Estramadura, on the Guadiana, being the native place of Fernando Cortez. It is an ancient town, having been founded by Q. C. Metellus, the Roman consul, and called by him "Metellinum;" 13 miles S.E. of Merida. N. lat. 38° 43′. W. long. 5° 47′.—Also, a town of Mexico, in the province of Tlascala, 25 miles S. of Vera Cruz, on a river of the same name, which runs into the gulf of Mexico, N. lat. 19°.

MEDELPAD, a province of Sweden, in the division called Nordland, bounded on the north-east by Angermanland, on the east by the gulf of Bothnia, on the south-west by Helsingland, and on the north-west by Jamtland, or north by the river Indal, and south by the Niurunda; from 13 to 20 leagues from north to south, and upwards of 30 from west to east. This province, though mountainous and woody, contains several vallies of meadow and arable land, interspersed with rivers and lakes, which yield abundance of fish. The grain, which is sown here about Whitsuntide, produces corn that ripens in ten weeks; and it is sufficient to supply the inhabitants. The forests abound with game of all sorts, elks, rein-deers, beavers, martins, weasels, lynxes, foxes, and wild fowl. The inhabitants have plenty of cattle, and traffic in timber, hops, flax, hemp, butter, fruits, and dried fish. The only sea-port is Sundswall, which is a mean though trading town, situated in a dry and sandy tract, near the bottom of a bay, with a convenient port. This province lies in N. lat. 62° 30′.

MEDELSHEIM, a town of France, in the department of Mont-Tonnerre, and chief place of a canton, in the district of Deux-Ponts. The place contains 338, and the canton 4521 inhabitants, in 15 communes.

MEDEM, a town of Arabia, in the province of Yemen, and the Imam's dominions: it is the capital of Hamdan, and the residence of a schiech; 10 miles N.N.W. of Sana.

MEDEMBLICK, a sea-port town of Holland, at the entrance into the Zuyder see, small though ancient, and, before Enckhuysen and Hoorn were built, the capital of North Holland. The inhabitants trade chiefly in timber, which they bring from Norway, and other northern parts of Europe. Its vicinity abounds with rich pastures. As the land is here lower than the waters, it requires very strong dykes and dams to defend it from the fury of the waves; 26 miles N. of Amsterdam. N. lat. 52° 29′. E. long. 4° 58′.

MEDEN, a river of the Isle of Wight, which runs into the sea between East and West Cowes, but is navigable for small vessels to Newport.—Also, a river, which rises from a lake in the duchy of Bremen, and discharges itself into the Elbe, two miles below Otterndorf, N. lat. 53° 55′. E. long. 8° 44′.

MEDENA, in *Surgery*, a name given by Paracelsus to a particular class of ulcers.

MEDENAM, in *Geography*, a town of Prussia, in the province of Samland; 12 miles N.W. of Konigsberg.

MEDEOLA, in *Botany*, is the Linnæan name of this genus, thought by Professor Martyn to be "a diminutive of *Medea*, the famous sorceress of antiquity." Linn. Gen. 179. Schreb. 240. Willd. Sp. Pl. v. 2. 270. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 327. Michaux. Boreal-Amer. v. 1. 214. Juss. 42. Lamarck Illustr. t. 266.—Class and order, *Hexandria Trigynia*. Nat. Ord. *Sarmentaceæ*, Linn. *Asparagi*, Juss.

Gen. Ch. *Cal.* Perianth none. *Cor.* inferior, deeply cloven into six, ovate-oblong, equal, spreading, revolute segments. *Stam.* Filaments six, awl-shaped, the length of the corolla; anthers incumbent. *Pist.* Germens three, corniculate, ending in the styles; stigmas recurved, thickish. *Peric.* Berry roundish, trifid, three-celled. *Seeds* solitary, heart-shaped.

Eff. Ch. Calyx none. Corolla deeply six-cleft, revolute. Berry three-seeded.

Obs. Linnæus remarks that *M. virginiana*, which he received from the celebrated Gronovius, had four petals; and Jussieu further says, that the same species having verticillate leaves, and the habit of *Trillium* or *Paris*, is very nearly akin to those genera. *Jacquinia ruscifolia* was originally considered by Linnæus as a *Medeola*.

1. M. *virginiana*. Virginian Medeola, or Indian Cucumber. Linn. Sp. Pl. 483. Sims in Bot. Mag. t. 1316.—Leaves verticillate.—A native of Virginia, flowering in June. Michaux says that it is common in moist woods throughout the whole of North America. *Root* tuberous and fibrous. *Stem* scarcely a foot high, simple, erect or somewhat scandent, about the thickness of a quill, covered with a reflexed, hairy down. *Leaves* whorled, from six to eight in the upper and three in the lower whorl, ovate, pointed. *Flowers* on pendent stalks, greenish-yellow, with purple filaments, without smell. Its root, which is eaten by the Indians, is said to resemble the Cucumber in flavour, and hence the English name.

2. M. *asparagoides*. Broad-leaved shrubby Medeola. Linn. Sp. Pl. 484. (Asparagus africanus scandens, myrti folio; Til. Pis. t. 12. f. 1.)—Leaves alternate, ovate, unequally heart-shaped at the base.—A native of the Cape of Good Hope. It flowers during the greater part of the winter, and was cultivated in 1702 by the duchess of Beaufort. *Root* composed of several oblong knobs, uniting at the top like that of a *Ranunculus*. *Stems* round, twining, branched, several feet long. *Leaves* sessile, acutely pointed, light-green beneath, but dark above. *Flowers* one or two on a stalk, dull white. Michaux is of opinion that *M. asparagoides* should be referred to another genus, and Mr. Gawler says, in the Botanical Magazine, that the following, *M. angustifolia*, together with this, should be excluded from *Medeola*.

3. M. *angustifolia*. Narrow-leaved Medeola. Willd. n. 3. (Asparagus africanus scandens, myrti folio angustiore; Til. Pis. t. 12. f. 2.)—Leaves alternate, lanceolate.—A native also of the Cape, flowering in the early spring. *Root* similar to the preceding. *Stalks* weaker, not so much branched, but climbing higher. *Leaves* long and narrow, of a greyish colour. *Flowers* lateral, two or three on a stalk, of an herbaceous white appearance.

Professor Martyn observes that "the flowers of these two latter species making no great appearance, the plants are not preserved for their beauty; but as their stalks are climbing, and their leaves are in full vigour in winter, during that season they add to the variety of the green-house."

Medeola, in *Gardening*, comprises plants of the herbaceous climbing kind, of which the species cultivated are the Virginian medeola (M. virginiana); the broad-leaved shrubby medeola (M. asparagoides); and the narrow-leaved medeola (M. angustifolia).

Method of Culture.—These sorts of plants may be increased by planting off-sets, taken from the roots in the summer season, about July, in pots filled with good, rich, light mould, remaining in the open air till autumn, when they should be removed into the green or hot-house; but the latter, when intended to fruit. While the plants have a vigorous growth, they should be frequently refreshed with water; but, as the stems decay, very little, especially when placed in an eastern aspect.

The

The fecond and third forts may alfo be raifed from feed; but they commonly remain long in the earth before they come up.

The firft fort is fufficiently hardy to ftand in the open air during the winter feafon.

They all afford variety in green-houfe and ftove collections, in the winter feafon, among other plants.

MEDERA, or MEDRA, in *Geography*, a town of Africa, in the kingdom of Bournou.

MEDES, *Empire of.* See EMPIRE and MEDIA.

MEDFIELD, in *Geography*, a townfhip in Norfolk county, Maffachufetts; 20 miles S.W. of Bofton; incorporated in 1650, and containing 745 inhabitants.

MEDFORD, a pleafant, thriving, compact town in Middlefex county, Maffachufetts, fituated on Myftick river, three miles from its mouth, and four miles N. of Bofton. The river is navigable for fmall veffels to this place, where it meets the Middlefex canal. The townfhip was incorporated in 1630, and contains 1114 induftrious inhabitants. Here are four diftilleries, which have diftilled in one year 252,450 gallons of rum. About four millions of bricks are made annually in this town, moft of which are conveyed to Bofton.

MEDHERAM, a town of Africa, in the kingdom of Fezzan; 330 miles S.S.E. of Mourzouk.

MEDHERAM *Iza*, a town of Africa, in the defert of Berdoa. N. lat. 24° 35'. E. long. 16° 24'.

MEDHRA, among Hindoo metaphyficians and mythologifts, is a name of the *Yoni;* which fee.

MEDIA, or, as it was fometimes called, *Medena*, in *Ancient Geography*, an extenfive country of Afia, and the feat of a powerful empire, bounded, according to Ptolemy, on the north by part of the Cafpian and Hyrcanian fea, on the fouth by Perfia, Sufiana, and Affyria, on the eaft by Parthia and Hyrcania, and on the weft by Armenia Major. In ancient times it was divided into feveral provinces, which by a later arrangement were reduced to two, the one called "Media Magna," and the other "Media Atropatra," or fimply *Atropatene;* which fee. The cities of note in this latter part of Media were Gaza, the metropolis (which fee); Sanina, fituated between the Araxes and the Cambyfes; Fazina, between the Cambyfes and the Cyrus; and Cyropolis, between the Cyrus and the Amardus. This tract was inhabited by the Cadufians and Cafpians, a barbarous and inhuman race, originally fprung from the Scythians.

Media Magna was bounded by Perfis, Parthia, Hyrcania, the Hyrcanian fea, and Atropatene. The moft remarkable cities in it were Ecbatana, Laodicea, Apamea, Rega or Regaia, and Arfacia. This part of Media was inhabited by the Carduchians, Marandæans, Gelians, Syro-Medians, Margafians, &c. The mountains of this country, according to Ptolemy and Strabo, are Choatra, parting Media from Affyria; Xagrus, dividing it from the fame Affyria on the eaft, which, according to Polybius, was 100 cubits high; Parachoatra, placed by Ptolemy on the borders towards Perfia, and by Strabo on the confines of Media, Hyrcania, and Parthia. To thefe, which are the boundaries between Media and the adjacent provinces, may be added the Orontes, the Jafonius, and the Coronus, in the interior of the country. The rivers of note, according to Ptolemy, are the Straton, the Amardus, the Cyrus, and the Cambyfes; properly belonging to the provinces of Ghilan and Mazanderan, and not to Media Proper, as defcribed by the ancients. The northern parts of Media, lying between the Cafpian mountains and the fea, are very cold and barren: the prefent inhabitants make their bread of dried almonds, and their drink of the juice of certain herbs. The fnow lies on the mountains for nine months in the year. But the fouthern parts produce all forts of grain, and neceffaries of life, and are fo pleafant, that the country adjoining to Tauris, probably the ancient Ecbatana, is called the garden of Perfia. It has large plains, one of which was called Nyfa, and was famous for its numerous ftuds of horfes, that were kept in it for the ufe of the Perfian monarchs. The climate of Media is various: that part which lies between the mountains and fea is cold and fwampy, and fubject to vapours exhaling from the Cafpian fea; but the provinces that are more remote from the fea, enjoy a very falubrious air, though liable to heavy rains and violent ftorms, efpecially in the fpring and autumn. In the neighbourhood of Tauris, it is faid that 60 different kinds of grapes, of exquifite flavour, have been found.

The Medes are faid to have fprung from Madai, the third fon of Japhet; and in procefs of time feveral perfons from the adjacent countries fettled here, on account of the fertility of the foil, and gave rife to the various tribes into which thefe people were anciently divided. Their government was originally monarchical, and they feem to have had their own kings in the earlieft times. They were firft brought under the Affyrian yoke by Pul, faid to be the founder of that monarchy, or by his immediate fucceffor Tiglath-Pilefer. In the reign of Sennacherib they fhook off this yoke, and fell into anarchy until the reign of Dejoces. Their kings after the revolt were quite abfolute, and controuled by no law. The Medes were once a very warlike people, but in procefs of time became one of the moft effeminate nations of Afia. They ufed the fame armour with the Perfians, whom, it is faid, they inftructed in the art of war; and it is likewife afferted, that they firft introduced luxury into Perfia, which ultimately occafioned the downfal of that empire. Polygamy was fo far from being difreputable among them, that they were bound by law to maintain, at leaft, feven wives, and thofe women were regarded with contempt, who maintained fewer than five hufbands. In war they fmeared their arrows with a bituminous liquor called naphta; fo that when the arrows were fet on fire and fhot from a flack bow, they burnt the flefh with fuch violence that water ferved to increafe rather than to extinguifh the flame. They are faid likewife to have bred a number of large dogs, to whom they threw the bodies of their friends, parents, and relations, when at the point of death, confidering it as difhonourable to die in their beds, or be laid in the ground. Some writers charge the Medes with being the firft who made eunuchs; but others impute this execrable practice to the Perfians. With the Medes originate the cuftom of confirming alliances with the blood of the contracting parties, which afterwards prevailed among all the eaftern nations, even in the Roman times. When they concluded alliances, they tied together, with a hard bandage, the thumbs of their right hands, until the blood ftarting to the extremities was, by a flight cut, difcharged. This they mutually fucked, and a league thus confirmed was efteemed moft awful, as myfterioufly folemnized with the blood of the parties. The laws and religion of the Medes were much the fame with thofe of the Perfians. (See PERSIA.) When a law was once enacted, it was not in the king's power to repeal it, or to reverfe a decree he had once made; whence the laws of the Medes are, in the facred writings (Dan. vi. 8.) called unchangeable. Their kings were treated with great refpect; and whenever they appeared in public, they were attended by mufic, and numerous guards, confifting of the prime nobility; their wives, children, and concubines, forming part of their retinue, even when they headed their armies in the field. We are ignorant of their arts, learning, and trade; but this is known, that during

during the ſhort period of their monarchy, they ſeem to have applied their thoughts only to warlike exerciſes, *viz.* to horſemanſhip and archery, in which they ſurpaſſed all other nations; the Median horſe being no leſs celebrated by the ancients than the Perſian infantry in ſubſequent ages.

In detailing their hiſtory, we begin with Pul, or Tiglath-Pileſer, already mentioned, who firſt brought them under ſubjection. From the time of Pul, or Tiglath-Pileſer, who ſucceeded his father in the year 740 B.C, they remained ſubject to the Aſſyrians till about the latter end of the reign of Sennacherib, 710 B.C., when, emancipating themſelves from Aſſyrian bondage, they fell into a ſtate of anarchy. This circumſtance, as Herodotus informs us, gave Eſar-Haddon, or Aſſar-Hadon, who ſucceeded Sennacherib, an opportunity of reducing a great part of Media, if not the whole country, under ſubjection. This anarchy is ſuppoſed to have laſted one year; for Dejoces, called Arphaxad in the book of Judith, was killed by Saooduchius or Nebuchadonoſor, in the year 656. From the commencement of the reign of Dejoces to the deſtruction of Nineveh, 601 B.C., Media may properly be ſtyled a kingdom. From the deſtruction of Nineveh, we may therefore date the riſe of the empire of the Medes. (See EMPIRE.) Their empire laſted till the taking of Babylon; for we learn from Xenophon, that after the reduction of that city, Cyrus went to the king of the Medes at Ecbatana, and ſucceeded him in the kingdom. The empire of the Medes laſted 65 years, at the period in which the Perſian empire took riſe in Cyrus. Paſſing over the fabulous hiſtory of the Medes, we ſhall begin with the reign of Dejoces, who was choſen by them as their judge, and who, aſpiring to the ſovereign power, performed that office with the ſtricteſt regard to juſtice. Upon his reſignation of this office, licentiouſneſs prevailed, and it was found neceſſary to appoint a king; upon which Dejoces was named to the ſovereignty, and with univerſal applauſe placed upon the throne 710 B.C. As ſoon as he was elected king, and veſted with the ſupreme power, he threw off the maſk, and became a tyrant. Ecbatana was built and choſen for the royal reſidence, and a ſtately palace was erected for the ſovereign. Dejoces, having enacted various laws for the government of the kingdom, and having, in a conſiderable degree, civilized his unpoliſhed ſubjects, entertained thoughts of extending the limits of his new kingdom, and with this view he invaded Aſſyria. Nebuchadonoſor, however, at that time king of Aſſyria, met him in the plain of Ragau, and a battle enſued, in which the Medes were utterly defeated, and Dejoces was ſlain, after a reign, according to Herodotus, of 53 years. The Aſſyrian king, availing himſelf of his ſucceſs, reduced ſeveral cities of Media, and among the reſt Ecbatana, which he almoſt utterly deſtroyed. Dejoces was ſucceeded by his ſon Phraortes, 647 B.C., and, not ſatisfied with the kingdom of Media, he invaded Perſia, and is ſaid to have brought that nation under ſubjection to the Medes. Such is the account of Herodotus; but others aſcribe the conqueſt of Perſia, not to Phraortes, but to his ſon and ſucceſſor Cyaxares. Phraortes, however, ſubdued ſeveral neighbouring nations, and made himſelf maſter of almoſt all the Upper Aſia, lying between mount Taurus and the river Halys. Emboldened by his ſucceſs, he invaded Aſſyria, ſubdued a great part of the country, and even laid ſiege to Nineveh, the metropolis. Here he periſhed, with the greater part of his army, after having reigned 22 years. Upon the death of Phraortes, his ſon, Cyaxares I., a brave and enterpriſing prince, ſucceeded him, 625 B.C. Having well diſciplined his troops, and recovered the territories which the Aſſyrians had taken during the reigns of his father and grandfather, he marched againſt Nineveh, but after having laid cloſe ſiege to the city, he was obliged to retreat, and to employ his troops in the defence of his own kingdom, againſt a formidable army of Scythians, who, having driven the Cimmerians out of Europe, purſued their flying enemies, and were ready to enter Media. The two armies engaged, and the Medes were utterly routed. The conquerors overran, not only all Media, but the greater part of Upper Aſia, extending their conqueſts into Syria, as far as the confines of Egypt. Cyaxares, deſpairing of being able to overpower the Scythians by force, had recourſe to ſtratagem; and invited them to a general feaſt, which was prepared in every family. Each hoſt intoxicated his gueſt; and in that condition the Scythians were maſſacred, and the kingdom delivered from a long and cruel bondage. The Medes were afterwards engaged with the Lydians; and during the engagement there happened a total eclipſe of the ſun, ſaid to have been foretold by Thales the Mileſian. Both parties were terrified, and ſoon after concluded a peace by the mediation of Labynetus, that is Nebuchadnezzar, king of Babylon, and Syenneſis, king of Cilicia. This peace was confirmed by the marriage of Aryenis, the daughter of Halyattes, and Aſtyages, the eldeſt ſon of Cyaxares; and of this marriage was born in the enſuing year Cyaxares, who, in the book of Daniel (ch. v. 31.) is called Darius the Mede. Cyaxares, diſengaged from the Lydian war, reſumed the ſiege of Nineveh; and having formed a ſtrict alliance with Nebuchadnezzar, king of Babylon, they joined their forces, and took and deſtroyed the city. (606 B.C.) With this proſperous event commenced the great ſucceſſes of Nebuchadnezzar and Cyaxares; and thus was laid the foundation of the two collateral empires, as they may be called, of the Medes and Babylonians, which roſe on the ruins of the Aſſyrian monarchy. After the reduction of Nineveh, the two conquerors led the confederate army againſt Pharaoh-Necho, king of Egypt, who was defeated near the Euphrates, and compelled to reſign what he had formerly taken from the Aſſyrians. After this victory they reduced all Cœleſyria and Phœnice; then they invaded, and laid waſte Samaria, Galilee, and Scythopolis; and at laſt beſieged Jeruſalem, and took Jehoiakim priſoner. Nebuchadnezzar afterwards purſued his conqueſts in the weſt, and Cyaxares ſubdued the Aſſyrian provinces of Armenia, Pontus, and Cappadocia. Again uniting their forces, they reduced Perſia and Suriana, and accompliſhed the conqueſt of the Aſſyrian empire. The prophet Ezekiel (ch. xxxii. 22. &c.) enumerates the chief nations that were ſubdued and ſlaughtered by the two conquerors Cyaxares and Nebuchadnezzar.

Cyaxares, having thus erected the kingdom of Media into a powerful empire, and ſhared the new acquiſitions with his Babylonian ally, died in the 40th year of his reign, and was ſucceeded by his ſon Aſtyages, called in ſcripture Ahaſuerus. This prince had by Aryenis, already-mentioned, Cyaxares II., called in ſcripture Darius the Mede, who was 62 years of age when Belſhazzar was ſlain at the capture of Babylon. In the year when Cyaxares was born, Aſtyages gave his daughter Mandane, whom he had by a former wife, to Cambyſes, a Perſian; from which marriage ſprung Cyrus, the founder of the Perſian monarchy, and the reſtorer of the Jews to their country, their temple, and their former condition. (See CYRUS.) Aſtyages, after a reign of 35 years, was ſucceeded by his ſon Cyaxares, uncle to Cyrus, 560 B.C. Whilſt Cyaxares lived, Cyrus held the empire only in partnerſhip with him, though he had entirely acquired it by his own valour; but as Cyrus was entruſted with the command of the army, and the whole management of affairs, he alone was regarded as the ſupreme governor of the empire. From

Joſephus

Josephus we learn, that Cyaxares, or Darius the Mede, with his ally, Cyrus, destroyed the kingdom of Babylon. After the reduction of Babylon, Cyaxares, in concert with Cyrus, settled the affairs of their new empire, and divided it into 120 provinces. The governors of these provinces were under the direction of three presidents, of whom Daniel was appointed the chief. (See DANIEL.) From this time Media became a province of Persia. See EMPIRE and PERSIA.

MEDIANA, in *Anatomy*, median, a name given to certain veins of the upper extremity. These are the median veins of the fore-arm, occupying the middle of the limb, between the radius and the ulna. These divide at the elbow into two chief trunks, of which one joins the basilic, and the other the cephalic vein of the arm: they are named respectively, vena mediana basilica, and v. m. cephalica. See VEIN.

MEDIANA, in *Geography*, a town of Spain, in Arragon; 12 miles S.E. of Saragossa.

MEDIANÆ, *Columnæ*, in Vitruvius, are the columns in the middle of a portico, whose intercolumniation is to be larger than those of the columns.

MEDIANTE, *Fr.*, in *Music*, is the string or sound which divides the fifth of a key into two thirds, the one major, and the other minor; and it is their relative position which determines the key. When the major third is the lowest, that is to say, between the mediante and key note, the key is major, or with a sharp third; when the major third is uppermost, and the minor at the bottom, the mode or key is minor, or with a flat third above the base.

MEDIASTINUM, in *Anatomy*, the partition which divides the chest into the right and left halves. See LUNG.

MEDIATE, or INTERMEDIATE, a term of relation to two extremes, applied to a third, which is in the middle between them. See MEAN and MEDIUM.

Substance is a genus with regard to man; but between the two there are other mediate genusses, as body and animal.

Mediate stands opposed to immediate: thus when we say that God and man concur to the production of man; God is the *mediate* cause, man the *immediate*.

MEDIATE *Mode*. See MODE.

MEDIATIO, *Lat.*, MEDIATION, *Fr.*, in *Canto Fermo*, implies the middle of a chant, or the sound which terminates the first part of a verse in the psalms. The punctuation of the psalms in the English psalter, where a colon is constantly placed in the middle of a verse, and frequently when the sense requires not so long a pause, expresses this mediatio, or breath-place, marked out for those who chaunt the psalms in the cathedral service.

MEDIATOR, in *Theology*, is an appellation which belongs in a peculiar, appropriate, and eminent sense, to Jesus Christ, the instructor and saviour of mankind; accordingly, as the doctrine of mediator between God and man is a matter of pure revelation, the New Testament expresly asserts that "there is one God, and one mediator between God and man, the man Christ Jesus," 1 Tim. ii. 5. Divines, however, have differed in their sentiments with respect to the nature and extent of this office, and the mode of its accomplishment. In a general view of this subject, it is argued by bishop Butler in his "Analogy, &c." that the whole analogy of nature removes all imagined presumption against the general notion of a mediator between God and man; so that, as the visible government which God exercises over the world, is carried on by the instrumentality and mediation of subordinate beings, there is no sort of objection against the general notion of a mediator, considered as a doctrine of Christianity, or as an appointment in this dispensation; since we find by experience, that God does appoint mediators to be the instruments of good and evil to us, the instruments of his justice and mercy. He adds, that it is clearly contrary to all our notions of government, as well as to what is, in fact, the general constitution of nature, to suppose that doing well for the future should, in all cases, prevent all the judicial bad consequences of having done evil, or all the punishment annexed to disobedience. And though the efficacy of repentance itself alone, to prevent what mankind had rendered themselves obnoxious to, and recover what they had forfeited, is now insisted upon, in opposition to Christianity; yet, by the general prevalence of propitiatory sacrifices over the heathen world, this notion of repentance alone being sufficient to expiate guilt, appears to be contrary to the general sense of mankind. As there was, therefore, room for an interposition to avert the fatal consequences of vice, revelation affords us such representations of the compassion and goodness of God in the administration of the world, as to give us reason to expect such an interposition; and, moreover, it informs us, that an interposition of this kind has been mercifully provided, in order to prevent the destruction of the human kind. (See John, iii. 16.) As for the particular manner in which Christ interposed in the redemption of the world, or his office as *mediator*, in the largest sense, *between God and man*, it is, as the learned prelate conceives, thus represented to us in the scriptures: 1st. He was, by way of eminence, "the prophet that should come into the world" (John, vi. 14.) to declare the divine will. He published anew the law of nature, which men had corrupted, and the knowledge of which was, to a great degree, lost among them. He taught mankind, authoritatively, to "live soberly, righteously, and godlily in this present world," in expectation of the future judgment of God. He confirmed the truth of this moral system of nature, and gave us additional evidence of it; the evidence of testimony. He distinctly revealed the manner in which God would be worshipped, the efficacy of repentance, and the rewards and punishments of a future life. Thus he was a prophet in a sense in which no other ever was. To which is to be added, that he set us a perfect "example, that we should follow his steps." 2dly. He has a "kingdom which is not of this world." He founded a church, to be to mankind a standing memorial of religion, and invitation to it; which he promised to be with always, even to the end. He exercises an invisible government over it himself, and by his spirit; over that part of it which is militant here on earth, a government of discipline. (See Eph. iv. 12, 13.) Of this church, all persons scattered over the world, who live in obedience to his laws, are members. 3dly. Christ offered himself a propitiatory sacrifice, and made atonement for the sins of the world; which is mentioned last, in regard to what is objected against it. Sacrifices of expiation were commanded the Jews, and obtained amongst most other nations, from tradition, whose original probably was revelation. And they were continually repeated, both occasionally and at the returns of stated times; and made up great part of the external religion of mankind. "But now once in the end of the world Christ appeared to put away sin by the sacrifice of himself." (Heb. ix. 26.) And this sacrifice was, in the highest degree, and with the most extensive influence, of that efficacy for obtaining pardon of sin, which the heathens may be supposed to have thought their sacrifices to have been, and which the Jewish sacrifices really were in some degree, and with regard to some persons.

How and in what particular way it had this efficacy, there are not wanting persons who have endeavoured to explain: but we do not find that the scripture has explained it. We seem to be very much in the dark, concerning the manner in which the ancients understood atonement to be made, *i. e.* pardon

pardon to be obtained by ſacrifices. And if the ſcripture has, as ſurely it has, left this matter of the ſatisfaction of Chriſt myſterious, left ſomewhat in it unrevealed, all conjectures about it muſt be, if not evidently abſurd, yet at leaſt uncertain. Nor has any one reaſon to complain for want of farther information, unleſs he can ſhew his claim to it.

Some have endeavoured to explain the efficacy of what Chriſt has done and ſuffered for us, beyond what the ſcripture has authorized: others, probably becauſe they could not explain it, have been for taking it away, and confining his office as redeemer of the world to his inſtruction, example, and government of the church. Whereas the doctrine of the goſpel appears to be; not only that he taught the efficacy of repentance, but rendered it of the efficacy which it is, by what he did and ſuffered for us: that he obtained for us the benefit of having our repentance accepted unto eternal life: not only that he revealed to ſinners, that they were in a capacity of ſalvation, and how they might obtain it; but moreover that he put them into this capacity of ſalvation, by what he did and ſuffered for them; put us into a capacity of eſcaping future puniſhment, and obtaining future happineſs. And it is our wiſdom thankfully to accept the benefit, by performing the conditions upon which it is offered, on our part, without diſputing how it was procured, on his.

Another writer, *viz.* Mr. Tomkins, in his treatiſe entitled "Jeſus the Mediator between God and Man," ſeems to have entertained ſimilar views with thoſe of biſhop Butler concerning the mediation of Chriſt. The ſcripture, ſays this writer, expreſsly gives Chriſt the title of mediator (the one mediator): this will be allowed even by thoſe who underſtand it of his mediating on the part of God towards us, or of his being inveſted with a mediatorial kingdom, in conſequence of which he diſpenſes the favours of God to men. But this, in the judgment of the author to whom we now refer, is merely half of what the ſcripture deſigns, when it calls Chriſt the mediator; for he ſuppoſes this office to include what he doth or hath done on our behalf towards God. The apoſtle, he thinks, evidently and directly refers to this (1 Tim. ii. 5.) when he adds, "who gave himſelf a ranſom for us." If, then, it appears that Chriſt offered himſelf a ſacrifice; that he makes interceſſion for us; that he is ordained for us an high-prieſt in things pertaining to God; and that we are required to come unto God by him under this character: if theſe, and the like, are in the plain literal ſenſe the doctrine of the New Teſtament, none, he ſuppoſes, can make it matter of diſpute, whether the title of mediator hath not reſpect to theſe things, as well as to his acting on the behalf of God towards us: in confirmation of which it may be obſerved, that the term itſelf ſeems to imply a tranſacting with each party on the behalf of the other; according to the language of the apoſtle "a mediator is not of one." The object of the author in the treatiſe which we have cited, is to lay before the reader the declarations of ſcripture on the ſubjects above ſtated; or to ſhew that they repreſent what it was appointed for Chriſt to do on our behalf, and conſequently what he hath done, or now does for us, in order to our reconciliation with God. Another writer, after ſhewing that the general notion of a mediator is not at all repugnant to the moſt honourable ſentiments we can entertain of the mercy of God, ſtates the ſubſtance of what he conceives to be the true Chriſtian doctrine of a mediator in the following terms: *viz.* "that our bleſſed Saviour was appointed by the ſupreme authority of heaven and earth, to *reconcile* apoſtate and rebellious men to their offended maker and ſovereign, and to be the *diſtributor* of God's favour to mankind." He thinks, that there are ſeveral probabilities that incline us to believe, that our bleſſed Lord never expreſsly aſſumed to himſelf the title of mediator, during the time of his public miniſtry upon earth, and that it never was aſcribed to him till after his exaltation to regal dignity and power; and of courſe that the mediatorial character of Chriſt did not properly commence till after his reſurrection, when he had all power committed to him, and was conſtituted the *one Lord*, through whom are all things. Adverting to the death of Chriſt, as a prominent event in his hiſtory, he obſerves, that it was not intended to render the Deity propitious, *i. e.* willing to be reconciled to his creatures upon fit and honourable terms, becauſe it was propoſed by *himſelf*, and the whole uſe and efficacy of it ſprung from his appointing and declaring it to be an accepted ſacrifice, ſo that it muſt neceſſarily ſuppoſe him to have been antecedently propitious. The truth of the caſe in his opinion ſeems to be, that it was "an expedient originally proceeding from the mercy of God, and not the argument or motive, inducing him to be merciful. The great purpoſes, as this author ſtates them, which are evidently ſerved by the expreſs command of God to conſider the death of Chriſt under the notion and character of a ſacrifice, are thoſe which follow.

Firſt, that it might be a ſtanding memorial of God's being propitious, and inclined to pardon the ſins of men; and an enforcement of that fundamental principle of all religion, that he is a rewarder of them that diligently ſeek him: "A memorial coinciding with the almoſt univerſal ſentiment and practice of the world (among whom ſacrifices were eſteemed as an eſſential part of religion), and likely, upon that account, to have a more certain and powerful influence."—Secondly, that it might be a ſtanding memorial, likewiſe, of the evil and demerit of ſin; and, conſequently, a perpetual incentive to humility and repentance.—And, thirdly, it ſeems to have been wiſely appointed with this view likewiſe, *viz.* to ſuperſede the uſe of all future ſacrifices; which, extending even to human ſacrifices, had been the moſt depraved and unnatural branch of heathen ſuperſtition. And, therefore, that it might the better produce this effect, which was worthy the care of infinite wiſdom and goodneſs, we are expreſsly informed, that Jeſus Chriſt hath, by one offering, "perfected for ever them that are ſanctified." Heb. x. 14.

And, in the laſt place, "there is formed, by this conſtitution, a beautiful analogy in a very conſiderable and important point, between the ſettled methods of God's natural providence, and the extraordinary operations of his grace;" which perhaps may juſtly be eſteemed as one of the principal reaſons of it. Foſter's Sermons, vol. iv. ſerm. xvi. See Atonement.

Mediators *of Queſtions*, in our *Old Writers*, were ſix perſons authorized by ſtatute, who, upon any queſtion ariſing among merchants, relating to any unmercable wool, or undue packing, &c. might, before the mayor, or officers of the ſtaple, upon their oath, certify and ſettle the ſame; to whoſe order and determination therein, the parties concerned were to give entire credence, and ſubmit. 27 Ed. III. ſtat. 2. c. 24.

Mediators, Μεσαζοντες, under the emperors of Conſtantinople, officers of ſtate, who had the direction of all affairs tranſacted at court. Their chief, or preſident, was called *megas meſazon*, μεγας μεσαζων, and anſwered to the prime or grand viſier of the Turks. Hofm. Lex. in voc.

MEDICA, in *Botany*, an old name for ſome plants of the Trefoil or Lucerne family, which Tournefort has retained for the genus *Medicago* of Linnæus. It is ſuppoſed to be derived from Media, the native country of the plants to which it was applied. See Medicago.

Medica

Medica is alſo the Linnæan ſpecific name of the Citron, *Malus medica*, or Median Apple, of the old writers. See Citrus.

MEDICAGO, ſo called by Tournefort, from *Medica*, which is indeed the proper name of the plant, (μηδικη of Dioſcorides), and aroſe from its having been introduced into Greece by the Medes, during the Perſian war in the time of Darius Hyſtaſpes. This name being reſtrained by Tournefort to a few ſpecies with a flat, not ſpiral, legume, he calls the very numerous ones in which that part is more or leſs convoluted, or ſpiral, *Medicago*, as reſembling, or approaching to, his *Medica*. Both tribes are united under the above appellation by Linnæus. The original *Medica* of the ancients, which was a valuable fodder, or, in the modern phraſe, *artificial graſs*, is probably one of the genus; though we cannot determine which, and it may poſſibly be ſome *Trifolium*, or perhaps a *Trigonella*. Lucern, Medick, or Snail Trefoil. Linn. Gen. 389. Schreb. 510. Willd. Sp. Pl. v. 3. 1403. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 795. Ait. Hort. Kew. ed. 1. v. 3. 96. Juſſ. 356. Lamarck Illuſtr. t. 612. Gærtn. t. 155. (Cochleata; Riv. Tetrap. Irr. t. 88. Falcata; ibid. t. 84, 85. 87.)—Claſs and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*, Juſſ.

Gen. Char. *Cal.* Perianth inferior, of one leaf, ſtraight, cylindrical, ſomewhat bell-ſhaped, divided about half way down into five pointed, nearly equal, ſegments. *Cor.* papilionaceous. Standard ovate, undivided, inflexed at its edges, the whole reflexed. Wings ovate-oblong, affixed to the appendages of the keel, cohering by their edges within it. Keel oblong, cloven, ſpreading, obtuſe, bent down by the piſtil, and divaricating from the ſtandard. *Stam.* Filaments in two ſets, united almoſt to the top; anthers ſmall. *Piſt.* Germen ſtalked, oblong, incurved, compreſſed, enfolded by the filaments, ſtarting from the keel, and forcing back the ſtandard, terminating in a ſhort, awl-ſhaped, nearly ſtraight, *ſtyle; ſtigma* terminal, minute. *Peric.* Legume compreſſed, long, inflexed. *Seeds* ſeveral, kidney-ſhaped or angular.

Obſ. The *Cochleatæ* of Rivinus have a ſpirally convoluted legume; his *Falcatæ* a curved, or ſickle-ſhaped one.

Eſſ. Ch. Legume compreſſed, ſpiral, forcing back the keel of the corolla from its ſtandard.

The lateſt edition of Linnæus enumerates but ten ſpecies of *Medicago*, becauſe he always confounded, under his *M. polymorpha*, a numerous tribe, which, though they generally accord very nearly in herbage, differ too widely and conſtantly in their fruit to be eſteemed mere varieties of one ſpecies. Willdenow, following Gærtner, has diſtinguiſhed them all, and has even added ſeveral new ones, making all together 37. He has perhaps gone too far, and the ſubject appears to demand reviſion, which we ſhall here attempt.—*Medicago virginica*, Linn. Sp. Pl. 1096, is ſuppoſed to be the ſame plant as *Hedyſarum fruteſcens*, and is therefore omitted here. On this point however the Linnæan herbarium affords no information.

* *Legumes lunate, ſomewhat twiſted.*

1. M. *arborea*. Tree Medick, or Moon Trefoil. Linn. Sp. Pl. 1096. (Cytiſus ſeptimus cornutus; Ger. em. 1305.)—Legumes lunate, entire at the margin. Stem arboreſcent.—Native of rocky places in various parts of Greece and the Archipelago, as well as about Naples, flowering in the early ſpring. It is with us a hardy green-houſe ſhrub. *Stem* buſhy. *Leaves* ternate, on long ſtalks; their leaflets inverſely heart-ſhaped, hoary and ſilky beneath, like all the ſtalks. *Flowers* in axillary, ſtalked heads, or very ſhort cluſters, of a full yellow. *Legume* reticulated, making ſcarcely more than one complete turn.—This ſhrub has been ſhewn by M. Amoureux in the *Mem. de la Soc. d'Agriculture de Paris*, for 1787, part 2d, to be the real *Cytiſus* of Virgil, celebrated by him for cauſing cows to yield abundance of milk, while its flowers are grateful to goats and to bees.

2. M. *radiata*. Radiated Medick. Gærtn. f. 5. (Lunaria radiata italorum; Lob. Ic. v. 2. 38. Trifolium ſiliquâ lunatâ; Ger. em. 1207.)—Legume kidney-ſhaped, toothed at the edge. Leaves ternate.—Native of Italy. *Root* annual. *Stem* erect, more or leſs branched from the bottom, a ſpan high. *Leaves* ſtalked, ternate, obovate, ſharply toothed, ſomewhat hairy. *Flowers* ſmall, yellow, two or three on each axillary ſtalk. *Calyx* hairy. *Legumes* ſingularly elegant, curved into an orbicular flat form, near an inch broad, naked, glaucous, purpliſh, finely reticulated, fringed with briſtly teeth. *Seeds* numerous, tranſverſely corrugated.

3. M. *circinata*. Pinnate Kidney Medick. Linn. Sp. Pl. 1096. (Falcata foliis anthyllidis; Riv. Tetrap. Irr. t. 87.)—Legume kidney-ſhaped, toothed at the edge. Leaves pinnate, lyrate, entire.—Native of Spain, Italy, and the Levant. Annual. *Leaves* ſomewhat like thoſe of *Anthyllis vulneraria*, pinnate, with obovate, entire, thick, hairy leaflets, the odd one very large. The earlieſt leaves are ſimple. *Flowers* yellow, two or three on a long bracteated axillary ſtalk, like thoſe of a *Lotus*. *Legume* ſmaller and leſs elegant than in the laſt, hairy. Willdenow and Gærtner deſcribe a variety whoſe legume is ſmaller, without teeth, which may well prove a ſpecies. We have never ſeen it.

4. M. *ſativa*. Lucern, or Purple Medick. Linn. Sp. Pl. 1096. Mart. Ruſt. t. 48. Engl. Bot. t. 1749. (Medica legitima; Cluſ. Hiſt. v. 2. 242.)—Flower-ſtalks racemoſe. Legumes contorted. Stem erect, ſmooth.—In dry paſtures and by road ſides in France and Spain, as well as occaſionally in England, but it is hardly wild with us. For its deſcription, and agricultural uſe, ſee Lucern. The *legume* is frequently ſo much convoluted, that it rather belongs to the next ſection.

5. M. *falcata*. Yellow Sickle-podded Medick. Linn. Sp. Pl. 1096. Mart. Ruſt. t. 86, 87. Engl. Bot. t. 1016.—Flower-ſtalks racemoſe. Legumes moon-ſhaped. Stem procumbent.—Found in dry gravelly places in various parts of Europe. In England chiefly about Norwich and Bury. It greatly reſembles the laſt, but does not grow erect, and the *legume* is merely ſickle-ſhaped, not contorted. The *flowers* vary from yellow to purple, and are often of a green hue, combined of both the former tints. Theſe two laſt ſpecies are perennial, and perhaps neareſt akin to the firſt, *arborea*.

6. M. *glutinoſa*. Clammy Medick. Willd. Sp. Pl. v. 3. 1406.—Flower-ſtalks racemoſe. Legumes falcate, twiſted, hairy and viſcid, like the calyx. Leaflets obovate, toothed at the ſummit.—Native of graſſy land in Tauria. Willdenow ſays it is very ſimilar to *M. falcata*, but differs in having obovate *leaflets*, and a hairy viſcid *calyx*. The *ſtems* are aſcending, and downy.

7. M. *lupulina*. Black Medick, or Noneſuch. Linn. Sp. Pl. 1097. Curt. Lond. faſc. 2. t. 57. Engl. Bot. t. 971. Mart. Ruſt. t. 19. (Trifolium luteum lupulinum; Ger. em. 1186.)—Spikes ovate. Legumes kidney-ſhaped, rugged and veiny, ſingle-ſeeded. Stem procumbent.—Frequent in the meadows and paſtures of Europe. It is annual, flowering all ſummer long, and is much cultivated, as an artificial graſs, for a crop of hay, or as fodder for ſheep. The *ſtems* ſpread widely. The *leaflets* are broad, roundiſh-obovate, finely toothed. *Flowers* yellow, ſmall, in denſe ovate ſtalked ſpikes, very much reſembling ſome of the common yellow

ſpecies

species of *Trifolium*, with which indeed the whole habit of the plant accords, but the curved, black, rugged *legumes*, as they ripen, conspicuously distinguish it.

8. M. *obscura* Doubtful Medick. Retz. Obs. fasc. 1. 25. t. 1.—Flower-stalks racemose. Legumes kidney-shaped, with two seeds. Stipulas toothed. Leaflets obovate, somewhat rhomboid. Stems recumbent.—Supposed by Retzius, who had it by accident with other seeds, to be a native of Germany. *Root* annual. The habit and flowers are like many of the next section, but the *legume* is merely orbicular, not cochleated, or truly spiral; its diameter scarcely a quarter of an inch.

** *Legumes spirally convoluted.*

9. M. *prostrata*. Slender Prostrate Medick. Linn. Suppl. 340. Jacq. Hort. Vind. v. 1. 39. t. 89. Ehrh. Pl. Select. 49. —Flower-stalks racemose. Stem procumbent, thread-shaped, much branched. Legumes thrice convoluted, thick-edged, without prickles. Stipulas bristle-shaped, undivided. Leaflets nearly linear.—Native of exposed stony ground in Hungary and Italy. It is known by its long, slender, much branched *stems*, simple *stipulas*, very narrow *leaflets* toothed merely at the point, and small orbicular *legumes*, consisting of two or three complete spiral turns, thick at the edge, destitute of teeth or prickles, and very slightly downy. The *flowers* are yellow, and, like the rest of the plant, vary much in size according to the richness of the soil. The *root* is perennial, in which it differs from most of this second section, and agrees with *sativa* and *falcata*, which also it approaches in habit; but the whole nature of the *legume* has induced us to remove it hither.

10. M. *orbicularis*. Flat Snail Medick. (M. polymorpha orbicularis; Linn. Sp. Pl. 1097. Cochleata fructu orbiculato; Riv. Tetr. Irr. t. 88. f. 1.—Moris. sect. 2. t. 15. f. 1, 2.)—Stalks one or two-flowered. Stipulas in many capillary segments. Legumes orbicular, depressed, with radiating veins, and no teeth.—Native of fields in the south of Europe. Annual. *Stems* long and prostrate, angular, slender, smooth. *Leaflets* obovate, sharply toothed, smooth. *Stipulas* deeply pinnatifid. *Flowers* very small, yellow, on slender axillary stalks. *Legumes* smooth, orbicular, depressed, above three quarters of an inch in diameter, singularly neat, marked with elevated radiating veins, and of a glaucous or purplish hue. This is one of those hardy annuals, cultivated in curious gardens, by the name of *Snails*, the *Scorpiurus vermiculata* generally accompanying them under the appellation of *Caterpillars*, which its legumes strikingly resemble.

11. M. *rugosa*. Rugged Snail Medick. Lamarck Dict. v. 3. 632. (M. elegans; Willd. Sp. Pl. v. 3. 1408. Cochleata fructu rugoso; Riv. t. 88. f. 5. Moris. sect. 2. t. 15. f. 4.)—Stalks about two-flowered. Stipulas toothed. Legumes orbicular, depressed, with radiating elevated veins, a thick edge, and no teeth.—Native of Sicily. We have seen no specimen of this, but it should seem to be only a slight variety of the last, except the *stipulas* may serve to distinguish them.

12. M. *scutellata*. Common Snail Medick. Lamarck Dict. v. 3. 633. (M. polymorpha scutellata; Linn. Sp. Pl. 1097. Cochleata fructu scutellato; Riv. t. 88. f. 2. t. 89. f. 1. Moris. sect. 2. t. 15. f. 3.)—Stalks about two-flowered. Stipulas half arrow-shaped, toothed. Legumes globular, spiral, convex beneath, the convolutions erect, rugose, without teeth.—Frequent in corn fields in the south of Europe, and the most common kind in our gardens. It differs specifically from *M. orbicularis* in having broad *stipulas*, often strongly toothed, but not divided into deep capillary segments. The *legume* moreover differs widely in being globose, in consequence of the edges of its convolutions being turned upwards, or erect, and they may be pulled asunder like a rolled slip of paper. The whole *herb* is more or less downy.

13. M. *Helix*. Small Snail Medick. Willd. Sp. Pl. v. 3. 1409. (M. lævis; Desfont. Atlant. v. 2. 213.)—Stalks many-flowered. Stipulas strongly toothed. Legumes orbicular, flat, of two spiral distant turns, concentrically veined, without spines.—We have from the south of France what answers well to Willdenow's description, nor have we the least doubt concerning the synonym of Desfontaines. The *leaflets* are obovate, rounded, with shallow teeth. *Stipulas* much like the last. *Flowers* four or five on a stalk. *Legumes* hairy, a quarter of an inch only in diameter, marked with concentric or spiral interbranching veins, in which respect it differs essentially from the three last, as well as from *M. obscura*, to which Willdenow compares it; a character which seems to have been noted by Desfontaines.

14. M. *tornata*. Screw-turned Snail Medick. Willd. Sp. Pl. v. 3. 1409. (M. polymorpha tornata; Linn. Sp. Pl. 1098. Herb. Linn. Cochleata fructu tornatili; Riv. t. 88. f. 4.)—Stalks many-flowered. Stipulas deeply toothed. Legumes cylindrical, flat at each end, of many, rather distant, horizontal, smooth, thin-edged turns, without spines. —Native of the south of Europe. The only specimen we have ever seen is that of Linnæus, who by quoting a figure of Morison which belongs to the following, has led some botanists astray. Lachenal took one for the other, and Desfontaines has confounded the two. Whether they are more than varieties may perhaps be doubted, as is the case with some others of the genus; but they appear distinct. The real *tornata*, figured by Rivinus in that curious tab. 88, which is wanting in many copies of his book, has a small *legume*, that appears to be neatly turned, exactly like a screw, the convolutions being flat and horizontal, rather distant, with a thin smooth even edge, parallel and near to which runs a principal concentric spiral rib or nerve, connected by reticulated veins with the centre, and sending off a minute branch, here and there, to the margin. The *stipulas* have generally a few deep taper-pointed teeth. The *flowers* are rather large, four or five on a stalk. *Leaves* sharply toothed.

15. M. *turbinata*. Close-turned Snail Medick. Willd. Sp. Pl. v. 3. 1409. (M. polymorpha turbinata; Linn. Sp. Pl. 1098. Cochleata fructu turbinato; Riv. t. 88. f. 3. Moris. sect. 2. t. 15. f. 5.)—Stalks many-flowered. Stipulas deeply toothed. Legumes ovate, convex at each end, of many, closely imbricated, thick-edged, even turns, without spines.—Native of Italy and the south of France. Like the last in habit and general characters, but the *legume* is twice as large, ovate, its convolutions crowded close together, as if imbricated upwards, presenting a thick edge outwards, along which runs the same spiral concentric nerve which in the *M. tornata* is situated within the margin. Willdenow, who appears to have paid great attention to these plants, has removed a synonym of J. Bauhin, cited here by Linnæus, to the following, to which it evidently belongs. Linnæus indeed confounded the two, and Lachenal, led perhaps by Bauhin's synonym, took the *tuberculata* for *turbinata*. We cannot however follow Willdenow in here quoting Bauhin's *Medica scutellata*, v. 2. 384, which appears to us the real *Medicago scutellata*, our n. 12.

16. M. *tuberculata*. Warty Snail Medick. Willd. Sp. Pl. v. 3. 1410 (M. polymorpha tuberculata; Retz. Obs. fasc. 2. 23. Medica magna turbinata; Bauh. Hist. v. 2. 385. Cochleata fructu verrucoso; Riv. t. 88. f. 6. Moris. sect. 2. t. 15. f. 6.)—Stalks about two-flowered. Stipulas deeply

deeply toothed. Legumes nearly cylindrical, flattiſh at each end, of many horizontal crowded turns, beſet with a double row of corrugated warts.—Native of the ſouth of Europe. This differs from the laſt in having only one or two *flowers* on each ſtalk, which ſeems to be conſtant, and in the rather ſmaller, more cylindrical, *legumes*, the outer edge of whoſe convolutions is cloſely beſet with a double row of bluntiſh warts, imbedded in a ſort of granulated ſkin. In an early ſtate theſe warts are rather bluntiſh ſpines.

17. M. *aculeata*. Prickly Snail Medick. Willd. Sp. Pl. v. 3. 1410. (Cochleata fructu turbinato et echinato; Riv. t. 88. f. 7?)—"Stalks about two-flowered. Stipulas toothed. Leaflets ſomewhat rhomboid. Legumes cylindrical, flattiſh at each end, of many turns, beſet with thick ſhort marginal ſpines."—Native country unknown. Willdenow deſcribes it as very like the preceding, but diſtinct, the *legumes* being beſet with unequal, thick, and very ſhort, prickles. Not having ſeen this plant, we quote with doubt the figure of Rivinus, which anſwers pretty well to the deſcription. Willdenow ſeems not to have known this tab. 88.

18. M. *Murex*. Thorny Snail Medick. Willd. Sp. Pl. v. 3. 1410. (Cochleata fructu duriùs echinato; Riv. t. 88. f. 10?)—"Stalks about two-flowered. Stipulas deeply toothed, or fringed. Leaflets obovate. Legumes cylindrical, rather convex at each end, of many turns, beſet with ſtraight thorns."—Native country unknown, but Willdenow had the plant alive, as well as the laſt. He deſcribes it with cylindrical turbinate legumes, beſet with thick awl-ſhaped thorns, and differing from the laſt in having obovate obtuſe *leaflets*, the lower ones *obcordate*; linear-awl-ſhaped *ſtipulas* with fringe-like teeth, not lanceolate ones toothed only at the baſe; and longer thorns upon the fruit. We quote Rivinus with doubt, for the ſame reaſon as before, though we have ſcarcely any heſitation about either of his figures.

19. M. *intertexta*. Entangled Prickly Medick. Willd. Sp. Pl. v. 3. 1411. (M. polymorpha intertexta; Linn. Sp. Pl. 1098. Cochleata fructu echinato maximo; Riv. t. 88. f. 9; and t. 90. Moriſ. ſect. 2. t. 15. f. 7, 8, 9.)—Stalks about two-flowered. Stipulas deeply toothed. Legumes oval, of many turns, beſet with two rows of long, awl-ſhaped, cloſe-preſſed thorns, alternately divaricated.—Native of the ſouth of Europe. Diſtinguiſhed from all the foregoing by its nearly globular *legumes*, about the ſize of a gooſeberry, compoſed of ſix or ſeven cloſe convolutions, concealed by the long ſharp thorns, which cover the whole fruit, and which being alternately depreſſed, in two oppoſite directions, appear matted together. In all our ſpecimens theſe thorns are ſmooth; Willdenow deſcribes them as pubeſcent. The *flowers* are from two to four on each ſtalk. *Stipulas* fringed with long ſharp teeth. *Leaflets* obovate, or ſomewhat rhomboid, narrow, ſharply toothed. This ſpecies is often met with in gardens.

20. M. *ciliaris*. Hairy Prickly Medick. Willd. Sp. Pl. 1411. (M. polymorpha ciliaris; Linn. Sp. Pl. 1099. Cochleata fructu echinato rotundo; Riv. t. 88. f. 8.)—Stalks about two flowered. Stipulas deeply toothed. Legumes oval, of many turns, beſet with two rows of ſhort awl-ſhaped hairy thorns, ſpreading in two directions.—"Native of the ſouth of France." *Willdenow*. Sent from Sicily by Mr. Bivona Bernardi. In habit and ſize it altogether agrees with the laſt; but the *legumes* are covered with much ſhorter hairy thorns, ranged in two rows along the edge of their convolutions, ſpreading in oppoſite directions, but not depreſſed.

21. M. *carſtienſis*. Creeping-rooted Medick. Jacq. Coll. v. 1. 86. Ic. Rar. t. 156. Curt. Mag. t. 909.—Stalks many-flowered. Leaflets ovate. Stem erect. Root creeping. Legumes depreſſed, of many turns, fringed with two rows of ſtraight ſpreading briſtles.—Native of the alps of Carinthia and Carniola, ſaid to have been introduced into our gardens in 1790. It is remarkable for its perennial creeping *root*, and upright, ſquare, almoſt ſhrubby *ſtem*. The *leaflets* moreover are ovate, not obovate. *Flowers* ſix or eight on each ſtalk, of a bright yellow, their ſtandard ſtreaked with red. *Legumes* black, not half the ſize of the two preceding, of fewer turns, and depreſſed, the edges fringed with two divaricated rows of long briſtles.

22. M. *maculata*. Spotted Medick. Sibth. Oxon. 232. Willd. Sp. Pl. v. 3. 1412. (M. polymorpha arabica; Linn. Sp. Pl. 1098. Fl. Brit. 797. Engl. Bot. t. 1616. Curt. Lond. faſc. 3. t. 47. Mart. Ruſt. t. 76. Cochleata fructu longiùs echinato; Riv. t. 88. f. 12. Moriſ. ſect. 2. t. 15. f. 12?)—Stalks two or three-flowered. Leaflets inverſely heart-ſhaped, ſpotted. Stipulas dilated, ſharply toothed. Legumes depreſſed, their convolutions fringed with numerous, long, ſpreading briſtles.—Native of the more temperate countries of Europe. Found in the ſouth of England, on a gravelly ſoil, flowering in May and June. The *ſtems* are proſtrate. *Root* annual. *Leaflets* diſtinguiſhed by their obcordate ſhape, and a black or purpliſh ſpot in the middle of their diſk, which however diſappears from the later or upper leaves. *Stipulas* half-heart-ſhaped, with ſharp broad teeth. *Flowers* two or three on a ſtalk, yellow, as indeed are all of this ſection of the genus. *Legumes* ſmall, depreſſed, of ſeveral turns, marked with concentric nearly parallel ribs, and fringed with long, ſpreading, ſlender, and rather weak ſpines, or briſtles, the whole pale brown or whitiſh when ripe.—The three varieties enumerated in the Flora Britannica are now eſteemed diſtinct ſpecies, at leaſt the β and γ. The δ we know only by the report of Dillenius.

23. M. *truncatula*. Abrupt Medick. Gærtn. v. 2. 350. t. 155. Moriſ. ſect. 2. t. 15. f. 17. (M. tentaculata, by miſtake; Willd. Sp. Pl. v. 3. 1413.)—Stalks about two-flowered. Stipulas toothed. Legumes cylindrical, ſpiral, flat at each end, beſet with two ranks of ſmooth, lanceolate, cloſe-preſſed prickles.—Native of the ſouth of Europe. Willdenow had it living, and deſcribes the *leaflets* as obovate; *ſtipulas* awl-ſhaped and toothed; *ſtalks* two-flowered; *legumes* as above. We ſhould think it a variety of the following, but not having ſeen it, we dare not decide.

24. M. *coronata*. Coronet Medick. Lamarck Dict. v. 3. 634. Willd. Sp. Pl. v. 3. 1413. (M. polymorpha coronata; Linn. Sp. Pl. 1098. Moriſ. ſect. 2. t. 15. f. 16. Medica coronata cherleri parva; Bauh. Hiſt. v. 2. 386.)—Stalks many-flowered. Leaflets inverſely heart-ſhaped. Legumes cylindrical, hairy, flat at each end, of about two turns, bordered with an aſcending and deſcending row of ſtrong, cloſe-preſſed, awl-ſhaped ſpines.—Native of the ſouth of France. We have it from Gerard. This is a very ſmall ſpecies, about three or four inches high, hardly branched; with lanceolate ribbed *ſtipulas*, ſcarcely toothed except at the baſe; ſeveral ſmall *flowers* on each ſtalk; and curious little *legumes*, well repreſented in the figures quoted. The *leaflets* are hairy, obcordate, ſtrongly toothed.

25. M. *apiculata*. Wheel-toothed Medick. Willd. Sp. Pl. v. 3. 1414. (M. coronata; Gærtn. v. 2. 349. t. 155. Moriſ. ſect. 2. t. 15. f. 14?)—Stalks many-flowered. Stipulas deeply toothed. Leaflets obovate. Legumes depreſſed, of three turns, ſtrongly reticulated, with two rows of minute, diverging, marginal teeth.—Native of the ſouth

south of Europe. We have it from Professor Lachenal under the name of *M. coronata*, but it is very distinct from the last, being a much larger plant, with deeply fringed *stipulas*, obovate smooth *leaflets*, and flattened strongly reticulated *legumes*, whose teeth are scarcely more prominent than their veins.

26. M. *denticulata*. Sickle-toothed Medick. Willd. Sp. Pl. v. 3. 1414.—" Stalks many-flowered. Stipulas deeply toothed. Leaflets obovate. Legumes depressed, of two turns, reticulated, with two rows of diverging marginal spines."—Native of the south of Europe. Very near the last, differing only in its longer bristle-like marginal spines. *Willd.* We have from the sea-coast near Cley, in Norfolk, what seems to answer to these characters, except that in ours the *leaflets* are inversely heart-shaped. We know not whether this has been noticed as a British plant, or whether it be the *M. polymorpha* δ of Fl. Brit. adopted there from Dillenius.

27. M. *muricata*. Flat-toothed Medick. Willd. Sp. Pl. v. 3. 1414. (M. polymorpha muricata; Linn. Sp. Pl. 1098. Fl. Brit. 798 γ. Moris. sect. 2. t. 15. f. 11. Trifolium cochleatum, modiolis spinosis; Pluk. Phyt. t. 113. f. 6.)—Stalks many-flowered. Stipulas deeply toothed. Leaflets obovate, somewhat rhomboid. Legumes depressed, of five turns, with short, depressed, radiating teeth.—Native of dry ground in France and Italy. Said by Ray to have been found on the sea bank at Orford, Suffolk. The structure of its *legume* is abundantly different from the foregoing five species, the teeth being horizontal, and in single rows, nor is the surface veiny or reticulated. The *leaflets* are hairy. *Flowers* from two to four on each stalk.

28. M. *Gerardi*. Gerardian Medick. Willd. Sp. Pl. v. 3. 1415. Waldst. and Kitaib. Hungar. Moris. sect. 2. t. 15. f. 18.—" Stalks about two-flowered. Stipulas with setaceous teeth. Leaflets obovate. Legumes hairy, depressed, of five turns, with awl-shaped, projecting, hooked spines."—Native of Spain, Narbonne, and Hungary.—We know it only from Willdenow, who had dried specimens before him.

29. M. *recta*. Upright Dwarf Medick. Willd. Sp. Pl. v. 3. 1415. (M. polymorpha recta; Desfont. Atlant. v. 2. 212.)—Stalks single-flowered. Stipulas entire. Leaflets wedge-shaped, downy. Stem erect. Legumes spiral, with hooked teeth.—Native of Barbary. About four inches high, annual, downy and silky. *Leaflets* small, with minute teeth. *Stipulas* ovate, acute. *Flowers* axillary, on very short stalks. *Legume* orbicular.

30. M. *marina*. Downy Sea Medick. Linn. Sp. Pl. 1097. Willd. Sp. Pl. v. 3. 1415. Cavan. Ic. v. 2. 26. t. 130. (Cochleata incana; Riv. t. 91. f. 2. t. 88. f. 15.)—Stalks many-flowered. Herb procumbent, very downy. Leaflets obovate, crenate or entire. Stipulas undivided. Legumes very hairy, with strong radiating teeth.—Native of the sandy sea-coast in the north of Africa, and south of Europe. *Root* perennial. *Stems* prostrate, much branched, densely clothed with soft hoary hairs, as is every part of the herbage. The *leaflets* are wedge-shaped, broad, but scarcely obovate, either quite entire, or slightly crenate at the end only. *Flowers* numerous, of a full yellow, in dense round heads. *Legumes* with several convolutions, edged with prominent, awl-shaped, strong hairy teeth.—This can be confounded with no other, and even Linnæus keeps it separate from the varieties of his supposed species *polymorpha*.

31. M. *Terebellum*. Prickly Screw Medick. Willd. Sp. Pl. v. 3. 1416. (M. aculeata; Gærtn. v. 2. 349. t. 155. Moris. sect. 2. t. 15. f. 20, 21. Cochleata fructu rarius echinato; Riv. t. 88. f. 11?) Stalks with several flowers. Stipulas deeply toothed. Leaflets obovate, obtuse. Legumes cylindrical, flat at each end, of five turns, with two rows of diverging, very short, awl-shaped spines.—Native of the south of Europe. In habit this is among the more luxuriant procumbent species. The *leaflets* are broad, strongly toothed; the lower ones most abrupt. Spines of the *legumes*, thick at the base, often conical, reflexed in opposite directions. The ripe *legume* is the size of a large pea. Hence we rather cite Rivinus's fig. 7 for our 17th species, *M. aculeata*, than, with Gærtner, for the present, that figure being nearly thrice as large.

32. M. *tribuloides*. Caltrop Medick. Lamarck Dict. v. 3. 635. Willd. Sp. Pl. v. 3. 1416.—" Stalks two-flowered. Stipulas toothed. Leaflets obovate. Legumes cylindrical, flat at each end, of five turns, with two rows of diverging conical spines."—Native of the south of Europe. Willdenow says the *legumes* are very like those of his *tentaculata*, our *truncatula*, n. 23, but larger, with longer spines, which are merely reflexed, not close-pressed. We have seen no specimen that answers to this. Willdenow had it alive.

33. M. *uncinata*. Larger Bur Medick. Willd. Sp. Pl. v. 3. 1417.—Stalks many-flowered. Stipulas toothed. Leaflets obovate. Legumes cylindrical, short, flat at each end, of several distant turns, with two spreading rows of long, awl-shaped, hooked spines.—Willdenow, who had this also alive, supposes it a native of the south of Europe. We find what answers very correctly to his description in the Linnæan herbarium, marked *coronata*, which is most assuredly an error. Linnæus having referred all this tribe to one species, was not sufficiently attentive to their differences, even as varieties. The *legumes* of the present are nearly globose, loosely spiral, and distinguished by their hooked prickles from nearly all the foregoing, in which mark they agree with two hereafter described, *minima* and *nigra*.

34. M. *rigidula*. Bristly Medick. Willd. Sp. Pl. v. 3. 1417. (M. polymorpha rigidula; Linn. Sp. Pl. 1098. Medica fructu cochleato spinoso; Ger. em. 1199. Cochleata fructu echinato rotundo minore; Riv. t. 88. f. 13?) Stalks with several flowers. Stipulas toothed. Leaflets obovate. Legumes cylindrical, of many turns, with conical straight spreading spines.—Native of fields in France, Italy, and Barbary.—This differs from the last in having the convolutions of the *legume* closer, the spines straight, all horizontally spreading; the *flowers* twice as large. It is difficult to adjust the synonyms of all these species. The figure of Gerard, which is also found in Lobel's Icones, v. 2. 37. f. 1, may have been done for either, but it best agrees with this. We are much in doubt concerning Rivinus's f. 13; but we cannot refer his f. 12 to the present species, because that figure so admirably and precisely represents the concentric veins of *M. maculata*, n. 22, which being a common plant, could hardly have been unknown to Rivinus.

35. M. *minima*. Little Bur Medick. Willd. Sp. Pl. v. 3. 1418. (*M.* polymorpha minima; Linn. Sp. Pl. 1099. Fl. Brit. 798 β. Fl. Dan. t. 211. Medica echinata minima; Bauh. Hist. v. 2. 386. Cochleata fructu echinato minimo; Riv. t. 88. f. 14.)—Stalks many-flowered. Stipulas half-ovate, undivided. Leaflets obovate, hairy. Legumes orbicular, hairy, of three or four turns, with two divaricated rows of hooked spines.—Native of Germany, Hungary, Switzerland, France, and England, chiefly on a calcareous soil. Mr. Woodward found it at Narburgh, Norfolk. A small prostrate downy species; its *leaflets* strongly toothed at the very summit only. *Flowers* four or five on each stalk, with a hairy calyx. *Legumes* small, orbicular,

cular,

cular, diftinguifhed by their numerous rigid, fpreading, but ftrongly hooked, prickles.

β. M. polymorpha hirfuta. Linn. Sp. Pl. 1099. (Medica echinata hirfuta; Bauh. Hift. v. 2. 386.) This is faid by Willdenow to be a variety, four times as large as the common *minima*, and lefs hairy. We know it not, but we have from Switzerland, intermixed with the common fort, a few fpecimens diftinguifhed by the long fpines of their fruit, hooked at the tip only. Thefe require inveftigation in a living ftate. They may be Bauhin's plant.

36. M. *nigra*. Black Prickly Medick. Willd. Sp. Pl. v. 3. 1418. (M. polymorpha nigra; Linn. Syft. Veg. ed. 14. 694. M. hifpida; Gærtn. v. 2. 349. t. 155. Morif. fect. 2. t. 15. f. 19.)—Stalks about two-flowered. Stipulas deeply toothed. Leaflets obovate. Legumes cylindrical, rather depreffed, of feveral clofe turns, with long, fpreading, black, hook-tipped fpines.—Native of the fouth of France. We have no fpecimen. It feems to be diftinguifhed by the long black prickles of the fruit, whofe points are faid to be hooked, though no fuch character is fhewn in the figures quoted. Gærtner furely mifapplies Rivinus's f. 12, in which, as we have obferved under n. 34, the veins are concentric, not reticulated as Gærtner reprefents them in his *hifpida*.

37. M. *laciniata*. Jagged-leaved Medick. Willd. Sp. Pl. v. 3. 1419. (M. polymorpha laciniata; Linn. Sp. Pl. 1099. Cochleata fyriaca; Riv. Tetr. Irr. t. 91. f. 1.)—Stalks about two-flowered. Stipulas fringed with capillary teeth. Leaflets linear-wedge-fhaped, abrupt, cut. Legumes cylindrical, of many turns, with two rows of alternately divaricated, ftrong, hook-tipped fpines.—Native of the fouth of Europe and north of Africa. This fpecies is readily known by its narrow jagged *leaflets*. The *ftipulas* are cut into deep capillary fegments. *Flowers* one or two, on long flender ftalks. *Legumes* cylindrical, fomewhat elliptical, the fize of a large pea, compofed of about five clofe turns, armed with a double divaricated row of peculiarly ftrong, awl-fhaped, fmooth, polifhed fpines, very minutely hooked at their tips only.

It is proper to obferve that all the fpecies of this fecond fection have yellow *flowers* on axillary ftalks; the *ftem*, where not defcribed otherwife, proftrate, branched from the *root*, which is generally annual. The *leaflets* are always more or lefs toothed. In quoting Morifon throughout this article, we have not thought it worth while to copy his long names or definitions, but merely to cite his figures. Many of thefe remain ftill unappropriated, for want of better defcriptions. S.

Medicago, in *Gardening*, furnifhes plants of the fhrubby evergreen and herbaceous annual kinds, of which the fpecies moftly cultivated are, the tree medick, or moon trefoil (M. arborea); and the variable medick, or fnail and hedge-hog trefoil (M. polymorpha.)

The fecond fort has numerous varieties and fubvarieties, but the principal ones are, the common fnail medicago, with large fmooth pods, fhaped and twifted like a fnail; the hedge-hog medicago, with large prickly fnail-fhaped pods, armed with fpines pointing every way, like a hedge-hog; with turbinated pods; with globular pods; with orbicular pods; with long crooked pods; with double pods; with twifted pods; and with jagged leaves.

Method of Culture.—The firft fort may be raifed from feeds or cuttings.

In the former mode the feeds fhould be fown in the early fpring, on a warm border, or in pots of light mould, and plunged in a moderate hot-bed, till the plants have attained a little growth; when they fhould be gradually hardened to the full air. And in both methods the plants fhould be kept clean, and have protection in the following winter from froft, and in the fpring they fhould be planted out, fome into pots to have the management of green-houfe plants, and others into borders and nurfery rows, in dry warm fituations, the former to remain, and the latter to be occafionally tranfplanted.

But when they are increafed by cuttings, thefe fhould be planted on a bed of light rich earth, or in pots of the fame fort of mould, and plunged in a moderate hot-bed, due fhade and water being given; and when they have formed good roots, in the autumn they may be removed into other pots, or the fituations in which they are to remain, fhading and watering them till they are well rooted, when they fhould be trained up to fticks, to have ftraight ftems and regular heads, their irregular fhoots being annually pruned to keep them in order. Thefe plants are found to grow ftronger and flower better when kept in warm fituations in the open air, than when managed as green-houfe plants. They fhould, however, be fheltered in very fevere winters.

And the fecond fort and varieties may alfo be raifed from feed, which fhould be fown in the early fpring months in the places where the plants are to remain, in patches of feveral feeds, after thinning the plants to two or three of the beft, when they require no further culture. It is the double forts that are chiefly cultivated in the garden.

They both afford variety in the borders and other parts, and the former in the green-houfe among other fimilar plants.

MEDICAL Electricity. It is natural to imagine, that a power of fuch efficacy as that of electricity, would be applied to medical purpofes; efpecially fince it has been found invariably to increafe the infenfible perfpiration, to quicken the circulation of the blood, and to promote the glandular fecretion. Accordingly, many inftances occur in the later period of the hiftory of this fcience, in which it has been tried, on various occafions, with confiderable advantage and fuccefs. Among the variety of cafes to which it has been applied, there are none in which it feems to have been prejudicial, except thofe of pregnancy and the venereal difeafe. In moft diforders, in which it has been ufed with perfeverance, it has given, at leaft, a temporary and partial relief, and in many effected a total cure. The firft inftance that occurs of its falutary effect, was that of a woman, who was cured in a quarter of an hour of a contracted finger, by M. Kratzenftein, at Halle, fo early as the year 1744. It was afterwards applied in a variety of paralytic cafes, by M. Jallabert of Geneva, in 1747; M. Sauvages of the academy in Montpellier, in the courfe of whofe experiments it appeared, that electrification increafes the circulation of the blood about one-fixth; Mr. Patrick Brydone in Scotland, in 1757; the abbé Nollet and others: in feveral of the cafes concerned prefent relief was obtained; but the beneficial effect does not appear to have been permanent. One inftance occurs, related by Dr. Hart of Shrewfbury, and recorded in the Phil. Tranf. vol. xlviii. part ii. p. 785, in which electrification was injurious, and brought on univerfal palfy on a young perfon, whofe right arm was paralytic; and though this palfy was removed by a courfe of medicine, the difeafed arm remained incurable. It alfo appears from a number of experiments made by Dr. Franklin in paralytic cafes, that no permanent advantage was derived from electricity in this diforder; and Mr. Wefley, who was long engaged in a courfe of medical electricity for the benefit of perfons in his connection, obferves, that though many paralytics have been helped by it, no palfy of a year's ftanding has been thoroughly cured by it. However, a remarkable inftance more lately occurs, in which an hemiplegia was cured by this

this means, under the direction of a physician at Greenwich. The patient was in such a state, that boiling water might be applied from her hand to her shoulder, and from her shoulder to her foot, on the diseased side, without being felt. This person was electrified, by drawing sparks from the palsied side, and giving shocks, beginning with stronger shocks, till she began to feel them, and continuing moderate ones, for 18 days; and in that time, during 31½ hours, the number of shocks was 141; and this perseverance was attended with such success, that her feeling was quite restored, and that she became capable of walking, and of writing with the hand, the use of which she had lost. Dr. de Haen observes, that with respect to partial palsies, electrification never did the least harm; and that one or two persons, who had received no benefit from it in six entire months, were yet much relieved by persevering in the use of it; and that some persons discontinuing it, after having received some benefit from it, relapsed again; but afterwards, by recurring to the use of electricity, recovered, though more slowly than before.

Dr. Hart, in 1756, mentions a cure performed on a woman, whose hand and wrist had been for some time rendered useless, by a violent contraction of the muscles; but the most remarkable case of this kind is that related by Dr. Watson, Phil. Transf. vol. liii. p. 10.

The patient, about seven years of age, was seized with an universal rigidity of her muscles, so that her whole body felt more like that of a dead corpse than of a living person; Dr. Watson electrified her, at convenient intervals, from the middle of November 1762, to the end of January 1763, when every muscle of the body was perfectly flexible, and subservient to her will, so that she could stand, walk, and run like other children of her age. Mr. Miles Partington also communicated to the Royal Society a surprising instance of the cure of a very great degree of contraction and rigidity in the sterno-mastoideus muscle by means of electrical sparks and shocks. (Phil. Transf. vol. lxviii. part i. p. 97, &c.) Mr. Wilson mentions a single instance, in which he had cured deafness of seventeen years continuance; but he acknowledges that he tried similar experiments on six other deaf persons without success.

Mr. Lovet and Mr. Wesley have extended the medical application of electricity to a greater variety of cases than any others. Mr. Lovet observes, in his "Essay," that electricity is almost a specific in all cases of violent pains, of however long continuance, in any part of the body; as in obstinate head-aches, the tooth-ache, the sciatica, the cramp, and disorders resembling the gout; and that it has seldom failed to cure rigidities, or a wasting of the muscles, and hysterical disorders; he adds, that it cures inflammations, and a fistula lachrymalis; that it has stopped a mortification, and dispersed extravasated blood; that it has been of excellent use in bringing to a suppuration, or in dispersing without suppuration, obstinate swellings of various kinds, even those that were scrophulous; that it has cured the falling-sickness, and several kinds of fits, and a disorder that seems to have been a gutta serena. He advises to begin, in general, with simple electrification, especially in hysterical cases; then to proceed to take sparks, and lastly, to give moderate shocks. Mr. Wesley observes, that he has scarcely known an instance, in which shocks all over the body have failed to cure a tertian or quartan ague; he mentions cases of blindness cured and relieved by it, and hearing given by it to a person who was born deaf; and he further says, that it has cured bruises, running sores, the dropsy, and a palsy in the tongue; and that it has brought away gravel from the kidnies. In hysterical cases, he recommends the patient's being simply electrified, by sitting on cakes of resin, at least for half an hour morning and evening; and then taking small sparks, and afterwards giving shocks, more or less strong as the disorder requires. Dr. Antonius de Haen, in his "Ratio Medendi," cited by Dr. Priestley (Hist. Elect. vol. i. p. 485, 8vo.), informs us, that a paralysis and trembling of the limbs, from whatever cause it arose, never failed to be relieved by electricity; and that it also certainly cures St. Vitus's dance; that it has been of some use in cases of deafness; but failed in its application to a gutta serena, and strumous neck. Mr. Hey, surgeon of Leeds, mentions several cases in which the power of electricity has been successfully applied to an "amaurosis." The machine was used twice a day; the patient was placed on a stool with glass legs, and had sparks drawn from the eyes and parts surrounding the orbit, especially where the superciliary and infra-orbitary branches of the fifth pair of nerves spread themselves. After this operation had been continued for half an hour, the patient was made to receive for an equal time slight shocks through the affected parts, which were sometimes directed across the head, from one of the temples to the other, but chiefly from the superciliary and infra-orbitary foramina to the occiput. Med. Obs. & Enq. vol. v. p. 1, &c.

In rheumatic cases, Mr. Ferguson observes, that he has generally found electricity successful, by continuing to take sparks from the places where the pain lies, till the skin has been red and pimpled, and the patient has felt a glowing warmth where the sparks were drawn off; and the same method has also proved effectual in old sprains. The use of electricity has also been recommended in cases of sudden death. See Drowning.

In all cases where shocks are given, gentle ones should be first used: and if the disorder continues, they may be gradually increased; and they should be confined to the affected part. The efficacy of electricity in the tooth-ache is so great, that it seldom or ever fails to give immediate relief, unless the tooth be very much decayed. The following instrument will serve for this purpose: it consists of two wires, A B and B E, fixed in the piece of bored wood H, and bent at C D and F G, and at A and B, as in *fig.* 1, *Plate* XV., *Electricity*. If the affected tooth be brought within the two wires at E, and the ring A or B be connected by a chain with the outside of a charged jar, and the other ring be connected by a chain with the knob of the jar, the shock will pass through the wires, and consequently through the tooth. The modes of applying electricity to the human frame, formerly used, were by the shock and spark, and sometimes, though rarely, by single electrification. These modes are now varied and multiplied according to the circumstances of the patient, and the nature of his disorder. Under the conduct of Mr. Birch, an eminent surgeon, who particularly directed his attention to the improvement and application of medical electricity, and of other gentlemen of the profession who have pursued the same course, the cases in which electricity may be employed with success have been ascertained, and its advantages evinced. For an account of this medical apparatus, and of various modes of applying it in different disorders, see Adams's Essay on Electricity, chap. 15, 8vo. 1785.

Dr. Cullen says, that electricity, when properly applied, is one of the most powerful stimulants that can be used to act upon the nervous system of animals. Mr. Birch considers electricity, applied under the form of a fluid, as a sedative, under that of a spark or friction, as a stimulant, and by way of a shock, as a deobstruent, in its action.

Under this head of medical electricity it may not be improper to mention those medicated tubes, the imaginary virtues of of which were first discovered by Signior Pivati, at Venice, and which were much recommended in the years 1747 and 1748, both in Italy, and by Mr. Winkler at Leipsic. These gentlemen imagined, that odorous substances, confined in excited glass vessels, would transpire through the pores of the glass, and communicate their medicinal virtue to the atmosphere of a conductor, and to all persons in contact with it; and that these substances would yield their virtues by being held in the hands of persons electrified; and they pretended that many cures were wrought in this way by the operation of medicines, without being taken into the stomach; but the whole was soon discovered to be a fallacy; and it was incontestibly proved, that no effluvia could pass from the included substances through the pores of excited glass; and that no method was known for causing the power of medicine to insinuate itself into the human body by electricity. Dr. Franklin, by proving that glass was impermeable to the electric fluid itself, and that its electricity was collected from the rubber, &c. evinced the absurdity of every attempt to transmit the effluvia of any substance through the glass. See Franklin's Letters, p. 82, &c.

Medical *Stones*. See Stone.

MEDICAMENTOSUS Lapis. See Lapis.

MEDICI, Cosmo de, in *Biography*, a citizen of Florence, born in that city in 1389, was the eldest son of John, or Giovanni de Medici, who laid the foundation of that greatness which his posterity enjoyed for several ages. By a strict attention to commerce, John acquired immense wealth; by his affability, moderation, and liberality he ensured the confidence and esteem of his fellow-citizens. Without seeking after the offices of the republic, he was honoured with them all. "The maxims," says Mr. Roscoe, "which, uniformly pursued, raised the house of Medici to the splendour which it afterwards enjoyed, are to be found in the charge given by this venerable old man on his death-bed to his two sons." These, on account of their excellence, of the authority by which they were enforced, and of the successful application of them by his posterity, we shall transcribe. "I feel," said he, "that I have lived the time prescribed me. I die content; leaving you, my sons, in affluence and in health, and in such a station, that while you follow my example, you may live in your native place honoured and respected. Nothing affords me more pleasure than the reflection that my conduct has not given offence to any one; but that, on the contrary, I have endeavoured to serve all persons to the best of my abilities. I advise you to do the same. With respect to the honours of the state, if you would live with security, accept only such as are bestowed on you by the laws, and the favour of your fellow-citizens; for it is the exercise of that power which is obtained by violence, and not of that which is voluntarily conferred, that occasions hatred and violence." At the death of this venerable man, in 1428, Cosmo had already attained to high respectability as well in the political as in the commercial world. He had engaged deeply, not only in the extensive commerce by which the family had acquired its wealth, but in the still weightier concerns of government. In the year 1414, when Balthasar Cossa, who had been elected pope, and had assumed the title of John XXIII., was summoned to attend the council of Constance, he chose to be accompanied by Cosmo de Medici, among other men of eminence, whose high characters might countenance his cause. On the death of his father, Cosmo succeeded to the influence possessed by him as head of that powerful family, which rendered him the first citizen of the state, though without any superiority of rank or title. He supported and augmented the family dignity. His conduct was uniformly marked by urbanity and kindness to the superior ranks of his fellow-citizens, and by a constant attention to the interests and wants of the lower class of citizens, whom he relieved with unbounded generosity. By these means he acquired numerous and zealous partizans, whom he considered rather as pledges for the continuance of the power which he possessed, than as instruments to be employed in the ruin and subjugation of the state.

The authority which Cosmo and his descendants exercised in Florence during the 15th century consisted rather in a tacit influence on their part, and a voluntary acquiescence on that of the people, than in any prescribed or definite compact between them. The form of government was that of a republic, directed by a council of ten officers, and a chief executive officer, called the *Gonfaloniere*, or standard bearer, who was chosen every two months. Under this establishment, the citizens imagined they were possessed of the full exercise of their liberties; but such was the influence of the Medici, that they generally assumed to themselves the first offices of the state, or nominated such persons as they esteemed fit for those employments. In this, however, they always paid great respect to popular opinion. Notwithstanding the great prudence and moderation of Cosmo's public conduct, the discontent of the Florentines, with the bad success of the war against Lucca, gave occasion to the preponderance of a party led on by Rinaldo de' Albizi, which, in 1433, after filling the magistracies with their own creatures, seized the person of Cosmo, and proceeded judicially against him, on the pretence that his influence was hazardous to the state. He was committed to prison, in which he remained for several days, in constant apprehension of some violence being offered to his person; but he still more dreaded that the malice of his enemies might make attempts upon his life by poison. On the news of his danger, several princes and states of Italy interfered in his behalf; and in conclusion, he was banished to Padua for ten years, and several other members and friends of the Medici family underwent a similar punishment. He was received with marked respect by the Venetian government, and took up his abode in the city of Venice. Within a year of his retreat, Rinaldo was himself obliged to quit Florence, and Cosmo being recalled, he returned amidst the acclamations of his fellow-subjects. Some victims were offered to his future security, and the gonfaloniere who had pronounced his sentence, with a few others of that party, were put to death. Measures were now taken to restrict the choice of magistrates to the partizans of the Medici, and alliances were formed with the neighbouring powers for the avowed purpose of supporting and perpetuating the system by which Florence was from that time to be governed. The manner in which Cosmo employed his authority, has conferred upon his memory the greatest honour. From this time his life was an almost uninterrupted series of prosperity. The tranquillity enjoyed by the republic, and the satisfaction and peace of mind which he experienced in the esteem and confidence of his fellow citizens, enabled him to indulge his natural propensity to the promotion of science, and the patronage and encouragement of learned men. The richest private citizen in Europe, he surpassed almost all sovereign princes in the munificence with which he patronized literature and the fine arts. He assembled around him some of the most learned men of the age, who had begun to cultivate the Grecian language and philosophy. He established, at Florence, an academy expressly for the elucidation of the Platonic philosophy, at the head of which he placed the celebrated Marsilio Ficino. He collected from all parts, by means of foreign correspondences, manuscripts of the

Greek,

Greek, Latin, and Oriental languages, which were the foundation of the Laurentian library. He gave great encouragement to the arts of painting, sculpture, and architecture, by the vast sums which he expended in the public edifices of the city, as well as in his private palaces. He also collected the valuable remains of ancient art in statues, vases, gems, and medals; and all his treasures were made liberally accessible to the curious.

Towards the latter period of his life, a great part of the time that Cosmo could withdraw from the administration of public affairs was passed at his seats at Careggi and Caffaggiolo, where he applied himself to the cultivation of his farms; but his happiest hours were devoted to the study of letters and philosophy, or passed in the company and conversation of learned men. In his country retreats he was usually accompanied by Ficino, where, after having been his protector, he became his pupil in the study of the Platonic philosophy. His attachment to the sentiments of antiquity did not render him indifferent to the religion of his country, and he displayed his piety according to the fashion of the age, by numerous religious foundations which he munificently endowed. He even erected a noble hospital at Jerusalem for the relief of distressed pilgrims. The spirit of his government was mildness and moderation. He never assumed a state beyond that of a citizen in a republic, and avoided every open exertion of authority which could lead the Florentines to suspect they had lost their liberties.

The wealth and influence that Cosmo had acquired, had long entitled him to rank with the most powerful princes of Italy, with whom he might have formed connections, by the intermarriage of his children; but being apprehensive that such measures would give rise to suspicions that he entertained designs inimical to the freedom of the state, he rather chose to increase his interest among the citizens of Florence, by the marriage of his children into the most distinguished families of that place. Piero, his eldest son, married Lucretia Tornabuoni, by whom he had two sons, Lorenzo, the subject of the following article, and Giuliano. Cosmo conversed freely with all orders of men, and there was scarcely a citizen whom he had not some time obliged by loans of money of which he never expected the repayment. His immense wealth was not the object of envy, because he chiefly expended it upon the public; so that it was a kind of common fund in which all had an interest. Parties were again formed in Florence hostile to the predominance of the Medici. The popularity of Cosmo, however, was not to be shaken, and while he withdrew from public business, he retained the influence of his benefits and virtues. He had lost his second son, Giovanni, on whom he had placed his chief expectations, as his eldest, Piero, laboured under various bodily infirmities, and he apprehended that at his own decease the splendour of his family would close. These reflections embittered the repose of his latter days: and he exclaimed, a short time before his death, as his attendants were carrying him through the apartments of his palace, "This is too large a house for so small a family." His latter days were, however, cheered by the honourable testimony to his merit, afforded by his fellow-citizens, in a public decree, conferring upon him the noble title of *Father of his Country*, which was inscribed on his tomb, and has ever since adhered to his name.

About three weeks before his death, when his strength began rapidly to decline, he entered into conversation with Ficino, lamenting the miseries of life, and the imperfections inseparable from human nature. As he continued his discourse, his sentiments and his views became more elevated, and from bewailing the lot of humanity, he began to exult in the prospect of that happier state towards which he felt himself approaching. He died August 1st, 1464, at the age of seventy-five years, deeply lamented by a vast majority of the citizens of Florence, whom he had firmly attached to his interest, and who feared for the safety of the city from the dissentions that were likely to ensue. Roscoe's Life of Lorenzo. Univer. Hist.

MEDICI, LORENZO DE, surnamed *The Magnificent*, grandson of Cosmo, and son of Piero de Medici, by Lucretia Tornabuoni, was born on January 1, 1448. He was about sixteen years of age when Cosmo died, and had, at that time, given striking indications of extraordinary talents. From his earliest years he had exhibited proofs of a retentive and vigorous mind, which had been cultivated by a very careful education, chiefly under the direction and good conduct of his mother Lucretia, who was one of the most accomplished women of the age, and who had distinguished herself not only as a patroness of learning, but by her own writings. The disposition of Lorenzo, which afterwards gave him a peculiar claim to the title of "Magnificent," was apparent in his childhood. Having received, as a present, a horse from Sicily, he sent the donor, in return, a gift of much greater value, and on being reproved for his profuseness, he remarked, that there was nothing more glorious than to overcome others in acts of generosity. In his youth he had the advantage of the instructions of some of the wisest and most learned men of the age, in the languages, and philosophy of antiquity, and the principles of polite literature. To the latter he displayed a decided inclination by some early poetical compositions in his native tongue; but he seemed formed for excelling in every thing that becomes an object of attention. He was not less addicted to active sports and laborious exercises, than to the studies of the closet, and was equally dextrous in the management of business, and in the pursuits of arts and science. Tall in his stature, robust in his form, Lorenzo had in his person more the appearance of strength than of elegance. From his birth he laboured under peculiar disadvantages; his sight was weak, his voice harsh and unpleasing, and he was totally deprived of the sense of smell. With all these defects, his countenance was dignified, and strongly indicated the magnanimity of his character; and the effects of his eloquence were conspicuous on many important occasions. At the death of Cosmo, on account of his father's infirmities, it was thought proper immediately to initiate Lorenzo into political life. He was, accordingly, sent to visit the principal courts of Italy for the purpose of forming a personal connection with the rulers, and making observations on the circumstances of each state. He strengthened the interests of his family in an interview with Ferdinand, king of Naples, who was impressed with a high idea of his early wisdom; and the prudence and vigour of his conduct at home were materially instrumental in restoring the superiority of the Medici. In 1469, Lorenzo married Clarice, the daughter of a member of the noble family of Orsini, and in the same year Piero de Medici died, leaving his two sons, Lorenzo and Giuliano, the heirs of his power and property. Immediately after the death of his father, Lorenzo, at the request of the people of Florence, took upon himself that post of head of the republic which Cosmo and Piero had occupied. Upon the accession of Sixtus IV. to the papacy, Lorenzo, with other eminent citizens, were deputed to congratulate him on the part of the Florentine republic. On this occasion he was invested with the office of treasurer of the holy see, and he took the opportunity of his abode at Rome to make valuable additions to the remains of ancient art already collected by his family. One of of the first public occurrences after he conducted the helm of government was a revolt of the inhabitants of Volterra, on account of a dispute with the Florentine republic; by the recommendation of Lorenzo, means of force were adopted, which ended in the sack of the unfortunate city, an event that gave him much concern. In 1472, he was the means of re-establishing the academy of Pisa, and he took up his residence for a considerable time in that city for the purpose of completing the work; exerted himself in selecting the most eminent professors, and contributed to it a large sum from his private fortune, in addition to that granted by the state of Florence. Zealously attached to the Platonic philosophy, he took an active part in the establishment of an academy for its promotion, and instituted an annual festival in honour of the memory of Plato, which was conducted with singular literary splendour. While he was thus advancing in a career of prosperity and reputation, a tragical incident was very near depriving his country of his future services. This was the conspiracy of the Pazzi, a numerous and distinguished family in Florence, the rivals of the house of Medici. The instigators of this foul conspiracy, of which the object was the assassination of Lorenzo and his brother, were pope Sixtus IV. and his nephew, cardinal Riario: and the archbishop of Pisa, Salviati, was the principal agent in the horrid design. Giacopo de Pazzi, the head of that family, gave his name and assistance, and several persons of desperate character undertook to aid in the execution. Nothing could exceed the atrocity of the plan which was to assassinate the two brothers, while they were partaking of the hospitality of Lorenzo; but the absence of Giuliano, on account of indisposition, obliged the conspirators to postpone the attempt. Thus disappointed, another plan was to be adopted, and on further deliberation it was resolved that the assassination should take place on the following Sunday, in the church, at the instant of the elevation of the host.

The immediate assassination of Giuliano was committed to Francesco de Pazzi and Bernardo Bandini, and that of Lorenzo had been intrusted to the sole hand of Montesicco. This office he had willingly undertaken while he understood that it was to be executed in a private dwelling, but he shrunk from the idea of polluting the house of God with so heinous a crime. Two ecclesiastics were therefore selected for the commission of a deed, from which the soldier was deterred by conscientious motives. It was in the month of April 1478, the young cardinal Riario, apostolic legate, a guest in the palace of Lorenzo, proceeded to the church of the Reharata, since called "Santa Maria del Fiore," where the intended victims were present. The conspirators having taken their stations, waited with impatience for the appointed signal. The bell rang—the priest raised the consecrated wafer; the people bowed before it, and at the same instant Bandini plunged a short dagger into the breast of Giuliano. On receiving the fatal wound he took a few hasty steps and fell, when the other fiend, Francesco de Pazzi, rushed upon him with incredible fury, and stabbed him in different parts of his body, continuing to repeat his strokes even after he was apparently dead. Such was the violence of his rage that he wounded himself deeply in the thigh. The priests who had undertaken the murder of Lorenzo were not equally successful: they inflicted only a slight wound, which rather roused him to his defence, than disabled him. He instantly threw off his cloak, and holding it up as a shield in his left hand, with his right hand drew his sword, and repelled the assailants, who fled. Bandini came up with his dagger streaming with the blood of Giuliano, but was instantly laid dead by a servant of the Medici. In the mean time, the friends of Lorenzo assembled round him, and conducted him home in safety. An attack upon the palace of government where the magistrates were sitting, by other conspirators, failed of success, and the people attached to the Medici, collecting in crowds, put to death or apprehended the assassins, whose designs were thus entirely frustrated, with the exception of the death of Giuliano. Signal and instant justice was inflicted on the criminals. The archbishop of Pisa was hanged out of the palace window in his sacerdotal robes, and Giacopo de Pazzi, with one of his nephews, shared the same fate. Lorenzo did himself honour by his efforts to restrain the fury of the populace, and induce them to commit to the magistrates the farther pursuit of the guilty. The name and arms of the Pazzi family were suppressed, its members were banished, and Lorenzo rose still higher in the esteem and affection of his fellow-citizens. The pope, inflamed almost to madness by the defeat of his schemes, excommunicated Lorenzo, and the magistrates of Florence, laid an interdict upon the whole territory, and forming a league with the king of Naples, prepared to invade the Florentine dominions. Lorenzo appealed to all the surrounding potentates for the justice of his cause; and he was affectionately supported by his fellow-citizens. Hostilities began, and were carried on with various success through two campaigns. At the close of the year 1479, Lorenzo took the bold resolution of paying a visit to the king of Naples, and, without any previous security, trusted his liberty and his life to the mercy of a declared enemy. The monarch was struck with this heroic act of confidence, and a treaty of mutual defence and friendship was agreed upon between them. Sixtus, however, persevered in the war, till a descent upon the coast of Italy by Mahomet II. excited such an alarm, that he consented to a peace upon the submission of the Florentine deputies to his pontifical reprimands.

Another attempt was made to assassinate Lorenzo in a church in the month of May 1481, but the plot was happily discovered, and the agent and his accomplices were seized and executed. From this time he generally appeared in public, surrounded with friends as a guard, a circumstance which has been represented by his enemies as a symptom of tyranny. His political conduct as head of the Florentine republic was chiefly directed to the preservation of the balance of power among the Italian states. The death of Sixtus IV. freed him from an adversary who never ceased to bear him ill-will, and he was able to secure himself a friend in his successor Innocent VIII. He conducted the republic of Florence to a degree of tranquillity and prosperity which it had scarcely ever known before, and by procuring the institution of a deliberative body of the nature of a senate, he corrected the democratical part of its constitution.

Lorenzo distinguished himself beyond any of his predecessors in the encouragement of literature and the arts: his proficiency in Italian poetry would have conferred distinction even upon one who had no other merit to adduce. The productions of this great man are distinguished by a vigour of imagination, an accuracy of judgment, and an elegance of style, which afforded the first great example of improvement, and entitle him, almost exclusively, to the honourable appellation of the "restorer of Italian literature." His compositions are sonnets, canzoni, and other lyric pieces, some longer works in stanzas, some comic satires, and jocose carnival songs, and various sacred poems, the latter as serious, as many of the former are licentious. Some of these pieces, especially those of the lighter kind, in which he imitated the rustic dialect, became extremely

tremely popular. His regard to literature, in general, was teſtified by the extraordinary attention which he paid to the augmentation of the Laurentian library. Although the anceſtors of Lorenzo laid the foundation of the immenſe collection of MSS. contained in this library, he may claim the honour of having raiſed the ſuperſtructure. If there was any purſuit in which he engaged more ardently and perſevered in more diligently than the reſt, it was that of enlarging his collection of books and antiquities: for this purpoſe he employed the ſervices of learned men, in different parts of Italy, and eſpecially of his intimate friend and companion Angelo Politiano, who took ſeveral journies in order to diſcover and purchaſe the valuable remains of antiquity. "I wiſh," ſaid Lorenzo to him as he was proceeding on one of theſe expeditions, "that the diligence of Pico and yourſelf would afford me ſuch opportunities of purchaſing books, that I ſhould be obliged even to pledge my furniture to poſſeſs them." Two journies, undertaken at the inſtance of Lorenzo, into the eaſt, by Giovanni Laſcar, produced a great number of rare and valuable works. On his return from his ſecond expedition, he brought with him two hundred copies, many of which he had procured from a monaſtery at mount Athos; but this treaſure did not arrive till after the death of Lorenzo, who, in his laſt moments, expreſſed to Politiano and Pico his regret that he could not live to complete the collection which he was forming for their accommodation. On the diſcovery of the invaluable art of printing, Lorenzo was ſolicitous to avail himſelf of its advantages in procuring editions of the beſt works of antiquity corrected by the ableſt ſcholars, whoſe labours were rewarded by his munificence. When the capture of Conſtantinople by the Turks cauſed the diſperſion of many learned Greeks, he took advantage of the circumſtance, to promote the ſtudy of the Greek language in Italy. It was now at Florence that this tongue was inculcated under the ſanction of a public inſtitution, either by native Greeks, or learned Italians, who were their powerful competitors, whoſe ſervices were procured by the diligence of Lorenzo de Medici, and repaid by his bounty. "Hence," ſays Mr. Roſcoe, "ſucceeding ſcholars have been profuſe of their acknowledgments to their great patron, who firſt formed that eſtabliſhment, from which, to uſe their own claſſical figure, as from the Trojan horſe, ſo many illuſtrious champions have ſprung, and by means of which the knowledge of the Greek tongue was extended, not only through all Italy, but through France, Spain, Germany, and England; from all which countries numerous pupils attended at Florence, who diffuſed the learning they had there acquired throughout the reſt of Europe."

The ſervices of Lorenzo to the fine arts were not leſs conſpicuous than thoſe which he rendered to letters. Coſmo had collected all the moſt valuable remains of ancient taſte and ſkill that he could obtain. His treaſures were vaſtly augmented by Lorenzo, who propoſed to himſelf the improvement of modern art as the chief end of his magnificence in this point. Of the earneſtneſs with which Lorenzo engaged in this purſuit inſtances may be adduced. It is ſaid that thoſe who wiſhed to oblige him were accuſtomed to collect from every part of the world medals and coins, eſtimable for their age or their workmanſhip, ſtatues, buſts, and whatever elſe bore the ſtamp of antiquity. By his conſtant attention to this purſuit, and by the expenditure of conſiderable ſums, he collected, under his roof, all the remains of antiquity that fell in his way, whether they tended to illuſtrate the hiſtory of letters or the arts. It is not, however, on this account only that he is entitled to the eſteem of the profeſſors and admirers of the arts. He determined to excite, among his countrymen, a good taſte, and, by propoſing to their imitation the remains of the ancient maſters, to elevate their views beyond the forms of common life, to the contemplation of that ideal beauty which alone diſtinguiſhes works of art from mere mechanical productions. With this view he appropriated his gardens in Florence to the eſtabliſhment of an academy for the ſtudy of the antique, which he furniſhed with a profuſion of ſtatues, buſts, and other relics of art, the moſt perfect in their kind that he could procure. The attention of the higher rank of his fellow-citizens was incited to theſe purſuits by the example of Lorenzo; that of the lower claſs by his liberality. To the latter he not only allowed competent ſtipends, while they attended to their ſtudies, but appointed conſiderable premiums as rewards of their proficiency. To this inſtitution, more than any other circumſtance, Mr. Roſcoe aſcribes the ſudden and aſtoniſhing proficiency which, towards the cloſe of the 15th century, was evidently made in the arts, and which commencing at Florence, extended itſelf to the reſt of Europe. The gardens of Lorenzo de Medici are frequently celebrated as the nurſery of men of genius, but if they had produced no other artiſt than Michael Angelo Buonarotti, they would have ſufficiently anſwered the purpoſes of the founder. It was here that this great man began to imbibe that ſpirit which was deſtined to effect a reformation in the arts, and which, perhaps, he could have derived from no other ſource. The art of architecture he encouraged by the numerous buildings which he erected, or induced others to erect in Florence and its vicinity, after deſigns furniſhed by the ableſt artiſts. By theſe exertions he prepared the way for thoſe wonders which have rendered the age denominated from his ſon Leo X. one of the moſt ſplendid in the records of mankind.

Lorenzo, in his domeſtic concerns, deſerves conſiderable, but by no means unmixed praiſe. The licentiouſneſs which characterizes ſeveral of his poems is ſaid to have tainted his manners with reſpect to the female ſex. He was neverthelеſs a very affectionate and attentive father, ſolicitous for the inſtruction of his children, whom he placed under the care of Politiano, and he was fond of partaking in their ſports and amuſements. The exigencies of the republic in conſequence of its wars had obliged him to borrow, in his own name, large ſums, which the negligence or infidelity of his commercial agents and correſpondents rendered it difficult for him to repay; and a decree for the diſcharge of his debts out of the public treaſury was neceſſary to relieve him from his embarraſſments. From this period he determined to quit his mercantile concerns, for the improvement of his eſtates under his own eye. He had a numerous family, in the ſettling of which he was as ſucceſsful as an ambitious parent would generally deſire. His eldeſt ſon Piero, deſigned for his own ſucceſſor in the Florentine ſtate, was ſent, at the age of fourteen, to viſit the pope, and cultivate the family intereſt of Rome. The object of his cloſe connection with the pontiff, and the profound reſpect which he always teſtified for the holy ſee, was the attainment of the favourite point of his ambition, the elevation of his ſecond ſon Giovanni to the cardinalate, with the future proſpect of his filling the papal chair. By means of inceſſant applications, he prevailed upon the pope to confer upon Giovanni, at the age of thirteen, the high dignity of one of the princes of the Roman church, which was unqueſtionably a flagrant violation of decorum, diſhonourable to both.

"It was," says one of the biographers of Lorenzo, "a deserved consequence of this prostitution of ecclesiastical honours, that this cardinal, when arrived at the popedom, should, by his levity and extravagance, have given the immediate occasion to that defection from the church of Rome, which has so much reduced her power and authority." (For a farther account of this pontiff, the reader is referred to Leo X.) Of his other children, Giuliano became allied to the royal house of France, and obtained the title of the duke of Nemours; and his daughters married into noble families.

In the year 1488, Lorenzo's domestic comfort was much impaired by the loss of his wife. He was at this time absent at the warm baths, which he was often obliged to use, on account of a gouty complaint that severely afflicted him, and had made an early breach in his constitution. In the intervals of ease and health, he appears to have flattered himself with the expectation of enjoying the reward of his public labours, and partaking of the general happiness, which he had so essentially contributed to promote, in a peaceful and dignified retirement, enlivened by social amusements, by philosophic studies, and literary pursuits. These expectations were built upon the most substantial foundation, the consciousness that he had discharged his more immediate duties and engagements. "Having," says he, "now obtained the object of my cares, I trust I may be allowed to enjoy the sweets of leisure, to share the reputation of my fellow-citizens, and to exult in the glory of my native place." This prospect of relaxation and happiness he was not destined to realize. Early in the year 1492, the complaint under which he laboured attacked him with additional violence, and while the attention of his physicians was employed in administering relief, he contracted a slow fever, which escaped their notice, until it was too late effectually to oppose its progress. He sunk, almost before his attendants suspected danger, into such a state of debility, as totally precluded all hopes of recovery. Having performed the offices of the church, and adjusted with sincerity and decorum his spiritual concerns, he requested a private interview with his son Piero, with whom he held a long and interesting conversation on the state of the republic, the situation of his family, and the conduct which it would be expedient for him to pursue. When Lorenzo had relieved his mind from the weight of its important concerns, he became more sensibly alive to the emotions of friendship. At this moment Politiano entered his chamber: Lorenzo heard his voice, and raising his languid arms, clasped the hands of his friend in his own, and at the same time steadfastly regarded him with a placid and even a cheerful countenance. Deeply affected at this silent, but unequivocal proof of his esteem, Politiano could not suppress his feelings, but, turning his head aside, attempted, as much as possible, to conceal his sobs and his tears. Perceiving his agitation, Lorenzo still continued to grasp his hand, as if intending to speak to him when his passion had subsided; but finding him unable to resist its impulse, he relaxed his hold, and Politiano, hastening into an inner apartment, flung himself on a bed, and gave way to his grief. Having at length composed himself, he returned to the chamber, when Lorenzo enquired with great kindness why Pico of Mirandola had not once paid him a visit during his sickness. Politiano apologized for his friend, by assuring Lorenzo that he had only been deterred by the apprehension that his presence might be troublesome. "On the contrary," replied Lorenzo, "if his journey from the city be not troublesome to him, I shall rejoice to see him before I take my final leave of you." Pico came, prepared with a melancholy pleasure, to share, for the last time, the interest of his conversation. Lorenzo expressed his esteem for him in the most affectionate terms, professing that he should meet death with more cheerfulness after this last interview. He then changed the subject to more familiar and lively topics; and it was on this occasion that he expressed, with some degree of jocularity, his wishes that he could have obtained a reprieve, until he could have completed the library destined to the use of his auditors. This interview was scarcely terminated, when the haughty priest Savonarolo reminded him, that it was his duty to bear death with fortitude, "with cheerfulness," replied Lorenzo, "if such be the will of God." His vivacity as well as his resignation were perceptible almost to the last moment. Being asked, on taking a morsel of food, how he relished it, "as a dying man always does," was his reply. Having affectionately embraced his surrounding friends, and submitted to the last ceremonies of the church, he became absorbed in meditation, occasionally repeating portions of scripture, and accompanying his ejaculations with elevated eyes and solemn gestures of his hands, till the energies of life gradually declining, and pressing to his lips a magnificent crucifix, he calmly expired, in the forty-fourth year of his age. Few persons of his condition have filled so contracted a space of life with so much glory and prosperity.

In summing up his character, Mr. Roscoe says, he is "a man who may be selected from all the characters of ancient and modern history, as exhibiting the most remarkable instance of depth of penetration, versatility of talent, and comprehension of mind.——Of the various occupations in which Lorenzo engaged, there is not one in which he was not eminently successful: but he was more particularly distinguished in those which justly hold the first rank in human estimation. The facility with which he turned from subjects of the highest importance, to those of amusement and levity, suggested to his countrymen the idea that he had two distinct souls combined in one body. Even his moral character seems to have partaken, in some degree, of the same diversity; and his devotional poems are as ardent as his lighter pieces are licentious. On all sides he touched the extremes of human character, and the powers of his mind were only bounded by that impenetrable circle, which prescribes the limits of human nature."

After all that we have said of this great man, and his grandfather Cosmo, those who would rightly appreciate their talents and various virtues, will consult the life of Lorenzo De Medici by Mr. Roscoe, of which the first chapter is chiefly devoted to Cosmo, the remainder of the three volumes to Lorenzo and the fortunes of his house.

MEDICINA Musica, or the medicinal Power of Music; being an essay on the effects of singing, music, and dancing on the human frame, revised and corrected. To which is annexed, a new essay on the nature and cure of the spleen and vapours, by Richard Browne, apothecary at Oakham, in the county of Rutland, small 12mo. London, 1729.

This is the title of a small tract but little known; but as it is not devoid of merit, we shall give some account of the author's principles. We feared we should have had the old stories over again, of Orpheus, Linus, Amphion, and Terpander; but their names do not once occur in the work. The author does not ascribe any miraculous powers to music, as the Greeks, the Chinese, and the Arabians have done; who pretend to cure many diseases with the instrument called *Oüd*, resembling our lute: he only points out its mechanical effects on the nerves and animal spirits. He is moderate in his demands, and modest in his assertions. It is not elaborate composition,

composition, or exquisite performance, that is required to operate the effects which he describes; but the *dulce linimen* of Horace.

The gentle exercise of the lungs in singing, as well as the gratification of the ear in hearing sweet tones well accented, are among the prescriptions. And for this he only requires the patient to have an ear well organized, and the vocal performance to consist of gay and lively strains, so that the body and the mind may be reciprocally affected by the production and sensation of sound. As the motion of the blood is accelerated or retarded during the rise or fall of the mercury in the barometer; so in singing, the pressure of the air upon the lungs is greater than in common respiration.

The author supports his opinions ably and anatomically. He seems to have loved and understood music, though he never speaks of it with the enthusiasm of a rapturist.

Among the possible evils of too frequent and too violent exercise of the lungs, we wish the author had cautioned parents not to let their children, whatever disposition they may discover for singing, begin to exercise the voice seriously in difficult songs, or *solfeggios*, till arrived at their teens: as we have frequently known a promising voice sung away, by tearing and straining the vocal organ beyond its power. Let them hum a tune, or sing a light and pleasing ballad if they please; but leave different intervals, and long and high notes, to a more robust and mature age.

In asthmatic complaints, when the tone of the stomach is relaxed, and appetite fails; and in nervous disorders, as music raises the spirits, and diverts our attention from ourselves and our woes, real or imaginary, singing is not only amusing but salutary.

The author, however, seems to think that nervous and low-spirited persons should refrain from pathetic, melancholy, and languid airs, which, instead of exhilarating and enlivening the spirits, rather tend to their depression. But on the contrary, in affliction, pain, and sorrow, as well as in hypochondriac and calamitous cases, when gay and lively music is to the last degree offensive, we rather enlist with those who think grave music, if it cannot radically cure, can sooth, alleviate, and afford a temporary relief.

And among the medicinal effects of modern music that border on the marvellous, we read in the memoirs of the Acad. des Sciences at Paris, that a musician was cured of a violent fever, by a concert of well selected and well executed music in his bed-chamber. And the effect which Farinelli's singing had on Philip V. king of Spain, who like Saul seemed to have been troubled with an evil spirit, has never been disputed.

As to the author's *Medicina Gymnastica*, as a specific for spleen, vapours, and hypochondriac affections, we shall leave the consideration of these mysterious disorders to the profound sons of Æsculapius, who peradventure may be perfectly acquainted with their nature and existence. Mr. Browne, who has not defined them very clearly, prescribes, however, after other preparatory medicines, dancing to a good band of music for the completion of the cure. And as the music is meant to exhilarate and excite motion, the whole process seems reduced to the two most simple of all Hygeia's agents, *Air* and *Exercise*.

To these Armstrong adds *Sun-shine*.

"Cheer'd by thy kind invigorating warmth,
We court thy beams, great majesty of day!
If not the soul, the regent of this world,
First-born of heaven, and only less than God!"

MEDICINAL Waters. See Waters.

Medicinal *Sacculus*. See Sacculus.

MEDICINE, Medicina, from *mederi, to heal* or *cure*, is the art of restoring health to the sick.

It must be obvious, from a slight consideration of the subject, that various and complicated knowledge must conspire to give perfection to this art. It is not from the labours of an individual, though he were an Esculapius, nor even from the united collections of an age, that the nature and means of curing the disorders of the animal frame can be fully ascertained. For, to trace the matter in detail, it is necessary to be previously acquainted with the structure of the animal machine, or with the *anatomy* of the body; and likewise with the uses and actions of its various organs, in a state of health, the knowledge of which constitutes the science of *physiology*. But to the proper cultivation of this science, a previous knowledge of many other departments of science is absolutely necessary. Almost every branch of natural philosophy, indeed, contributes to the explanation of the functions of the animal economy. The uses of the eye are intelligible only upon the principles of *optics*, as applied to inorganic instruments; the functions of the ear upon those of *acoustics*; and the various mechanical operations of the body, such as those of muscular motion, the circulation of the fluids, the action of respiration, &c. upon the common principles of *mechanics* and *hydrostatics*: not to mention the numerous changes in the combinations and properties of the fluids; in the blood, as it passes through the lungs; in the food and drink, under the process of digestion; and in the various secreted fluids, as the urine, milk, bile, &c.; for the elucidation of which, the science of *chemistry* lends its aid. Upon these branches of knowledge the foundation of medicine is laid; but the superstructure requires many additional materials for its erection. The animal machine differs materially from all other examples of mechanism; principally in the possession of a self-sustaining and self-moving power, upon which alone the operation of every external influence must be directed; and from which result many phenomena, that belong exclusively to its constitution, and are inexplicable on any of the principles of mechanical or chemical philosophy: but it differs likewise, secondarily, in the circumstance that its motions are not (as in other machines) exposed to our view; that we cannot remove, repair, and renew, (as in them,) those parts or organs which become inadequate to their functions, and cannot suspend the motion of the whole but for a moment, without the imminent risk of stopping it for ever. Hence then, in addition to the principles of mere mechanism, the study of the animal constitution includes a series of minute observations on those phenomena, which are the result of *life*; and this study is necessarily rendered more obscure and difficult, from the circumstance last alluded to: for the internal operations of the vital machine, not being directly cognizable, can only be ascertained by indirect inference from external and obvious signs or symptoms. These signs or symptoms, therefore, are the sole object of the examination of the practisers of the art of medicine, and the sole guides of their proceedings. But as the existence and the nature of disease are known only by a comparison of those signs, which are exhibited by the body in health, with those which occur in disease; so the study of symptoms includes not only the science of *pathology*, but also a knowledge of the various *temperaments*, as they have been called, or of those various appearances of the structure, complexion, size, strength, &c. which are all compatible with health. (See Temperament.) The signs of the respective diseases of the different organs of the body we have detailed under their proper appellations, in the

the various articles in *medicine* and *ſurgery*; and a ſeries of the ſigns which are to be inveſtigated, as the indications of diſeaſe in general, will be found under the article DISEASE.

Poſſeſſed, however, of this knowledge, we ſhould ſtill be little more than uſeleſs, though learned, ſpectators of the phenomena of diſeaſe, if we were ignorant of all means of controlling the actions of the vital power. The art of medicine, then, obviouſly requires alſo a knowledge of the various productions of the material world, and of their properties, *i. e.* their agency upon the animal ſyſtem: for theſe productions afford the inſtruments by which alone art can effect any phyſical change in its condition. A ſeries of ages would be requiſite to teach mankind the phyſical properties of the animal, vegetable, and mineral ſubſtances, by which they are ſurrounded; and the nature of many of them could only be aſcertained by accidental trials, from the fatality, injury, or benefit derived from which, a ſlow but multiplying experience would ultimately ariſe. "Hæc ſimiliaque cum quotidie inciderent, diligentes homines notaſſe, quæ plerumque melius reſponderent; deinde ægrotantibus ea præcipere cæpiſſe: ſic medicinam ortam, ſubinde aliorum ſalute, aliorum interitu, pernicioſa diſcernentem a ſalutaribus." (Celſus. Præf.) The knowledge of the *materia medica* has thus been gradually brought to that comprehenſive extent, in which it exiſts at preſent, by a long ſeries of experiments, aided by the reſearches of travellers and naturaliſts, and by the diſcoveries and combinations of chemiſts.

The progreſs of the art of medicine, however, as Celſus has intimated, was the reverſe of the foregoing ſtatement. "Repertis deinde medicinæ remediis, homines de rationibus eorum differere cæpiſſe; nec poſt rationem, medicinam eſſe inventam; ſed poſt inventam medicinam, rationem eſſe quæſitam." (Loc. cit.) The hiſtory of the progreſs of medicine is, in fact, principally a hiſtory of thoſe reaſonings, or hypothetical ſyſtems, adopted by different individuals and their followers; and theſe conſiſted chiefly in transferring to the ſcience of life the doctrines of the collateral departments of philoſophy, which were ſucceſſively cultivated, as the following ſketch will evince.

MEDICINE, *Hiſtory of*. The hiſtory of medicine has for its object to deſcribe the origin and progreſs of the art, and to inveſtigate the cauſes and conſequences of the different revolutions which it has undergone.

Some authors have waſted much time and learning in attempting to depict the firſt origin of phyſic. Thus Schulze, a writer of great erudition, who was profeſſor at Altorf in the beginning of the 18th century, has traced it to the fall of man; ſhewing, with great gravity, what obſervations Adam and Eve were likely to make on the ſubject of their natural appetites, and the evacuations which followed their indulgence; what a rich ſtore of phyſiological knowledge they would collect, "quum ſe mutuo contemplarentur, quum amplecterentur, coirent;" and how probable it is, that Adam, yielding to the neceſſity of the occaſion, "laboranti amicæ, obſtetricias manus adhibuiſſe, ſicque chirurgiæ primam forte operationem exercuiſſe!" Even Le Clerc thinks it neceſſary to diſcuſs the queſtion, "Si la médécine eſt venue immediatement de Dieu?" and to ſhew, that the firſt man muſt have been alſo the firſt phyſician. And Brambilla, a ſurgeon of ſome repute at Vienna, aſſerts that Tubal Cain was the inventor and manufacturer of ſeveral ſurgical inſtruments; whence he endeavours to prove the greater antiquity of ſurgery!

It is evident, however, that medicine muſt have had a very early origin: for mankind, even in the moſt uncivilized ages of the world, would ſoon be led to remark the more or leſs agreeable, and more or leſs ſalubrious, qualities of the different articles of their food; and expoſed, as they would be, in the common courſe of things, to a variety of accidents, they would, by degrees, learn the means of alleviating the pain, or averting the conſequences of the more uſual external injuries. They would thus, in proceſs of time, form to themſelves certain dietetic maxims and rules, for the treatment of thoſe diſeaſes to which they found themſelves liable. Their materia medica would probably, at firſt, conſiſt of only a few herbs, which they had diſcovered to be efficacious in ſuppreſſing hemorrhage, and in healing wounds, or to which they imputed virtues, real or imaginary, in the cure of internal complaints; but all the concomitant circumſtances, under which they had obſerved recovery, in any doubtful caſe, to take place, would be regarded as indiſpenſable in every ſimilar caſe, and would be imitated accordingly. "Tunc non ſanabat medicina," as Meibomius ſhrewdly remarks, "ſed quidquid videbatur ſanaſſe erat medicina." Unacquainted, however, with the economy of the human body, and unable, for the moſt part, to trace the progreſs of diſeaſe, they would aſcribe the more fatal internal diſorders to the powers of ſorcery, or to the wrath of thoſe deities whom they had been taught to fear; and would reſort, for their cure, to thoſe rites and ceremonies by which they conceived they could break the charm, and pacify the offended gods. Hence would ariſe various ſuperſtitious practices, which would be handed down from one generation to another, and of which the prieſts and magicians of the communities would gladly avail themſelves, as affording them the means of extending their influence. Such we may conceive to have been the origin of the medical art; and ſuch nearly is its condition at the preſent day, among the ſavages of Africa and America, New Holland, Zealand, &c. See Winterbottom's Account of the native Africans in the Neighbourhood of Sierra Leone, vol. ii. Millar's Diſquiſitions in the Hiſtory of Medicine.

The Egyptians appear to have been the firſt nation which cultivated medicine in a ſyſtematic manner. Thouth, or Taaut, (the *Hermes Triſmegiſtus* of the Greeks,) who had been, according to Diodorus, the ſecretary of Oſiris, had divine honours paid him, as the inventor of letters, and of all uſeful arts and ſciences. His doctrines were collected, after his death, into a book, to which the title of "Embre" (*Scientia Cauſalitatis*) was given. A great part of this work conſiſted of medical precepts, which the phyſicians or prieſts were bound to obſerve ſtrictly. If they followed the directions, and the patient happened to die, they were held free from blame; but if they deviated in any manner from the rules laid down, they were puniſhable with death, whatever might be the iſſue of the caſe. Another of the Egyptian deities, Apis, is mentioned by ſome as the inventor of medicine; but greater influence is attributed to Serapis, whoſe moſt ancient temple was at Memphis, and who was worſhipped by the Greeks, as well as Egyptians, as preſiding over health. In whatever way theſe divinities may be ſuppoſed to have firſt attracted the adoration of the people, it is certain that the prieſts, from among whom the ancient kings of Egypt were choſen, appropriated to themſelves the functions of the medical art. The chief prieſts exerciſed what was conſidered as the higher branch of the profeſſion, which conſiſted of magic rites and propheſyings. They are the wiſe men and magicians of whom Moſes ſpeaks, and they appear to have been very expert in their tricks. On the *Paſtophori*, or image-bearers, who were an inferior order of the prieſthood, devolved the taſk of ſtudying the ſix hermetical

metical books on medicine. Theſe treated of the ſtructure of the body, of diſeaſes in general, of ſurgical inſtruments, of materia medica, of diſeaſes of the eyes, and of diſeaſes of women. It was the office of the chief prieſts to prognoſticate the courſe and event of the diſeaſe, while the paſtophori applied the remedies as directed in the ſacred books. As the rank of the Egyptian prieſts was hereditary, as the ſon received and obeyed implicitly the inſtructions of the father, and as their knowledge was communicated to none but thoſe who had been adopted into their order, it is evident that their medical knowledge would remain nearly ſtationary. It was obviouſly their intereſt to teach the people, that all diſeaſes proceeded from the immediate agency of the gods, and were to be cured only by ſacrifices and offerings. They concealed their art under the forms of religious ceremony, and conſequently we know very little concerning the details of their practice. Judging, however, from the analogy of other nations, we may infer that they left the cure of diſeaſes, in a great meaſure, to nature; and were content with promoting the diſcharges, which ſeemed to be indicated. This opinion is in ſome degree confirmed by the remarkable circumſtance which Ariſtotle mentions, (Polit. lib. iii.) *viz.* that it was contrary to their rules to venture upon any active treatment before the fourth day of the diſeaſe. We have the teſtimonies of Diodorus and Plutarch, that incubations were practiſed in the temples of Iſis and Serapis; and we learn from Pliny (lib. viii. c. 46.), that predictions of life and death were delivered in thoſe of Apis.

In the time of Herodotus, the ſtate of phyſic in Egypt ſeems to have been ſomewhat altered. According to this hiſtorian, "every diſtinct diſtemper had its own phyſician, who confined himſelf to the ſtudy and cure of that, and meddled with no other; ſo that all places were crowded with phyſicians; for one claſs had the care of the eyes, another of the head, another of the teeth, another of the ſtomach, and another of occult diſeaſes." But Herodotus would ſcarcely have ſpoken thus of the prieſt-phyſicians. We muſt therefore ſuppoſe that his deſcription applies to the exoteric practice of medicine, as profeſſed by Jatraliptæ and others; and we are inclined, notwithſtanding the dogmatical commentary of Warburton, to put a ſomewhat ſimilar interpretation on the paſſage of Geneſis (c l v. 2.), in which it is ſaid, that "Joſeph commanded *his ſervants, the* PHYSICIANS, to embalm his father; and the PHYSICIANS embalmed Iſrael." On the ſtrength of this uſe of the word *phyſicians*, the author of the divine legation (b. iv. § 3) has amuſed himſelf with forming an ideal picture of "the grandeur, luxury, and politeneſs" of the Egyptian people; and the writer of the article MEDICINE in the Encyclopedia Britannica has haſtily concluded that the firſt phyſicians of Egypt were not of the order of prieſts; but, when we conſider what muſt have been the ſtate of medicine in Joſeph's time; and when we find, that, long afterwards, the prieſts of the Jews were, properly ſpeaking, their only phyſicians, it will at once appear, how abſurd and untenable the above cited tranſlation of the original text is. It is far more probable, and it is certainly more conſonant with all that we have learnt concerning Egyptian hiſtory, to believe that the רופאי, whom Joſeph ordered "to embalm his father," were merely *embalmers*, or, as we might term them, *undertakers*. So, in fact, they are deſignated in the ſeptuagint; Και προσεταξεν Ιωσηφ τοις παισιν αυτου, τοις ενταφιασταις, ενταφιασαι τον πατερα αυτου. Και ενεταφιασαν δι ενταφιασται τον Ισραηλ. We know pretty accurately in what manner the ceremony of embalming was performed, and in what degree of eſtimation the perſons who executed the office were held; we know, too, that among the ancient Egyptians, there was a great diviſion of labour, and that no one was allowed to meddle with the trade or profeſſion of another; it is, therefore, not very likely that, if Joſeph had been ſo affluent as to retain a number of phyſicians in his ſuite, as Warburton ſuppoſes, they would have condeſcended, or been permitted, to embalm the body of his father. From the diſtribution of medical practice, as deſcribed by Herodotus, however, one might be diſpoſed to infer, that the Egyptians had already made conſiderable advances in the art; but as they were, in a great meaſure, debarred from all opportunities of acquiring anatomical knowledge, by the horror that purſued every one who cut open a dead body; and as they laboured, beſides, under many other reſtrictions in the cultivation of the ſcience, this could not poſſibly have been the caſe. That the Egyptian phyſicians were even very unſkilful in the treatment of external complaints, is proved by what the author juſt mentioned relates (lib. iii. c. 129.) concerning their inability to cure a common luxation of the foot, which Darius, the ſon of Hyſtaſpes, had met with in hunting. They appear, however, to have been acquainted with the powers of ſome valuable remedies, as of ſquills in dropſy, and of iron as a tonic in cachectic diſeaſes.

Medicine was eſtabliſhed on nearly the ſame footing among the Jews, as among the Egyptians. The prieſts, forming the only learned claſs, conſtituted themſelves the ſole judges and phyſicians of the people. Diſeaſes were believed to proceed from the wrath of "a jealous God;" and prayer was the chief means employed for their removal (Gen. xx. 17. Numb. xii. 13.); an immediate revelation to Moſes even declares, that if the people would give ear to the commandments of the Lord, and keep all his ſtatutes, he would put none of thoſe diſeaſes upon them which he had brought upon the Egyptians, for it was the Lord that healed them. (Exod. xv. 26.) It would appear, however, from different paſſages of the Pentateuch, and, in particular, from the enumeration of the different ſigns and varieties of leproſy, in Leviticus xiii., that the lawgiver of the Jews muſt have been, at leaſt, a very accurate obſerver. Some perſons have concluded, that he muſt have been alſo deeply ſkilled in chemiſtry, from his being able to diſſolve the golden calf, in the wilderneſs, and from his changing the bitter waters of Marah to ſweet, by means of a certain wood; but without more particular information reſpecting the means which he employed on theſe occaſions, it is impoſſible to form any accurate eſtimate of his chemical proficiency. In later times, the *prophets* of the Jews ſignalized themſelves by healing the ſick, raiſing from the dead, and occaſionally denouncing the infliction of diſtempers on thoſe who had rebelled againſt the law of God.

Recent reſearches have ſhewn, that, at a very early period of hiſtory, the inhabitants of Hindooſtan had made great progreſs in ſeveral branches of phyſical ſcience, but there does not appear to be any reaſon for believing that in the art of curing diſeaſes, they were ſuperior to the ſurrounding nations. According to Strabo (lib. xv.), they truſted chiefly to diet, and to external applications; the ſuperintendance of the ſick was committed in the towns to a particular deſcription of magiſtrates, under whoſe inſpection the Samaneans (Σαμαναιοι) were permitted to practiſe. A law prevailed, that whoever diſcovered a poiſon, was bound to keep it ſecret till he had found an antidote to it; if he ſucceeded in diſcovering the latter, he was rewarded with great honours; but if he made known the poiſon without the antidote, he was puniſhed with death.

Under the deſpotic government of China, whatever its admirers may chooſe to ſay, and whatever degree of antiquity they may aſcribe to its inſtitutions, it was utterly impoſſible

poſſible that the liberal arts could attain any high improvement. The medical code, which is aſcribed to Hoangti, and ſaid to have been compoſed 4000 years ago, but which has been proved to be of much later origin, forms the guide of the Chineſe phyſicians. Formerly there were public ſchools in different parts of the empire, in which medicine was taught in conjunction with aſtrology; but theſe no longer exiſt; and the art itſelf, as we learn from ſir George Staunton and other late travellers, is in a very degraded ſtate. The *Specimen Medicinæ Sinicæ*, for which we are indebted to Cleyen, ſufficiently proves that the Chineſe were never acquainted with its fundamental principles.

There is a ſtriking coincidence between the accounts which have been given of the medical divinities among the Greeks, and thoſe of the Egyptians, though it may be doubted whether the Greeks derived their knowledge of the art from the latter people. Like the Iſis and Oſiris, Apollo and Minerva became the gods of phyſic in Greece, and Orpheus, who was ſaid to be the ſon of Apollo and Calliope, performed the part of Thouth; inſtructing his countrymen in the myſteries of religion, in poetry, and in medicine. According to ſome chronologiſts, however, Melampus is reported to have flouriſhed conſiderably before his time, and to have diſtinguiſhed himſelf by his medical ſkill; of which he gave a remarkable proof in the cure of the daughters of Prœtus, king of Argos, who were attacked with leproſy and madneſs. Afterwards it would appear that all the chief heroes of Greece, and particularly thoſe of the Argonautic and Trojan expeditions, were more or leſs verſed in the phyſical art; in which they are ſaid to have received their inſtruction from Chiron the Theſſalian, ſurnamed the Centaur. Cephalus, Æſculapius, Melanion, Neſtor, Amphiaraus, Peleus, Telamon, Meleagrus, Theſeus, Hippolytus, Palamedes, Ulyſſes, Meneſtheus, Diomedes, Caſtor, Polydeuces, Machaon, Podalirius, Antilochus, Æneas, and Achilles, are all mentioned by Xenophon as the pupils of Chiron. Of theſe by far the moſt celebrated is Æſculapius, or Aſclepios, the reputed ſon of Apollo and Coronis. He was probably a Theſſalian prince; and he is deſcribed as particularly ſucceſsful in the cure of external diſeaſes. That, indeed, his merits muſt have been very extraordinary for the age in which he lived, ſeems proved by the fable, that Jupiter was obliged to remove him from the world, to prevent the growing indifference of mankind towards the gods, and the deſolation of Pluto's kingdom. Some time after his death, divine honours began to be paid him; in conſequence, chiefly, of his deſcendants devoting themſelves to the medical profeſſion; pretending to have derived their knowledge immediately from him, and aſcribing all the cures which they effected to his direct influence. His ſons, Podalirius and Machaon, have acquired a durable celebrity from the mention which the author of the Iliad has made of their ſurgical ſkill.

From the Trojan war till the age of Hippocrates, the art of medicine continued chiefly in the hands of the prieſts, who exerciſed it for their own profit in the temples of the gods. In conformity with the ſuperſtitious character of the age, the patients were taught to expect a cure, or at leaſt to learn the means of obtaining it, in dreams, for which they were previouſly prepared, or rather ſtupefied, by a courſe of impoſing ceremonies. The temples were generally ſituated in the neighbourhood of rivers, or mineral ſprings, and in elevated ſituations, where the influence of the freſh air, and the beauty of the ſurrounding proſpects, were likely to excite cheerful ideas, and to conduce to the recovery of the patient. Bathing was an indiſpenſable part of the initiatory proceſs; and this, conjoined with the ſtrict abſtinence which was enforced, doubtleſs often effected a cure. When recovery took place, the patients were led, from gratitude, to preſent various offerings to the deity of the place; ſometimes pieces of money were thrown into the ſpring where they had bathed, or from which they had drunk; at other times drawings and images of the diſeaſed parts, or tablets deſcriptive of the diſorder and cure, together with the names of the patients, were ſuſpended in the temples. Theſe narratives, ſome of which have been reſcued from oblivion by the induſtry of Grüter (Corp. Inſcript.), muſt have doubtleſs contributed to the progreſs of the art, and ſupplied the ſucceſſive generations of prieſts with ſome uſeful practical obſervations. The temples in which they were recorded, particularly thoſe of the Aſclepiades, became, in fact, ſo many medical ſchools, differing however from one another, and that often materially, in their doctrines and practice. Thus, the Cnidian ſchool diſtinguiſhed itſelf by its ſtrict empiriciſm; while that of Cos had more of a dogmatical character, laying much ſtreſs on the knowledge of the exciting cauſes, and the prognoſis of diſeaſe, and purſuing a more methodic and rational mode of treatment. The former produced Euryphon, the author of the Γνωμαι Κνιδιαι, and Cteſias, of whoſe Perſian hiſtory ſome fragments have been preſerved by Photius; in the latter was developed the genius of Hippocrates.

At firſt, they were only the actual deſcendants of Æſculapius who were inſtructed in the art: afterwards other perſons were admitted as pupils, having previouſly undergone a particular initiation, and bound themſelves by an oath to conform to the rules of the Aſclepiades. Some philoſophers of comprehenſive genius, however, accuſtomed to ſpeculate on the origin of things, the nature of man, &c. had already begun to extend their reſearches to medicine, and ſucceeded in reſcuing the ſtudy, to a certain degree, from the dominion of the prieſts. Of theſe benefactors of their race, no one is more deſerving of mention than Pythagoras, who, after viſiting Egypt and India in queſt of knowledge, returned to his own country and eſtabliſhed the ſchool of Crotona. He applied himſelf to the ſtudy of the animal economy; introduced a regular ſyſtem of dietetics; and did not neglect the practice of medicine. His attempts to explain every thing by the power of numbers, were, indeed, ſufficiently ridiculous; and his therapeutical maxims differed ſcarcely from thoſe of the temples; but the rules of regimen which he inculcated were, generally ſpeaking, very judicious, and implied conſiderable powers of obſervation; though they have, no doubt, been carried to an extravagant length by his followers. Among his immediate diſciples, Alcmæon is celebrated as the inventor of anatomy; and though his knowledge of the internal ſtructure of the human frame may be diſputed, yet the concurring teſtimonies of Ariſtotle, Diogenes, and Plutarch, abundantly prove that he made no inconſiderable figure as a comparative anatomiſt. He is alſo the author of the firſt theory of ſleep. "When the blood," he ſays, "returns into the larger blood-veſſels, ſleep is induced: when it is again diſtributed, waking occurs; but a complete congeſtion is followed by death." (Plutarch de Plac. Philoſ. lib. v. c. 23.) Empedocles was another diſtinguiſhed adherent of the Pythagorean ſect. See Empedocles.

Beſides theſe philoſophers, and the Aſclepiadæ, there were, at this period, other perſons who devoted themſelves to the profeſſion of phyſic, and who occaſionally were remunerated by a fixed ſalary. Thus, Democetes of Crotona was retained at the court of the Samian tyrant, Polycrates, with an allowance of two talents yearly: being afterwards taken priſoner, and carried as a ſlave into Perſia, he acquired great repute by curing Darius of a ſprained foot, after the

Egyptian

Egyptian phyſicians had failed; and alſo by his ſucceſsful treatment of a tumour of the breaſt, under which Atoſſa, the daughter of Cyrus, and wife of Darius, had laboured for a conſiderable time. (Herod. iii. 133.) Such practitioners, from their wandering lives, were ſometimes deſignated by the name of περιοδευται. Of this claſs, one of the moſt conſpicuous was Acron of Agrigentum, the contemporary and rival of Empedocles, reſpecting whom Pliny has fallen into a ſtrange error, in deſcribing him as the founder of the empiric ſect "under the ſanction of Empedocles." According to Diogenes, he was the author of ſome books on medicine and dietetics, written in the Doric dialect; and he ſignalized himſelf at Athens, in the time of the great plague, by introducing the practice of fumigations (πυρ καιοντα παρακαλειν τοις νοσουσιν), and thus affording relief to many. (Plut. de Iſid. et Oſir.) The *gymnaſia* of ancient Greece ſeem alſo to have contributed to the improvement of the art. It belonged to the gymnaſiarch, or *palæſtrophylax*, to regulate the diet of the youths who were trained in theſe ſeminaries; the ιατραλειπται were preſumed to be converſant with diſeaſes; and it was the buſineſs of the αλειπται to perform veneſection, to dreſs wounds, fractures, &c. They were ſometimes called phyſicians. It was in theſe ſeminaries that the gymnaſtic ſyſtem of medicine originated, under the auſpices of Iccus of Tarentum, and Herodicus of Selymbria. See HERODICUS.

The firſt year of the eightieth Olympiad gave birth to Hippocrates, the ſecond of that name, who was deſtined to effect a greater revolution in medical ſcience than had hitherto been accompliſhed, and whoſe authority continued to be regarded with almoſt implicit veneration by his ſucceſſors, during a period of more than two thouſand years. "He ſaw," ſays Mr. Cabanis, "that too much, and yet not enough, had been done for medicine; and he accordingly ſeparated it from philoſophy, to which it had never been united by its true and reciprocal relation. He brought the ſcience back again into its proper channel, that of rational experience. However, as he himſelf obſerves, he introduced both theſe ſciences into each other, for he conſidered them as inſeparable; but he aſſigned to them relations which were altogether new. In ſhort, he freed medicine from falſe theories, and formed for it new and ſolid ſyſtems: this, he with juſtice ſaid, was to render medicine philoſophical. On the other hand, he elucidated moral and natural philoſophy by the light of medical ſcience. This we may, with propriety, call with him the introduction of the one into the other.

"The new ſpirit of improvement, which was thus communicated to medicine, reſembled a ſudden light that diſpels the phantoms of darkneſs, and reſtores to bodies their proper figure and natural colour. By rejecting the errors of former ages, Hippocrates learned more fully to avail himſelf of the uſeful part of their labours. The connection and dependence, both of the facts which had been obſerved, and of the concluſions which had been legitimately deduced from their compariſon, were now perceived with a degree of evidence, which, till then, had been unknown. All the diſcoveries were certainly not yet made; but from that moment inquirers began to purſue the only path which can conduct to them; from that moment, if they had been able to preſerve themſelves from deluſion, they would have poſſeſſed ſure means of eſtimating, with preciſion, the new ideas which time was deſtined to develope; and if the diſciples of Hippocrates had underſtood his leſſons well, they might have laid the foundation of that analytical philoſophy, by the aid of which the human mind will be henceforth enabled to create to itſelf, as it were, daily, ſome new and improved methods of advancement." Coup d'Œil ſur les Revolutions, &c. de la Médécine, 76—78.

Unfortunately, however, for the progreſs of the art, the diſciples of Hippocrates either did not "underſtand his leſſons," or, miſled by vanity, or other more ignoble paſſions, they ſoon deviated from the path which he had ſtruck out. Inſtead of purſuing quietly the obſervation of nature, they conſumed their time in framing fanciful hypotheſes to explain her operations: inſtead of ſtudying, in a ſincere ſpirit, the works of the maſter whom they profeſſed to worſhip, they ſhameleſsly falſified his writings, in order to adapt them to their own peculiar views, ſo that it has become, as we have already had occaſion to ſhew, (ſee HIPPOCRATES,) a matter of no ſmall difficulty to diſtinguiſh the genuine from the ſpurious compoſitions that have been aſcribed to the father of medicine. But, notwithſtanding theſe errors, it cannot be doubted, that the genius of Hippocrates exerted a highly beneficial influence on the minds of ſucceeding inquirers; and that, without his writings for a guide, the ſcience of phyſic would have remained, for a much longer period, in a ſtate of infancy. "Au lieu de ces ſyſtêmes, ſinon meurtriers, du moins ridicules, qu'a enfantés la médécine moderne pour les proſcrire enſuite, on y trouve des faits bien vus et bien rapprochés; on y voit un ſyſtême d'obſervations, qui encore aujourdhui ſert de baſe à l'art de guérir." D'Alembert, Melanges, iii. 271.

The Dogmatic ſchool, of which Hippocrates has erroneouſly been conſidered as the head, was founded by his ſons Theſſalus and Draco, and his ſon-in-law Polybus, who are the reputed authors of many of the books that now paſs under Hippocrates' name. Polybus is mentioned by Ariſtotle as the compiler, at leaſt in part, of the book "On the Nature of Man," which contains all the leading tenets of the Dogmatiſts, and which was regarded by Galen not as the compoſition of one individual, but as a collection of fragments by different writers. Applying the myſtical doctrines of the Platonic philoſophy to medicine, the Dogmatiſts proceeded upon the principle which has exerted ſuch baneful influence on the progreſs of ſcience in general, *viz.* "that where obſervation failed, reaſon might ſuffice." (De Arte. Ed. Foeſ. 1657. p. 6.) They accordingly were led to neglect the patient ſtudy of nature; and before they had collected a ſufficient ſtore of facts, they fondly imagined that they had laid the foundation of an incontrovertible ſyſtem. Hence it came, that, in their inquiries, ſophiſtry often uſurped the place of obſervation, and futile hypotheſis was preferred to experience. In this way aroſe a multitude of ſects, who contributed little or nothing to the advancement of the art, but, on the contrary, were daily miſleading their followers more and more from the right path of reſearch. It is therefore highly unjuſt to refer the origin of the Dogmatic ſchool to Hippocrates, in whoſe genuine writings it will be found that the moſt oppoſite principles are inculcated. For a more particular account of the doctrines of this ſect, ſee EMPIRIC.

About the ſame period, Eudoxus of Cnidos introduced the Pythagorean ſyſtem, and a modification of the Egyptian practice, in which he was followed by his diſciple Chryſippus. With the latter, cabbage and other vegetables were the favourite remedies; to purgatives and blood-letting he had an averſion. One of the moſt diſtinguiſhed men of the age, however, was Diocles of Caryſtus, whom Pliny (xxvi. 2.) ranks as almoſt equal to Hippocrates. He employed himſelf in comparative anatomy, and corrected many errors of his predeceſſors: like the two laſt mentioned phyſicians, he united the doctrines of Pythagoras with medicine; aſcrib-

ing

ing great influence to the number ſeven and its combinations. (Macrob. in Somn. Scip. i. 6.) He was alſo the inventor of a ſurgical inſtrument for the extraction of arrows, called after him *Diocleus graphiſcus*. His contemporary, Praxagoras of Cos, is not leſs deſerving of notice on account of his anatomical labours, being the firſt perſon who eſtabliſhed the diſtinction of arteries and veins, and who demonſtrated the abſence of *cotyledons* in the human uterus; whence Sprengel (Geſchichte der Arzneikunde, i. 549.) has with great plauſibility conjectured, that diſſections of the human ſubject could not have been, at that time, entirely unknown. Praxagoras alſo introduced the doctrine of the pulſe, and reduced the humoral pathology to a more regular ſyſtem: he made frequent uſe of veneſection, particularly in hemorrhage, and was a bold ſurgical operator; for he ſcrupled not, as Cælius Aurelianus informs us, to lay open the abdomen, and divide the *inteſtinum rectum*, in the iliac paſſion, in order to remove the accumulated fæces.

Many circumſtances had now concurred to favour the advancement of natural knowledge. The ſpirit of inquiry, which the early philoſophers had excited, was cheriſhed by the eſtabliſhment of ſo many rival ſchools; but, above all, by the number of learned men, who aroſe to adorn and inſtruct the world. Within the ſhort ſpace of a century appeared Ariſtotle, Pyrrho, Theophraſtus, Zeno, and Epicurus, all of them endowed with tranſcendent genius. and conſpicuous for their zeal in the cauſe of ſcience. The influence which they exerted on the character of their age was accordingly very great. While Ariſtotle applied himſelf, with the moſt ſignal ſucceſs, to all the branches of moral and phyſical reſearch, and his pupil Theophraſtus laid the foundation of true botanical ſcience; Zeno and Epicurus developed thoſe beautiful ſyſtems of ethics, which tranſported their contemporaries, and which ſtill, in ſome meaſure, divide the minds of men. However remote from medicine the ſpeculations of moraliſts may at firſt ſight appear, a little obſervation will teach us, that the phyſicians of almoſt every age have allowed themſelves to be carried along by the current of prevailing opinions. In the epoch of which we are now writing, the tenets of Pyrrho and Epicurus were eagerly ſeized upon by the empirical ſect, as favouring their peculiar views; while the ſtoical ſyſtem gave new ſtrength to the dogmatiſts, particularly by the introduction of the dialectic method.

The eſtabliſhment of a magnificent library and muſeum of natural hiſtory at Alexandria, and the liberal patronage which learning there received from the Ptolemies, rendered that city the chief reſort of men of ſcience from all parts of the world, and the great emporium of literature. In conſequence, the Alexandrian ſchool ſoon eclipſed all the rival ſeminaries, and produced a ſucceſſion of eminent phyſicians; among whom Herophilus and Eraſiſtratus are entitled to the firſt place, on account of their important contributions to anatomical knowledge. (See their reſpective articles.) It was in their time, and probably at Alexandria, that the memorable diviſion of the art into three branches took place: "Iiſdem temporibus, in tres partes medicina diducta eſt, ut una eſſet, quæ victu, altera quæ medicamentis, tertia quæ manu mederetur." (Celſ. l. i.) But, however much this diſtribution of practice was calculated to accelerate the progreſs of medical ſcience, in all its different parts, it does not appear that the immediate ſucceſſors of Herophilus and Eraſiſtratus turned the circumſtance to great account; though Celſus affirms, that ſurgery improved rapidly after its ſeparation. Lib. vii. Præf.

Of the eſtabliſhment and doctrines of the Empirical ſect we have already given a ſufficiently minute view under the proper article. We have there ſhewn how decidedly the principles of this ſchool were oppoſed to thoſe of the Dogmatiſts; and that there was ſomething more than a mere diſpute of words between them, as ſome writers maintain. Notwithſtanding, however, all their points of variance; notwithſtanding the violence and bitter animoſity which the contending parties diſplayed in their controverſies; it was found, that when they came to apply their reſpective principles to practice, and to determine on the treatment of diſeaſe, all differences, in a great meaſure, vaniſhed. Nor was this to be wondered at: for the dogmatiſts, though they indulged too much in hypothetical reaſoning, did not altogether neglect obſervation, and were conſequently more or leſs guided by the ſame leſſons of experience, on which the empirics founded their therapeutical maxims. The ſame remark will be found to apply to almoſt all the ſects which have acquired any conſequence in the medical world.

In the article laſt referred to, Heraclides of Tarentum has been mentioned as one of the adherents of the empirical ſchool; but he deviated from the ſtrict empirics in this reſpect, that he did not neglect the inveſtigation of the hidden and remote cauſes of diſeaſe. His practice in ſome of the moſt dangerous diſeaſes, as phrenitis, lethargy, cynanche, tetanus, and cholera, (for the deſcription of which we are indebted to Cælius Aurelianus,) ſeems to have been highly judicious. To the materia medica he contributed largely: he wrote a treatiſe on the compoſition of medicines, in which he obſerved the praiſeworthy maxim of noticing only ſuch remedies as he had adminiſtered himſelf. He is alſo reported to have poſſeſſed no inconſiderable ſkill in ſurgery; and, on the whole, he appears to have fully merited the eulogies of Galen and Aurelianus, the latter of which ſtyles him *empiricorum princeps*. After his death, the ſtudy of the materia medica took a new direction, in conſequence of the attention that was paid to the ſubject of poiſons and their antidotes, by the kings of Pergamus and Pontus. The antidote which was invented by the latter is well known, though its efficacy has never been proved. Even Serenus, who is in general ſufficiently credulous, ſeems to have had no very high opinion of its virtues.

> "Antidotus vero multis Mithridatica fertur
> Conſociata modis, ſed Magnus ſcrinia regis
> Cum caperet victor, vilem deprehendit in illis
> Syntheſin, et vulgata ſatis medicamina riſit." Cap. lx.

Nicander of Colophon, who was the contemporary of Attalus, king of Pergamus, acquired great fame as a grammarian, a poet, and a phyſician. Of his works, only the two treatiſes in verſe, entitled Θεριακα and Αλεξιφαρμακα, have been handed down to us. Though not abounding in poetical merit, they diſplay no mean acquaintance with natural hiſtory.

The Roman people, as Pliny aſſures us (xxix. 1.), had continued without phyſicians, if not without phyſic, during a period of 600 years. On the occaſion of a deſtructive epidemic, in the year 463 A.U.C. however, they ſent a deputation to the temple of Eſculapius at Epidaurus. Inſtead of an oracle, they received one of the ſacred ſerpents, and following the indication of its ſpringing from the ſhip upon the iſland of the Tiber, they there founded a temple to the god of medicine, and eſtabliſhed his worſhip on the ſame footing as at Epidaurus. Shortly afterwards, a temple was dedicated to the Grecian Hygeia, and the worſhip of Iſis and Serapis was borrowed from the Egyptians: but, beſides theſe, the Romans had certain medical deities quite peculiar to themfelves. For example, on the Palatine Mount, there was a temple of the goddefs Febris, who probably received divine honours from a prevalent dread of the difeafe. Tomafini, (in Grev. Thefaur. Roman. Antiquit. v. xii. p. 867.) has preferved the following infcription of a votive tablet to this goddefs:

"Febri divæ febri
Sanctæ febri magnæ
Camilla amuta pro
Filio male affecto p."

There was alfo a goddefs Offipaga, who prefided over the growth of the bones, and one ftyled Carna, who took care of the vifcera, and who had bean-broth and bacon offered to her, as being the moft nutritious articles of diet. (Macrob. Saturnal. lib. i. p. 123. ed. Ald.) The goddefs Mephitis, who is mentioned by Tacitus, as worfhipped at Cremona, had probably the fame attributes as Febris.

With refpect to the queftion, which was fo warmly debated in the beginning of the laft century, (*viz.* Whether the art of phyfic was exercifed by any other perfons than flaves, or freedmen, in the earlier periods of Roman hiftory?) we would obferve, that the probability is againft the fuppofition, that it was fo. Certain it is, that the inferior orders of the profeffion, thofe Greeks, for example, who were employed to perform venefection, to extract corns, or draw teeth, were all dignified with the title of *medici*, in the fame way as the Jatraliptæ were often ftyled ἰατροι. But that in time they raifed themfelves above this fervile condition, is abundantly proved by the honour of citizenfhip, and other privileges, which were conferred upon them. Archagathus is the firft perfon who is mentioned as having come to Rome, of his own accord, to practife the art of furgery. The fenate decreed him the freedom of the city, and purchafed for him a fhop in the Acilian crofsway; but his cruel operations—"fævitia fecandi urendique"—foon brought him into difrepute, and eventually led to his banifhment. Pliny, loc. cit.

In the 654th year A.U.C., or 100 years before the Chriftian era, Afclepiades, a native of Prufa in Bithynia, who had ftudied at Alexandria and Athens, came to Rome as a teacher of rhetoric: but not finding that profeffion fufficiently lucrative, he fuddenly turned phyfician, and by his confummate addrefs, in a fhort time, brought himfelf into great notice. The prototype of all fucceeding quacks, Afclepiades affected to contemn every thing that had been done before him—"omnia abdicavit; totamque medicinam, ad caufam revocando, conjecturam fecit;" he ridiculed Hippocrates for his patient obfervation of nature, and called his fyftem a *meditation on death*, θανάτου μελέτην. His fame, however, would have been incomplete, if he had not introduced a fyftem of his own. Accordingly, taking, for the bafis of it, the philofophy of Epicurus and Heraclides of Pontus, he attempted to explain all the functions of the human body, and all the operations of health and difeafe, by means of corpufcles and pores, ὄγκοι and πόροι. Anatomy was altogether neglected by him. In his practice, he profeffed to be guided by the maxim *tuto, celeriter, et jucunde:* but though he flattered the caprices of his patients, and foothed their complaints by the blandifhments of his rhetoric; yet we learn from Celfus (lib. iii. c. 4.), that he fubjected them to many fevere mortifications; keeping them, for inftance, feveral days without drink or fleep, in the early ftages of fever. That Afclepiades, however, poffeffed no mean talent for obfervation, is proved by his defcription of difeafes, and by the divifion of them into acute and chronic, which appears to have originated with him. The remedies which he employed were chiefly dietetical; but he was no enemy to phlebotomy, though he difcouraged vomiting and purgation: inftead of the latter he recommended clyfters. He was a great advocate for the efficacy of frictions, geftation, and other corporeal exercifes; and he fedulouﬂy prefcribed the ufe of cold water externally as well as internally; though he probably ingratiated himfelf with the Romans more by his free adminiftration of wine, in diforders where it had not formerly been allowed. Sprengel fuppofes him to have been the inventor of the fhower-bath, *balinea penfilis*. Pliny, xxvi. c. 3.

Themifon of Laodicea, a difciple of Afclepiades, adopting the leading doctrines of his teacher, founded upon them the Methodic fyftem. He difcarded the ftudy of remote caufes, the theory of critical days, &c. as wholly ufelefs; and maintained, that all that was neceffary for the phyfician, was an acquaintance with certain general conftituents of difeafe. In his practice he followed the footfteps of Afclepiades, firft famifhing his patients, and then endeavouring to obviate the preternatural condition, which he had induced. His fuccefs, however, would not appear to have been very great, if we are to credit the infinuation contained in the line of Juvenal,

"Quot Themifon ægros autumno occiderat uno."

The object which the Methodic fect had in view, feems to have been the fimplification of the theory and practice of the art. The inveftigations of the Dogmatifts refpecting occult caufes appeared to them to reft on too fallacious grounds; nor were they fatisfied with obferving the *concurfus fymptomatum*, like the Empirics: they therefore fteered a middle courfe between the two, taking for the bafis of their theory certain conditions of the fyftem, which are common to different difeafes (quædam morborum communia, κοινότητα); without confidering, as Sprengel well obferves, that thefe conditions of the body are as often, if not more frequently, concealed from view, than all the occult caufes of the Dogmatifts. The earlier adherents of this fyftem contended, that there were two general morbid conditions to which all difeafes were referrible, *viz.* a ftate of *conftriction*, and a ftate of *relaxation;* but they applied thefe terms not, as it would appear, in the modern acceptation, to particular organs, but to the body at large. Conformably to this view of difeafe, all that the practitioner had to do, was to find out, in each cafe, the morbid condition, and to apply his remedies accordingly: if it was a difeafe of conftriction, he prefcribed relaxing medicines; and if it was one of relaxation, he employed aftringents. But it was very foon difcovered, that thefe two ftates would not comprehend all difeafes: the Methodifts therefore invented a third common condition, which they called the *mixed* ftate. "We may form fome idea," Mr. Cabanis obferves, "of what they meant to defignate by the term *difeafes of conftriction*, though it is certainly not fo intelligible to men of fcience, as it appears to the uninformed clafs; we may alfo conceive the import of the phrafe *relaxed fibres;* but it is difficult to divine, what they could underftand by their *mixed fpecies*, or how they could apply to practice this fpeculative notion, which is fo very fubtle, as to elude all clear conception. Befides, is it not evident, that almoft all difeafes belong to the *mixed* clafs, or may be referred to it? For this word, if it fignify any thing, muft mean an *inequality of tone* in the different organs, or an *irregular diftribution* of the vital power. Now the majority of difeafes prefent the general phenomenon of a derangement of equilibrium,

brium, or irregular expenditure of living energy. In thoſe caſes, in which theſe deviations from the healthy ſtandard are leſs obvious, an obſerving eye may ſtill perceive them; and, perhaps, there is no diſeaſe in which a deficiency of equilibrium is not, in ſome degree, manifeſted, whether it be in the tone of the different organs, or in the exerciſe of life, and diſtribution of the ſenſibility of the ſyſtem. Thus then, the *mixed ſpecies* of the Methodic ſect, by comprehending every thing, becomes, in fact, applicable to nothing." Loc. cit. p. 100.

Notwithſtanding the juſtice of theſe ſtrictures, it cannot be denied, that the doctrines in queſtion had, in one point of view, a beneficial tendency, *viz.* by obliging phyſicians to ſtudy more attentively, than they had hitherto been accuſtomed to do, the different *indications* of diſeaſe. If the Methodiſts had applied themſelves to the inveſtigation of ſuch morbid conditions of the ſyſtem as were manifeſted by the ſymptoms; and if they had not raſhly attempted to ſimplify pathology, by ranging diſeaſes in two general claſſes, according to characters that were but partially applicable; their ſchool would have conduced ſtill more to the improvement of the ſcience of medicine. As to their mode of practice, it may be obſerved, that they wholly overlooked the healing powers of the ſyſtem, and, without regard to the peculiar circumſtances of the caſe, or the nature of the part affected, were ſolely intent on fulfilling thoſe general indications, that were conformable to their theory. It is true, that they paid particular attention to days; not, however, as connected with the doctrine of criſes, for which, as we have already hinted, the founders of this ſect entertained a marked contempt; but only as affording them a meaſure of the duration of the diſorder, and a guide for the method of treatment. In the firſt days, they followed the ſtarving ſyſtem; afterwards they purſued the ſuppoſed general indications of conſtricting, or of relaxing: during the exacerbation of the diſeaſe, they endeavoured to moderate the violence of it; during its decline, they ſupported the powers of the ſyſtem by nutritive diet. This was their mode of proceeding in all acute diſeaſes: but, in chronic complaints to which it was leſs applicable, they had recourſe to what they termed the μετασυγκρισις, or *reincorporation,* of which the profeſſed object was to reſtore the proper relations between the atoms and pores, and for which they prepared the patient by the αναληψις, or *reſumptive circle.* It was, in fact, little elſe than their practice in acute diſeaſes reverſed,—they firſt ſought to ſtrengthen the patient by a generous diet, and then they adminiſtered a ſucceſſion of violent remedies, to ſubdue the original malady. For the details of this mode of treatment, ſee Cæl. Aurel. Chron. i. c. 1. ii. c. 13. 29. &c.

Among the diſciples of Themiſon, one Theſſalus of Trallis, a man of low birth and coarſe manners, made himſelf conſpicuous by the ſhameleſs audacity with which he ſought to diſparage the labours of others—arrogating to himſelf the title of ιατρονικης, or *conqueror of phyſicians,* and that, it would appear, without the ſlighteſt pretenſions to either learning or talents. (Plin. l. xxix. c. 1.) He held forth, that he could qualify any one for a phyſician in the ſpace of ſix months, and actually ſucceeded in obtaining a great number of pupils; but it was from among the loweſt order of artiſans, ſuch as rope-makers, weavers, cooks, butchers, fullers, and ſuch like. Theſe he took with him to viſit his patients for the ſtipulated time, and then he conferred upon them the privilege of practiſing for themſelves. From his time it became the cuſtom for the Roman phyſicians to viſit their patients attended by all their pupils; in alluſion to which, we have the epigram of Martial:

> "Languebam; ſed tu comitatus protinus ad me
> Veniſti, centum, Symmache, diſcipulis.
> Centum me tetigere manus aquilone gelatæ:
> Non habui febrem, Symmache: nunc habeo!"

The methodic ſchool acquired much greater repute from the labours of Soranus and Cælius Aurelianus; the former a native of Epheſus, who had ſtudied at Alexandria, and came to Rome during the reign of Trajan; the latter an African by birth. Free from the prejudices, which had diſgraced his predeceſſors, Soranus cultivated the ſtudy of anatomy, and wrote a book on *the female organs of generation,* which is ſtill extant, and which diſplays conſiderable acquaintance with the ſubject. Many of his obſervations on diſeaſe ſhew, that he was poſſeſſed of great ſagacity and ſtrength of judgment. To Cælius Aurelianus, on the other hand, we are indebted for an account of his doctrines and practice, and for one of the beſt works on medicine, which have come to us from ancient times; written, it is true, in a barbarous ſtyle, but highly deſerving of peruſal on account of the accurate deſcription of diſeaſes, and the different methods of treatment, which it contains.

Anatomy and the other auxiliary ſciences, though they had been ſo much neglected by the methodiſts, were now receiving important additions from other quarters. Rufus of Epheſus, who lived in the time of the emperor Trajan, and whoſe works have been edited by our countryman, Clinch, applied himſelf zealouſly to the diſſection of animals, particularly of apes, and deſcribed from analogy the different organs of the human body. He traced the nerves from their origin in the brain, and divided them into thoſe of ſenſation and thoſe of voluntary motion; he pointed out the decuſſation of the optic nerves at the *infundibulum,* and he ſpeaks of the capſule of the cryſtalline lens, under the appellation ὑμην φακοειδης. The heart he believed to be the ſeat of life, of animal heat, and the cauſe of pulſation, and he ſhewed the difference of ſtructure and capacity between the right and the left ventricle. The ſpleen he held to be an uſeleſs organ. Marinus, whom Galen calls the reſtorer of anatomy, and to whoſe labours he was himſelf probably indebted for much of his knowledge on the ſubject, rendered ſtill greater ſervices to the ſcience. He inveſtigated the abſorbent ſyſtem with great care, and diſcovered the meſenteric glands; he diſtributed the nerves into ſeven pairs: the N. palatinus (then called the fourth pair) was firſt deſcribed by him; and he is ſaid to have been the diſcoverer alſo of the *par vagum,* which he termed the ſixth pair. His numerous writings have all periſhed.

The ſtudy of the materia medica, and of the other branches of natural hiſtory, was proſecuted with no leſs vigour; and we owe to this epoch the invention of many remedies, which are ſtill retained in our pharmaceutical ſyſtems. The elder Pliny, ſecond only to Ariſtotle in the univerſality of his genius, but ſurpaſſing even that great man in his inſatiable thirſt for knowledge, had collected in his Hiſtoria Mundi all that the ancients knew of natural ſcience. Dioſcorides of Anazarba, devoting himſelf to botany and materia medica, produced a work, which ſerved for a guide in theſe ſciences till a very late period. His deſcriptions of ſome of the more valuable drugs, ſuch as myrrh, ladanum, aſſafœtida, ammoniac, opium, ſquills, and their different preparations, are entitled to great praiſe. The efficacy of ſeveral remedies, which he recommends, has been admirably confirmed by later experience, ſuch as of the

the elm-bark in cutaneous diseases, of potash as a caustic, of the male fern against worms, &c. &c. Some of the contemporaries of Dioscorides, as Scribonius Largus, Xenocrates, and Andromachus, cultivated the materia medica, but with less success. To Menecrates, who lived in the reign of Tiberius, and who, according to an inscription in Montfaucon, appears to have been the author of 155 books, we are indebted for the invention of the *diachylon* plaister; and Damocrates is well known as the author of several complicated remedies, which bear his name. Herennius Philo, of Tarsus, is mentioned by Galen as the inventor of an anodyne composition, called, after him, Philonium, and which consisted of opium, euphorbium, and different aromatics; and Asclepiades Pharmacion was the introducer of numerous remedies from the animal kingdom, which, though long honoured with a place in our pharmacopeias, have now deservedly fallen into disrepute.

Before quitting this period of medical history, it will be necessary to say a few words respecting two other sects, which arose soon after the establishment of the methodic school: we mean the Eclectic and Pneumatic sects. The founder of the latter, Aristæus of Cilicia, flourished as a physician at Rome about the middle of the first century, and distinguished himself by his opposition to the tenets of Asclepiades, and his attachment to the Stoical system: he extended the theory of pre-existent germs; treated the doctrine of the pulse with dialectic subtlety, referring its varieties to the exhalation of the πνευμα from the heart and arteries; and cultivated several branches of pathology; but was more successful in his dietetical researches, particularly with respect to the influence of the atmosphere. His pupil Agathinus, endeavouring to reconcile his principles with those of the methodic and empiric sects, acquired the name of the Episynthetic or Eclectic, and thus established the Eclectic system, on which, however, he does not appear to have conferred much repute by his own labours. That merit was reserved for Archigenes and Aretæus, who, adopting the leading tenets of the Pneumatic theory, gave it a more scientific form, and enriched it by many valuable observations. The former attempted to reform the language of medicine, but without much effect; for even Galen has occasion to complain of the obscurity of his phraseology; he was, besides, too fond of subtleties: but many of his practical observations, which Galen has recorded, are excellent. The merits of Aretæus, as a skilful and attentive observer, and as an elegant describer of disease, are familiar to every one. To Cassius, the Jatrosophist, another Eclectic, we are indebted for many valuable pathological remarks concerning the diseases of association, and the sympathies of the nervous system.

During this period, surgery received considerable improvement; particularly from the labours of Heliodorus and of Antyllus. Of the former, who was an eminent surgeon at Rome, in the time of Trajan, Nicetas has preserved several practical observations, on injuries of the head and diseases of the bones, which evince no mean proficiency in his art. The latter is perhaps still more deserving of notice, as being the first who gives any account of the extraction of the cataract: he recommends this operation to be performed while the cataract is small, being of opinion, that, when enlarged, it cannot be extracted without bringing the humours of the eye along with it. (Rhaz. Continent. lib. ii. c. 3.) His directions concerning the preparation of plasters and ointments, and concerning the choice of veins in phlebotomy, are very minute. In dangerous cases of cynanche, he advises bronchotomy; and in *hernia humoralis* he operated by incision. Philagrius, who lived about the time of Valens, appears to have been the first who attempted to extract a stone from the bladder by the high operation. (Aët. Tetrab. iii. s. iii. c. 5.) The last quoted author has also transmitted to us an account of the surgical practice of one Leonides of Alexandria, whose observations on hernia, scrofula, and glandular swellings, on ulcers and warts of the genital organs, on hydrocele, and on inflammation of the scrotum, shew considerable discernment. In cancerous affections of the breast, he resorted to amputation, and the actual cautery; in *fistula*, his method of operation differed but little from that recommended by Pott.

The art of medicine was advancing thus rapidly in all its branches, when Galen appeared, a man of signal talents, who soon outstripped all his competitors in the profession, and divided with Hippocrates the admiration of the medical world. "Endowed with a genius sufficiently comprehensive to embrace all the sciences, and to cultivate them all with equal success," if we may borrow the language of Cabanis, "he, even in early infancy, gave proofs of uncommon capacity; and while pursuing his youthful studies, began to perceive the futility of the prevailing systems. Dissatisfied with what his masters taught him as incontrovertible truths, and as the immutable principles of the art, he read Hippocrates' works, and was struck, as it were, with a new light. In comparing them with Nature, his astonishment and admiration redoubled; and Hippocrates and Nature thenceforth became the only preceptors to whose instructions he would listen. He undertook the task of commenting upon the writings of the father of medicine; he presented his opinions in various lights, in which they had not hitherto been regarded; he repeated his observations, he extended them, and supported them with all the aids which philosophy and physics were capable of affording them, either by the simple comparison of facts, or by the collation of different theories, or, finally, by the combination of different methods of reasoning. In short, Galen revived the Hippocratic system of medicine, and communicated to it a lustre, which it did not possess in its primitive simplicity. But, at the same time, what it gained in his hands, must be allowed to have more the appearance of dress and ornament, than of real solid acquisition. The observations which had been collected, and the rules which had been laid down by Hippocrates, in assuming a more splendid and systematic form, lost much of their original purity; nature, whom the Coan physician had always followed with so much accuracy and caution, became obscured, and, as it were, stifled, by the foreign pomp of various sciences and dogmas; and the art of medicine, overcharged, as it already was, with subtle and superfluous rules, became entangled in a number of new and unnecessary difficulties." Q. c. p. 113.

Though possessed of more extensive erudition than either Hippocrates or Aretæus, Galen was decidedly their inferior as a pathological observer; not, however, so much from any defect of his mental powers, as from his attachment to false theory. It was on the pseudo-Hippocratic doctrines, particularly as developed in the book περι φυσιος ἀνθρωπου, that he founded his system. Although, therefore, he professed to follow Hippocrates, he did not always follow him in his genuine spirit. But all the departments of the art have been enriched by his labours: to anatomy and physiology, in particular, he made many useful additions by the information which he collected in his travels, and by his assiduous dissections of the inferior animals. For the history of his life and writings, and for an account of the ſyſtem which took its name from him, ſee GALEN and GALENICAL *Syſtem.*

Unfortunately the exertions of Galen, to preſerve the ſcience in the path of improvement, were not ſeconded by his immediate ſucceſſors. During a period of thirteen centuries, medicine remained nearly ſtationary, and, in ſome inſtances, aſſumed even a retrograde courſe. The beſt writers who appeared among the Greeks, ſuch as Oribaſius, Aëtius, Alexander Trallianus, Paulus Ægineta, Nicetas, &c. contented themſelves, in a great meaſure, with the merit of compilation; while among the eaſtern nations an unnatural union was attempted between medicine and the favourite ſtudies of magic and aſtrology. The Arabians, from their vicinity to Alexandria, from their intercourſe with the ſect of Neſtorians and with the Greek philoſophers, who had been compelled by the perſecution of Juſtinian to take refuge in the Mahometan ſtates, had acquired a taſte for literature and the ſciences. About the commencement of the ſeventh century, the works of ſeveral of the Greek philoſophers and phyſicians were tranſlated into Arabic, under the patronage of the caliphs; ſeveral of whom were zealous encouragers of learning. In the eighth century, the caliph Almanſur eſtabliſhed an academy and hoſpitals for the ſick at Bagdad, which ſoon became ſo great a reſort for men of letters from all parts of the world, that, as Leo Africanus aſſures us, it at one time contained ſix thouſand. His ſucceſſor, Harun-Arraſchid, patroniſed the medical ſchool of Jondiſabur, the teachers in which were chiefly Neſtorians; and both he and Almamun were unremitting in their exertions to procure tranſlations from the Greek, and the ſettlement of men of ſcience in their dominions. But it was in Spain that Arabian learning roſe to the higheſt pitch, and produced the moſt brilliant fruits. The univerſity of Cordova, which had been founded by Alhakem, became the moſt celebrated in the world, and maintained its repute for a long courſe of years. As early as the tenth century, Cordova could boaſt of the largeſt library in the Weſt; a library of 250,000 books, and of which the catalogue is ſaid to have filled forty-four volumes. In the twelfth century, there were no leſs than ſeventy public libraries in Spain: Cordova had produced 150 authors, Almeria 52, and Murcia 62. At Seville, at Toledo, and at Murcia, academies were alſo eſtabliſhed, which continued to flouriſh during the whole period of the dominion of the Arabians.

Notwithſtanding theſe numerous incitements to learning, notwithſtanding the multitude of authors which they produced, the labours of the Arabians in the field of ſcience were attended with but ſmall fruits. Worſhipping the authority of Ariſtotle and of Galen, they conſumed their time in commenting upon theſe writers, and neglected the path of individual obſervation and experiment. To anatomy they contributed nothing; the tenets of their religion forbad all attempts at diſſection; and the only thing they ventured upon was the inſpection of the ſkeleton. Their pathology, though disfigured by numberleſs extravagances, was enriched by the deſcription of ſome new diſeaſes, particularly of the ſmall-pox, which, according to the Arabian writers, broke out about the year 558, and of which the firſt account was given by Ahrun, the author of a work in the Syriac tongue, intitled "Pandects." Their practice, in as far as it deviated from the Grecian model, was miſerable quackery. The only improvement deſerving of notice was the introduction of lenitive medicines, in the place of draſtic purgatives, which had been too freely employed by the Greeks. A predilection for the wonderful led them to cultivate with great aſſiduity the arts of aſtrology and uroſcopy, and to deliver their judgments with all the airs of propheſying. National prejudices, and a falſe delicacy, prevented their making any progreſs in ſurgery; and Albucaſis had much reaſon to complain of the ignorance of his countrymen in that department of the ſcience. In the auxiliary arts of chemiſtry and pharmacy they were more ſucceſsful. The former had been cultivated by the later Alexandrians, principally with a view to the tranſmutation of metals; an art which ſeemed to poſſeſs great attractions in the eyes of the Arabians, and to which they accordingly applied themſelves with eagerneſs. Geber, who lived in the commencement of the eighth century, and who is ſaid to have been the firſt alchemiſt of his nation, ſeems to have been acquainted with various preparations of mercury, ſuch as corroſive ſublimate and red precipitate, with the nitric acid, aqua regia, &c. Pharmacy was an object of ſtill greater attention among them; and the Arabians have the credit of having ſet the firſt example of publiſhing regular diſpenſatories, or collections of authorized formulæ. The firſt pharmacopeia was the production of one Sabon-ebn-Sahel, head maſter of the academy of Jondiſabur, and appeared towards the end of the ninth century, under the title of "Krabadin." The ſhops of the Arabian apothecaries were placed under the immediate ſuperintendance of the magiſtracy, who took care that they ſhould be provided with genuine drugs, and that theſe ſhould be ſold at a reaſonable price. Many of the pharmaceutical terms ſtill employed are of Arabian origin, *e. g.* alcohol, naphtha, camphor, julep, ſyrup, &c. &c. For a more particular account of Arabian medicine, ſee Sprengel, G. d. A. Th. ii. ſ. 324—450 (2le Augs.): the modes of practice have been ſufficiently deſcribed by Freind.

If the Mahometans, generally ſpeaking, contributed little to the improvement of the ſcience, they have yet more claims on our gratitude than the Chriſtian profeſſors of the art during the ſame period. To the former we owe, in ſome meaſure, the preſervation and diffuſion of the writings of the Greek phyſicians: the latter did every thing in their power to degrade the profeſſion, and bring it back to its condition in the moſt barbarous times. The clergy, actuated by avaricious motives, ſeized upon the province of the phyſician, and the moſt ignorant prieſts and monks ventured upon the practice of medicine, without any proper ſtudy or preparation. At length the evil became too crying to be any longer endured; and the firſt Lateran council, held in 1123, forbad the regular clergy to viſit any longer the ſick. The prohibition was repeated, in other terms, by the council of Rheims, in 1131, and by the ſecond general Lateran council in 1139; and thoſe monks and canons, who applied themſelves to phyſic, "ordinis ſui propoſitum nullatenus attendentes, *pro deteſtanda pecunia ſanitatem pollicentes*," were threatened with ſevere penalties, and all biſhops, abbots, and priors, who connived at their miſconduct, were ordered to be ſuſpended from their eccleſiaſtical functions. "But the French prieſts and monks," ſays Cabanis, "bade defiance to theſe thundering anathemas; and it was not till three hundred years after, that common ſenſe and a regard to propriety and the public good, triumphed finally over their artifices. A ſpecial bull, procured by the cardinal d'Eſtonteville, which permitted phyſicians to marry, effected their complete ſeparation from the clergy; and, by this means alone, put a ſtop to a variety of ſhameful abuſes." To the honour of our own country, however, be it mentioned, that theſe abuſes do not appear to have prevailed to ſuch an extent among us; but that, on the contrary, England could reckon many ſcientific men among its clergy, even as early

as

as the seventh and eighth centuries, whose fame was so great as to procure them the chief literary appointments abroad. The learned society, which was formed at the court of Charlemagne, consisted chiefly of Britons, with the celebrated Alcuin at their head; and it would appear from the verses of the last-mentioned personage, that the members practised medicine:

> " Accurrunt medici mox Hippocratica tecta;
> Hic venas fundit, herbas hic miscet in olla,
> Ille coquit pultes, alter sed pocula præfert."
>
> Carmin. 228.

The Benedictine monks of Salerno, in the Neapolitan territory, after having exercised the art for several centuries, according to the taste of the age, and performed many miraculous cures with the relics of St. Matthew and other holy persons, betook themselves to the study of the Arabian and Grecian writers on physic, but especially of Galen, whom they esteemed the prince of physicians; and by their successful labours procured for their residence the title of *Civitas Medicinæ*. In the twelfth century, Salerno arrived at its highest fame; and was much frequented by the crusaders in their passage to and from the Holy Land. Among these, Robert, the son of William the Conqueror, had the honour of having the well-known " Regimen Sanitatis Salerni" dedicated to him. In the year 1140, the emperor Frederic II. conferred particular privileges on the school of Salerno, and regulated the course of studies, and the probations which physicians and surgeons should undergo before they were permitted to practise. Many of the ordinances shew great judgment. The Salernian school continued accordingly to flourish till the middle of the fourteenth century, when it appears to have begun to decline. " Fuisse Salerni," says Petrarch, " medicinæ fontem fama est; sed nihil est, quod non senio exarescat." Gariopontus, Nicolaus, Ægidius, Enos, and John of Milan, the author of the " Regimen Sanitatis," are the chief writers whom this school boasts.

Medicine was now generally taught in the universities of Europe, among which those of Montpellier, Paris, Bologna, Padua, Ferrara, Pavia, Milan, and Piacenza, were the most distinguished; but it was taught in a slavish spirit of adherence to the dogmas of Galen and Hippocrates, and, what was still worse, in combination with the scholastic philosophy. In 1271, the College of Surgeons at Paris was established by Pitard, a man who, according to Quesnay, was born for the advancement of his art; and surgery was henceforth cultivated with much success in France, as a distinct branch of the profession. Several writers on physic appeared in England; among whom Gilbert has the merit of having furnished the best description of the leprosy of the middle ages; but he trod in the footsteps of the Arabians, and gave into the scholastic style. The same remark applies to his successors, John of St. Giles, Richard of Windermere, Nicolas Farneham, John of Gaddesden, &c. It was in Italy that medical science was revived in the truest spirit. In the year 1315, Mondini de' Luzzi, professor at Bologna, astonished the whole world, to use Vicq d'Azyr's expression, by the public dissection of two human bodies. His example was followed in other universities; but the utility of the practice was in a great degree frustrated by the predilection for ancient opinions, which made the anatomists of the age less anxious to discover facts, than to reconcile the appearances which they observed with the dogmas of Galen and Avicenna. An absurd bull of pope Boniface VIII. forbidding the maceration and preparation of skeletons, also concurred to impede the progress of anatomy (Blumenbach, Hist. Med. Litterar. p. 99.): but from this time forward, the Italian professors maintained a high repute for anatomical science, and have ranked among the most zealous contributors to our knowledge of the human frame.

Though the crusades had conferred no direct benefits on science, but, on the contrary, had tended to prolong the reign of prejudice and folly, they had given a new impulse to the human mind, by the spirit of commerce which they excited. They were also the occasion of the rapid spreading of leprosy and some other diseases in the West, and of the consequent increase of institutions for the relief of the sick, after the example of the Oriental nations. Several orders of knighthood, as the Templars, the knights of St. John, of St. Lazarus, the *Hospitalarii Sancti Spiritus*, &c. were founded with this charitable view; the members devoting themselves to the cure of such pilgrims as were afflicted with disease.

In the fifteenth century several new diseases appear to have invaded mankind, or, at least, to have attacked them with a degree of violence that was before unknown; such as the hooping-cough, which was epidemic in France in the year 1414, and which, according to Mezeray, attacked all descriptions of persons, even the oldest men; the sweating sickness, that broke out first in 1486; the scurvy, of which some traces had been observed in earlier times, but which became much more common, perhaps in consequence of the greater frequency of sea voyages about this period; and, lastly, the venereal disease, the origin of which we shall investigate in a separate article. The rules of the ancients proving but little applicable to the treatment of these complaints, physicians began to doubt the infallibility of these guides, and to perceive the necessity of observing and judging for themselves. Nor was the influence of the revival of letters, and the great events by which it was followed, lost upon medicine. But, unfortunately, the taste for astrological studies continued to prevail, and to obstruct the progress of the art in all its branches. The auxiliary sciences received little improvement during this epoch.

The very general attention which was now paid to classical literature in the universities of Europe contributed to the restoration of the Hippocratic system of medicine. Among the Italians, Leonicenus and Manardus laboured to expose the errors of the Arabians, whom the latter justly designated as *ex commentario medicos;* among the Germans, Fuchs, Koch, Winter, and Hagenbut, made known to their countrymen the merits of the Greek physicians, by their translations and commentaries; and a similar service was performed in this country by Linacre and Caius. The Parisian school was still more zealous in the cause; Houlier, Duret, and Gorræus, elucidated the doctrines of Hippocrates with much success; and Foësius produced an edition of his works, which even at this day ranks as the most accurate and the most complete. Medical literature was still farther enriched by the magnificent collections of pathological observations, which the industry of Dodonæus, Schenckius, Forestus, and Platerus accomplished. A controversy respecting the mode of performing venesection in pleurisy, was begun in the early part of the sixteenth century by Brissot, a physician of Poitou, who observing the good effects of abstracting blood as near as possible from the seat of inflammation, had the courage to oppose the Arabian method, and to revive the Hippocratic practice. This important innovation, however, was opposed by the physicians of the time with great warmth, and continued the subject of violent dispute till the anatomical discoveries of Vesalius, Faloppia, and Amatus, turned the scale in Brissot's favour. The credulous and superstitious character of the age, however, was still opposed to any great improvement in the art of observing and curing disease:

disease: physicians were more anxious to collect what was wonderful than what was useful; their practice was directed chiefly by the theory of the elementary qualities, and was disfigured by many remnants of the barbarous ages. The best observer which the sixteenth century produced was Jodocus Lommius, the author of a classical work on the cure of continued fevers, and of "Three Books of Medical Observations."

Though the futility and absurdity of astrological science had been successfully exposed by Picus of Mirandola, Marlianus, and Paulus Florentinus, yet it continued to be pursued with unabated ardour, and to obtain many votaries, among men of otherwise great judgment and learning. Even those who evinced the greatest contempt for this nugatory art, could not divest themselves of a partiality for studies of an equally frivolous nature. Of this weakness we have a remarkable instance in Picus of Mirandola himself; who, after combating astrology, applied himself to the study of the Cabbalistic philosophy. The belief in the influence of demons, the efficacy of magic, and the powers of witchcraft, became very prevalent throughout Europe, and perhaps in no part of it to a greater degree than in England, which acquired the repute of being the country of witches. Even the illustrious Luther was so completely biassed by the prejudices of his age, that he ascribed the majority of diseases to the arts of the devil, and found great fault with physicians, when they attempted to account for them by natural causes. Alchemy had been hitherto cultivated only by the most illiterate men; but the introduction of theosophism and the cabbalistic art brought the study into great vogue, and it was thenceforth prosecuted with much eagerness by the monks and wandering scholastics (*scholastici vagantes*), under the patronage of kings and princes, who fondly hoped to augment their revenues by the products of this art. Though a law was passed by Henry IV., condemning as impostors the alchemists, who were then very numerous in England, yet they contrived to maintain their ground; and practised so adroitly on the weakness of his successor, Henry VI., that this monarch, finding his treasures exhausted by the unfortunate wars in which he had engaged, granted to certain transmuters of metals the privilege of making gold, and preparing the elixir of life. (Henry's Hist. of G. B. b. v. ch. iv. § 7.) The labours of Basilius Valentinus, the reputed author of the "Currus Antimonii Triumphalis," and of Isaac le Hollandois, were rather more usefully directed; but it was reserved for Paracelsus to appropriate to himself all the knowledge which his predecessors had attained in this branch of learning, and to apply it with success to medicine.

It has been too much the fashion to ridicule this singular man, and to overlook his merits as one of the great reformers of our art; though it must be acknowledged, that the extravagance of his pretensions, his insolent behaviour, and his dissolute manners, afford strong grounds for much of the contempt with which he has been visited. The early education of Paracelsus, or, as he called himself, Philippus Aureolus Theophrastus Paracelsus Bombast von Hohenheim, would appear to have been greatly neglected: and, notwithstanding his asseveration, that he had been at German, French, and Italian universities, it is sufficiently evident from his writings, that he could never have enjoyed the benefit of proper classical instruction. From his father, who is said to have been a physician, he obtained a smattering of medicine, astrology, and alchemy: he afterwards served as surgeon in several wars, and visited most of the countries of Europe, seeking information not only from physicians and other men of learning, but from old women, from the gipsies, and from conjurers. From these he boasts of having learned the preparation of several valuable remedies: from his intercourse with the miners, he became acquainted with various processes for extracting metals. Returning to Germany, he soon acquired great repute by his cures, and was believed to have discovered the elixir of life. In the year 1526, his increasing fame procured him the appointment of professor of medicine and surgery in the university of Basle; where he commenced a course of lectures on the theory and practice of physic, in the German language, and succeeded in attracting a considerable audience, but chiefly from among the dregs of the people, who, seduced by his vauntings, were eager to obtain the knowledge of his secrets. He began by burning the works of Galen and of Avicenna, in his auditory, assuring his hearers "that his shoe-latchets possessed more knowledge than Galen and Avicenna; that all the academies of the world had not so much experience as his beard; and that the hair of the back of his neck was more learned than the whole tribe of authors." The lectures, however, which he delivered, consisted of little else than the recommendation of a number of empirical remedies, of the infallibility of which he spoke with much assurance. But his disciples soon became disgusted with him, on account of the drunken irregular life which he led; and though he still continued to perform many wonderful cures, his fame as a practitioner began to decline, and a dispute with the magistracy compelled him suddenly to quit Basle, and to take refuge at Alsace. He, however, did not settle there, but continued to lead a wandering life through different parts of Germany and Switzerland, till the year 1541, when he died at Salzburgh, in the hospital of St. Stephen.

The obscure and barbarous style in which the writings of Paracelsus are composed, has rendered it a matter of great difficulty to give a clear account of his speculative opinions. Even the indefatigable Hensler (Geschichte der Lustseuche, s. 120.) complains, that it was with him the business of several months to unravel the confusion of his system. Certain, however, it is, that there never was a more glaring example of the error to which chemists have been ever prone—that of carrying into other sciences what Bacon appropriately calls "the smoke and tarnish of the furnace." The elements of the living system he fancied to be the same as those of his laboratory; and sulphur, salt, and quicksilver, were, according to Paracelsus, the constituents of all organized bodies. They were combined by chemical operations, and their relations were governed by the *Archeus*, or demon, who performed the part of alchemist in the stomach, who separated the poisonous from the nutritive part of the food, and who communicated the tincture by which the food became capable of assimilation. This governor in the stomach, this *spiritus vitæ*, this *astral body* of man, was the immediate cause of all diseases, and the chief agent in their cure; yet each member of the body was supposed to have its peculiar stomach, by which the work of secretion was effected. Diseases were produced by certain influences, of which Paracelsus reckoned five, *viz. ens astrale, ens veneni, ens naturale, ens spirituale,* and *ens deale.* When the archeus was sick, putrescence was occasioned, and that either *localiter* or *emunctorialiter. Tartarus,* or a certain morbific matter, was the cause of all disorders, exhibiting a viscidity of the fluids, rigidity of the solids, or a concretion of earthy matter, and was believed to be secreted when archeus operated in an irregular or too potent a manner, and digestion was too fully performed. Such speculations, considered abstractedly, are no doubt very absurd; but when divested of the cabbalistical jargon in which they have been enveloped, they will be found to contain a certain portion of truth. Of so great value have

have the views of Paracelsus respecting the functions and diseases of the digestive organs latterly appeared, that they have been revived with little alteration, though clothed in a new dress, by a writer at the commencement of the nineteenth century, in a treatise "On Disorders of the Stomach."

The best and most original of Paracelsus' works is his treatise, in three books, on the venereal disease, entitled "Von den Imposturen in den Franzosen;" in which he has given a minute description of the various forms of syphilis, and shewn in what manner other disorders were liable to be modified by its presence; and in which he has successfully exposed the errors, or, as he terms them, "impostures," of the then prevailing practice. Instead of the inert fumigations, quintessences, and diet drinks, which were in vogue, he recommended mercury as the only remedy on which dependence could be placed, and exhibited it both internally, and by the way of friction. Medicine, in general, was indebted to him for the free introduction of this and other mineral remedies, and of opium, and for pointing out the necessity of attending to chemical actions in pharmaceutical operations. To complex prescriptions he was no friend, and he ridiculed with considerable effect the absurdity of imagining, that 40 or 50 simples in a compound would all retain and exert their separate virtues. The treatment of wounds and ulcers received great improvement at his hands, and his observations on the *balsam* (coagulable lymph), by which he supposed nature to effect their cure, display no small degree of discernment. His confidence in his *arcana* led him to condemn the use of cauterizing instruments, and even to reject the employment of sutures.

The *anatomy of Mundini* was servilely followed as a text-book in all the universities of Europe till towards the middle of the sixteenth century, when the discoveries of Achillini, Berengar of Carpi, Serveto, Sylvius, and Eustachius, but, above all, of Faloppia and Vesalius, threw a new light on the science, and established it on an unalterable basis. Galen was no longer appealed to on doubtful points; on the contrary, anatomists seemed to vie with each other in exposing his errors, and in multiplying the proofs of their observations, by repeated dissections. The structure of the organ of hearing, and other parts of the osseous system, which had escaped the notice of the ancients, was now fully investigated; the arrangement and formation of the muscles were examined, and the mistake of supposing them to consist of an union of tendinous and nervous fibres was satisfactorily confuted; the nerves were traced from their origins, and the base of the brain was minutely described. But it was in respect to the vascular system, that the most brilliant and fruitful discoveries took place. Berengar, who had paid great attention to the structure of the heart, conjectured the right use of the semilunar valves. So early as 1547, Cannani and Amatus had observed the valve at the termination of the vena azygos; but they had not turned the discovery to account; and it was reserved for Fabricius of Aquapendente to prove the presence of valves throughout the whole course of the veins. Five years afterwards, the circulation of the blood through the lungs was imperfectly described by Servetus, who had availed himself of the researches of Berengar and Vesalius. In the year 1571, Cæsalpini had the merit of stating it more clearly, and even of suggesting the first hint of the greater circulation (De Plantis, lib. i. c. 2.); but the full honour of the latter discovery, at least of its complete demonstration, must be ascribed to our countryman, Harvey. See CIRCULATION.

It is sufficiently apparent, even from the above imperfect account, that nothing but a succession of fortunate events could ever have brought about this great improvement in physiological science. The discovery of the circulation of the blood was one of those occurrences, which, to use the language of Bacon, "are more the birth of time than of genius;" and, though the merit of it could only belong to a man of transcendent talents, yet we rather detract from, than add to the glory of Harvey, by supposing him to have hit upon it by chance, unguided by the light which he had received from the instructions of his predecessors and contemporaries. We may also observe, that the beneficial consequences of the discovery in question have been greatly overrated, at least as far as practical medicine is concerned; and, in this point of view, we cannot help subscribing most fully to the opinions of a writer, whom we have had frequent occasion to quote. "The new light," Mr. Cabanis remarks, "which was thrown upon the animal economy by this important discovery, served only, in a manner, to redouble the rage of systems. Nothing else was thought of, but to cause the blood to circulate more freely, to destroy its viscosity, to draw off from the body that which was supposed to be corrupted, to purify it, correct it, and renew it, and to preserve the blood-vessels in a relaxed and pervious state. Hence those torrents of aqueous and diluent drinks, with which Bontekoe and his adherents deluged their patients. Hence that sanguinary fury, which the partisans of Botalli thought themselves entitled to exercise in their treatment of all sorts of diseases; a fury which, though so often damped, in some measure, by systematic murders, has ceased only for intervals, and still from time to time re-appears in the schools. Hence, too, that wretched mania of the transfusion of blood, of which the practice almost always deprived those who had the temerity to subject themselves to so dangerous an operation, of their reason, or their lives.

"Thus, one of the most beautiful discoveries of modern medicine, far from elucidating the practice of the art, as there was every reason to expect, only had the effect of misleading weak imaginations, dazzled by its splendour; and it may still be doubted, whether its application to the knowledge and cure of internal diseases has been of any real use. In surgical cases, even where its assistance is generally regarded as indispensable, might not observation almost always supply its place? And must we not limit its importance to the elucidation of a point in anatomy and physiology, very curious, no doubt, in itself; but which, if it did not indirectly affect many other interesting questions relative to the animal economy, would probably have contributed very little to our knowledge of its true laws?" Loc. cit. p. 166—8.

A system that is founded on mysticism, and clothed in obscurity of language, is sure to find numerous votaries. Accordingly, the doctrines of Paracelsus, notwithstanding the opposition of Erastus, Dessenius, Libavius, and others, continued to attract adherents in all the countries of Europe, but particularly in Germany. They were eagerly embraced by the fraternity of Rosicrucians, among whom our countryman, Fludd, made himself conspicuous by his uncommon proficiency in cabbalistical and astrological learning. But of all the followers of Paracelsus, Van Helmont was the only one who could be said to tread successfully in the footsteps of his master; attacking vigorously, on the one hand, the Galenical system; and labouring, on the other hand, with unremitting zeal in the prosecution of chemical research. Though misled in his speculations by a strong bias to theosophism, he must be allowed to have shewn himself, on many occasions, a skilful observer of nature: he was the first who pointed out distinctly the influence which the epigastric organs exert upon the other parts of the system,

ſyſtem, in health as well as diſeaſe; he determined the nature and cauſe of inflammation more accurately than any of his predeceſſors had done; he gave the firſt ſatisfactory explanation of the origin of calculi; he expoſed the abſurdity of the prevailing theory of putrefaction of the blood; and he placed in a ſtrong point of view the pernicious conſequences and the dangers of exceſſive blood-letting. Chemiſtry owes to him the diſcovery of carbonic acid and hydrogen gas, and the firſt inveſtigation of their properties. In his practice he made great uſe of calomel, of antimony, wine, and opium; and it is ſomewhat remarkable, that with regard to the virtues of the laſt mentioned remedy, he in ſome meaſure anticipated the Brunonian doctrine; for he maintained that opium was not to be conſidered as a *refrigerant* medicine, but as a *tonic* and *anodyne*. The utility of Van Helmont's labours, however, was leſſened by his attachment to the Paracelſian phraſeology; and, as his works were not publiſhed till a conſiderable time after his death, when other ſyſtems had come into vogue, his doctrines had few adherents, at leaſt in their original ſtate.

We have already had occaſion to obſerve the influence which the prevailing ſyſtems of philoſophy have exerted on medicine. In no period of medical hiſtory was this influence greater than in that of which we are now about to treat: in no period has it been productive of more marked effects. From the revival of letters to the commencement of the ſeventeenth century, Ariſtotle had continued to be the great authority of the ſchools; dialectic ſtudies were conſidered as the beſt preparative for all the other branches of learning; and natural philoſophy, in particular, was confined within very narrow limits by its union with the ſcholaſtic diſcipline. Some philoſophers, it is true, had ſtumbled, as it were, on the proper road of its inveſtigation, and, freeing themſelves from the ſlaviſh admiration of received opinions, had proſecuted, with conſiderable ſucceſs, their inquiries in ſeveral departments of phyſical reſearch: but the ſlow and uncertain advances which they made, prove, that their march was wavering and their footing inſecure; that they had ſoon deviated from the path, and had never diſcovered its whole extent. It was reſerved for the genius of Bacon to point out the various ſources of error, by which they had been miſled; to demonſtrate the true end and uſe of all ſcientific inquiry; to ſhew the only method by which it could be ſucceſsfully purſued; and to deliver the code by which the ſtudy of nature muſt be thenceforth conducted. Embracing in his comprehenſive mind the whole circle of human knowledge, he ſaw that in medicine much remained to be accompliſhed; and recalling the attention of phyſicians to the proper objects of inveſtigation, he inculcated the neceſſity of a ſtrict adherence to the path of obſervation and experiment, as the only way by which their art could be improved. By this recommendation, he juſtly remarks, that he was only enforcing the example of Hippocrates, which had been too long neglected: but his views were more correct and enlarged than thoſe of the father of phyſic, and more fully adapted to the exiſting condition of the ſcience, or rather, to ſpeak more accurately, to its future progreſs; for it has been only in very late times, that ſome of the more important *deſiderata*, which Bacon indicated, have been completely realiſed; as, for inſtance, his directions concerning the proſecution of morbid anatomy, and his ſuggeſtion of "an imitation by art of natural bathes and medicinable fountaines &c." Medical ſcience, however, has profited much leſs than it ought to have done by the labours of this truly great man; his writings were for a long time neglected; and, even at this day, though we talk of the reform in the method of inveſtigation which Bacon introduced, the undigeſted knowledge and crude ſpeculations of too many of our phyſicians demonſtrate, that they neither obſerve his model, nor fully comprehend his precepts. Till the preſent age, Baglivi appears to have been the only writer who knew how to appretiate the importance of the "Novum Organum," as a guide in medical inquiries; but his unfortunate predilection for the chemico-mechanical theory, led him too often to forget the maxims to which he had given his cordial aſſent, and to commit thoſe very errors which in others he had ſeverely reprehended.

The efforts of Bacon to overthrow the Ariſtotelian philoſophy were powerfully ſeconded by Deſcartes. As the opinions of the latter found a much readier reception among the learned, eſpecially on the continent, than thoſe of our illuſtrious countryman, they accordingly had a more immediate operation, and impreſs their character more diſtinctly on the ſpeculations of the age; but their tendency was in many reſpects injurious to the intereſts of medical ſcience. Adopting ſome of the moſt objectionable parts of Van Helmont's ſyſtem, particularly the doctrine of fermentation, and combining them with his own hypotheſis of vortical motion, Deſcartes attempts to explain all the chief functions of the living body on chemico-mechanical principles. Thus, the circulation of the blood and animal heat were produced by the ebullition or fermentation that took place in the heart; digeſtion was likewiſe performed by a ſpecies of fermentation; and the ſenſation of hunger proceeded from the acid which was evolved during the proceſs. To explain the nature of ſecretion, Deſcartes had recourſe to the corpuſcular philoſophy; comparing the ſecreting organs to ſieves, which allowed only the more minute and homogeneous particles to paſs through, while the coarſer and heterogeneous bodies were rejected:—the round particles were ſuppoſed by him to enter into cylindrical tubes; pyramidal particles penetrated by triangular pores, and cubical particles by ſquare pores; and in this way each ſecretion remained diſtinct, at leaſt in the healthy ſtate. Theſe ideas were eagerly embraced by the Dutch phyſicians of the time, and may be conſidered as forming the groundwork of the chemical and mechanical ſyſtems, which divided the medical world at the end of the ſeventeenth century, notwithſtanding the claims to originality which ſeveral of their followers have put in.

If the importance of the chemical ſyſtem of medicine were to be eſtimated by the portion of good which it has effected, its hiſtory might be brought within a very ſmall compaſs; but if it ſhould be viewed as one of the chief impediments to the free progreſs of the art, which ſo many circumſtances had conſpired to favour; if it ſhould be conſidered in relation to the miſchievous bent which it gave to medical ſpeculations, and, above all, in relation to the fatal errors of practice which it countenanced; few ſyſtems would appear entitled to more ſerious notice. Its firſt and great ſupporter was Francis de le Böe Sylvius, a man of no mean talents, a ſkilful anatomiſt, and the firſt inſtitutor of clinical lectures in hoſpitals. Though he perceived the full value of experience in medicine, and ſtrenuouſly inculcated the neceſſity of ſubjecting all theories to its teſt; yet he allowed himſelf to be dazzled by the glare of opinions, which not only were not confirmed by experience, but which were, for the moſt part, in direct oppoſition to its leſſons. Fancying that all the operations of life might be explained by a few chemical principles, he could diſcern nothing but fermentations, ebullitions, and combuſtions, in the different organs of the body, except, indeed, that he ſuppoſed the animal ſpirits to be produced by a diſtillation in the brain; diſeaſes were referred by him to an exceſs of either acid or

 alkali

alkali in the fluids, to which he gave the name of *acrimony*, and the consequent inspissation or attenuation of the blood and lymph; and they were to be cured only by neutralizing the morbific cause. Thus, he sought to correct the acrimony of the bile by opium and other narcotic remedies; in intermittent fevers, which he believed to proceed from the acid acrimony of the pancreatic juice, he administered the *sal succini volatile* and opium; and in malignant fevers, which he ascribed to an alkaline acrimony and attenuation of the humours, he gave acids, ethers, opium, absorbent earths, and cordials,—paying no regard to the different stages of the disorder, or the character of the prevailing epidemic; but solely intent on fulfilling the indications of his mistaken theory. In this way, the practice of medicine may be said to have commenced a retrograde march, from which it long suffered, and from the injurious consequences of which it has scarcely yet entirely recovered.

After a slight opposition, the doctrines of Sylvius were almost universally adopted. In England, indeed, they experienced some modification, without becoming more rational, as we have elsewhere shewn (see HUMORAL *pathology*); and in Italy, where mathematical studies had acquired the ascendency, though they were received by many, yet they never obtained that exclusive sway which they enjoyed in other countries. The professors of Paris and Montpellier, refining upon the Helmontian and Cartesian hypothesis, divided the fermentations of the fluids into several distinct species; attempted to account for their production by the admixture of the animal spirits from the brain; and formed a classification of fevers into *fievres chyleuses*, and *fievres sanguines*. Attempts were even made, and with apparent success, by Viridet, Vieussens, and others, to demonstrate, by experiment, the presence of alkali in the bile, and of acid in the blood, in the pancreatic and gastric juices. But it was in Holland and Germany that this system had its most bigotted votaries, and was pushed to the most absurd and pernicious extreme. Thus one physician conceived, that acidity was the sole and universal cause of disease; another affirmed, that gout originated from the effervescence of the synovia of the joints with the vitriolated blood, and recommended alcohol for its cure; while a third deduced all disorders whatever from inspissation of the fluids, and expatiated on the sovereign efficacy of diluent drinks, especially of tea. "Tea," says Bontekoe, who is loudest in his praises of this panacea, and who, as Blumenbach remarks, deserved to have been pensioned by the East India Company for his services,—"tea is the best, nay the only remedy for correcting viscidity of the blood, the source of all diseases, and for dissipating the acid of the stomach; as it contains a fine oleaginous volatile salt, and certain subtle spirits, which are analogous in their nature to the animal spirits. Tea fortifies the memory and all the intellectual faculties: it will therefore furnish the most effectual means of improving physical education. Against fever there is no better remedy than 40 or 50 cups of tea, swallowed immediately after one another: the slime of the pancreas is in this way carried off." (Abhandlung vom Menschlichen Leben, Budissen, 1685.) A physician of Minden, named Van der Becke, attempted an union between the chemical hypothesis and the peripatetic philosophy,—taking water, or alkali, for the *matter*, and fire, or acid, for the *form*, of all organized bodies; and was followed by one Van Rustingh, who derived all diseases from a deficiency or a redundancy of fire or water; maintaining, for example, that, where the water predominated, the fluids became viscid, and intermittent fevers and arthritic complaints arose: these were to be cured by volatile salts, which contain many fiery particles. Condemning the employment of venesection *in t to*, this author did not scruple to adopt the same *fiery* treatment in various inflammatory distempers: so completely had false theory obscured his mind; and to such a deplorable state was medical practice reduced, in the hands of these chemical dreamers!

Some few, however, had the sagacity to perceive the inadequacy of such speculations to illustrate the phenomena of life, and ventured to call in question the propriety of applying them to the treatment of disease. Boyle, in his "Sceptical Chemist," and other essays, had refuted the hypothesis of acid and alkali; and Le Mort, pursuing his ideas, attacked the doctrine of fermentation, and substituted a theory of his own, which was more immediately grounded on the corpuscular philosophy. Bohn, a professor of medicine at Leipsic, brought forward a number of arguments to prove that digestion was not effected by any fermentative process; that, in the healthy state at least, there was no acid fermentation in the stomach; and that the presence of acidity, instead of assisting, rather impaired the functions of that organ. He shewed, by experiment, that the bile did not effervesce on the addition of acids; and he controverted the doctrine of a nervous fluid, as inconsistent with the structure and properties of the nerves. Pechlin and Brunner proved, that the hypothesis of the acid nature of the pancreatic juice was utterly unfounded; that this fluid did not effervesce with the bile; and that it was not even necessary for digestion. In this manner several physiological facts became ascertained; and this is the only way in which the chemical theory can be said to have done any thing for the progress of science.

The practical errors of the chemists were ably exposed by Sydenham, who, having applied himself late in life to the study of his profession, was never so strongly imbued with the prejudices of the schools, but that he could easily shake them off when they would not bend to his experience; and who, living on terms of intimacy with Boyle and Locke, brought into medicine many of those sound and enlightened views, which had guided their researches in other departments of learning. Adopting the suggestion of Bacon, Sydenham returned to the Hippocratic method of collecting histories of disease, and shewed the necessity of coming to its observation with an unbiassed mind; of attending more carefully to its distinguishing characters; and of marking all the circumstances by which it was liable to be modified. He saw that sufficient diligence and discrimination had not been used in these particulars; that observers either had confined their attention to uncommon cases, or, misguided by false hypothesis, had given imperfect and erroneous views of the disorders which they attempted to describe. It was only, he maintained, by discarding all hypothetical reasonings, and by investigating minutely the succession of symptoms, that we should ever be able to arrive at the knowledge of the causes, and the curative indications of disease. Accordingly, though he forgot his own precept, and indulged much in fanciful speculation, Sydenham laboured assiduously to improve the practice of medicine, and has justly acquired the title of its reformer. The descriptions which he furnished of the various epidemics of his time have served as models to succeeding writers, and in point of simplicity and accuracy have scarcely ever been surpassed: his "Treatise on the Gout" is still consulted as one of the best accounts of that disease. Sydenham is also to be regarded as the reviver of the antiphlogistic method; for he was the first who pointed out all the dangers of the stimulant plan which the chemists pursued in the early stages of acute disorders, and which, in many instances, but especially in small-pox, had been attended with the most fatal consequences. The practical doctrines of Sydenham, indeed, were adopted by few of his

his contemporaries; and at the commencement of the following century a large proportion of the English physicians continued to advocate the Sylvian hypothesis, or some of its modifications.

In proportion as true chemical science advanced, the partiality for chemical explications of the functions of the living system abated; and physicians seem to have discovered, for the first time, that the theory of the humours, even with all the improvements which it derived from the corpuscular philosophy, threw no light whatever on the actions of the solids. A new hypothesis, therefore, was projected; and as men, in avoiding one error, are apt to run into the opposite extreme, physiologists now attempted to explain all the phenomena of life according to the mere mechanical powers of the organs, and to reduce the laws of the animal economy to the rigid calculations of geometry. They imagined, that they could illustrate every operation of the human body, by comparing it to a system of ropes, levers, and pullies, united with a number of rigid tubes of different lengths and diameters, containing fluids, which, from variations in the impelling causes, moved with different degrees of velocity. When the fibres of this machine were not sufficiently flexible; when the pullies and joints of the levers were not kept in sufficient repair; or when the apertures of the pipes were not sufficiently free; the movements were necessarily suspended, or less perfectly performed, and they were only to be brought into proper regulation, according to the practitioners who adopted this fanciful theory, by removing the above described impediments. The composition of the fluids was supposed to be the result of their motion in the tubes; and in these nothing was attended to but the forces of gravity and cohesion; as in calculating the action of a pump, or other hydraulic engine. "If the chemical school," to use the words of Sprengel, "had degraded the physician to the rank of a brewer or distiller, the disciples of the iatro-mechanical school, on the other hand, were glad to be esteemed as hydraulical engineers; and several of them, in fact, served in the double capacity of engineers and professors of medicine." One of them, Dionis, a professor of surgery at the Jardin du Roi, went so far as to compare the circulatory system to the water-works at Marly, by which the water of the Seine is raised to considerable height, and from thence made to fall again upon the great wheel.

Among the causes which conduced to the establishment of this sect, the discovery of the circulation of the blood is the most prominent. When it was found that the blood flowed in a regular manner, through certain conduits, from the heart, and returned to that organ, by other vessels, from the extremities, physicians set about calculating the mechanical force which they supposed necessary for enabling the heart and arteries to produce this effect; and, elated with their apparent success, were led by degrees to transfer their calculations to the other functions of the body. Geometry had become the prevailing study of the learned; and societies for the promotion of experimental philosophy were established in the different countries of Europe, among which the Florentine academy del Cimento took, in some measure, the lead. It was in Italy that mathematics had been most assiduously cultivated; and it was there that the first attempt was made to introduce them into medicine. In the year 1614, Sanctorius published his "Medicina Statica," in which he endeavoured to shew the great influence which the insensible perspiration has upon health, and to calculate with precision all the variations in its quantity, in the different conditions of the body. According to his theory, diseases originated from the noxious particles of the food being retained in the system, in consequence of the stoppage of the transpiration; and till the latter function was restored to the proper standard, no cure could well take place. Sanctorius distinguished the different alimentary matters according to their specific gravities, and according as they appeared more or less fitted to pass off in the way of insensible perspiration; he even ventured to apply his maxims to the passions of the mind; shewing how joy and equanimity favoured the excretions, while sorrow and fear impeded them; how fevers and melancholy arose from the obstructed perspirable matter, where grief was long continued; and how they were to be removed by restoring the suspended exhalation. Among the "Aphorisms" of Sanctorius, there are many sound observations; and medical science is under considerable obligations to him for having directed the attention of physiologists to the functions of the skin, which, till then, had been in a great measure overlooked; but his views, like those of most theorists, were far too partial; and there can be little doubt that, in one respect, they had a most injurious influence, *viz.* by encouraging physicians in the universal employment of sudorifics, to which they were already too prone; and no one will now subscribe to the judgment of Boerhaave, who says of Sanctorius and his work, "Nullus medicorum, qui ante eum scripserunt, cardinem rei ita adtigit—nec ullus liber in re medica ad eam perfectionem scriptus est."

Such were the advances towards the formation of that system on which the talents of Borelli, Baglivi, and Bernouilli, in Italy, and of Pitcairne, Keil, Wintringham, and Mead in England, afterwards shed so much lustre. Among the French it found comparatively few supporters, though a certain Peter Chirac was captivated with Borelli's ideas to that degree, that he bequeathed 30,000 livres towards the establishment of two professorships at Montpellier; the one for comparative anatomy, and the other for the iatro-mechanical theory: but in Holland and Germany it soon made its way, and was taught at all the principal universities. That the labours of Borelli and his successors were often confirmed by observation, and have served to illustrate those movements of the living body which are clearly referrible to mechanical laws, such as the compound actions of the muscles, the functions of the eye, &c. will not be denied: but when mathematical reasonings were applied to phenomena, which furnished no fixed data for calculation, and which were, in fact, to be investigated by very different methods, no useful result could be expected. Accordingly it happened, that almost every calculator came to a different conclusion from those who had preceded him in the inquiry. Borelli, comparing the mass of the heart with that of the temporal and masseter muscles, concluded that that organ was capable of supporting a weight of 3000 pounds, and that its absolute power was therefore equal to 3000; but, as it had to overcome a resistance in the smaller arteries at least sixty times greater, its relative power must be estimated at 180,000 pounds. Keil, on the other hand, applying the Newtonian doctrine of gravitation to the motion of the blood, maintained that the power of the heart was only from five to eight ounces: but his calculations were controverted by Jurin, who made it fifteen pounds three ounces. Again, with regard to digestion, which these mechanists conceived to be only a species of trituration, Borelli instituted a comparison between the human stomach and the stomachs of different species of birds, estimating, for example, the power of that organ in the turkey-cock at 1350; Hecquet calculated the power of the coats of the human stomach and abdominal muscles at 261,000; while Astruc asserted that it amounted to only four pounds three ounces. Secretion, in like manner, was supposed to depend on the various

diameter

diameter of the secreting vessels, on their different convolutions, and on the angles at which they branched off from the arteries. But in order to ensure success in the most simple of these inquiries, "it would be necessary," as D'Alembert has shewn, "to know exactly to what degree the vessels are capable of dilatation; in what manner, and according to what law, they are dilated; to be perfectly acquainted with their figure, with their various elasticity, with their different anastomoses, with the number, the strength, and the position of their valves; with the heat of the blood, and the degree of tenacity which it possesses; and with the moving powers which impel it. Even supposing each of these particulars to be accurately known, still the great number of elements, which would enter into such a theorem, would probably render all our calculations fruitless." Elemens de Philosophie, Amst. 1764, p. 268. It is almost needless to add, that not one of these circumstances was ever properly ascertained: the laborious calculations of the mechanical physicians were therefore, for the most part, wholly nugatory.

In some respects, however, they must be allowed to have had a beneficial tendency. By accustoming the mind to the strictness of mathematical methods; by fixing the attention of physiologists on points of the animal economy that had been previously but little investigated; and by inducing them to seek occasionally for experimental proofs of their theories; they led to discoveries which probably would otherwise have long remained unmade. From the time of Harvey to the middle of the last century, in fact, anatomy continued to make great progress; the errors which had obscured its study were gradually dissipated; and the more important functions of the organic frame were explained with all the rigour of demonstration. A summary view of the principal discoveries of this epoch will shew the importance, and also, in some degree, the share which the followers of the mechanical sect had in them.

The heart had been regarded as a parenchymatous vessel by the ancients, with the exception of the author of the pseudo-Hippocratic treatise, περὶ καρδίης, who calls it a *strong muscle*. In the year 1663, Stenonis ascertained the muscularity of its structure; and three years afterwards the work of Lower appeared, in which all the circumstances of its position and organization were more fully demonstrated. Wepfer, a physician of Suabia, instituted various experiments with cicuta and other poisons, which proved that the blood was only the exciting, and not the proximate cause, of the motion of the heart; and that this motion depended solely on the organic powers of that organ. Lange, a professor at Leipzig, gave, in the year 1680, an account of some experiments with injections, by which several important facts connected with the circulation were brought to light. He succeeded, for example, in injecting the cells of the lungs from the pulmonary artery, and the placenta from the arteries of the uterus. In 1683, a Dublin professor of the name of Molyneux demonstrated, by aid of the microscope, the circulation in the amphibia: but it was chiefly through the indefatigable exertions of Leeuwenhoek, that this new instrument of anatomical observation was brought to perfection, and that full ocular proof was afforded of the Harveian discovery. By successive improvements on his magnifiers, he was at last enabled to perceive distinctly the passage of the blood from the smallest arteries into the veins, and the continuity of these two sets of vessels; and to observe the figures of the globules of the blood. The art of injection, which was carried to a great degree of nicety by Ruysch, served also to throw new light on the vascular system. Vieussens gave a minute description of the *vena cava*, and pointed out the *fossa ovalis* and the ring by which it is encompassed: and, in the year 1700, he discovered the serous vessels of the *uvea*. Gastaldy, having divided the intercostal and eighth pair of nerves, above the heart, found that it still continued to contract; whence he justly inferred, that its action did not depend on the nervous influence. The experimental labours of Hales and Wintringham served to determine several questions relating to the motion of the blood, the connection of the veins and arteries, and their relative strength; but their calculations concerning the force of the heart and the velocity of the blood were all founded on the arbitrary principles of the mechanical system. Weitbrecht and De Gorter proved the independent action of the arteries; and, lastly, Senac and Haller put an end to all controversy on the subject by their masterly descriptions of the heart, and the complete analysis of its functions.

Previously to the publication of Harvey's work on the circulation, Faber, a physician at Rome, had ascertained by experiment, that no air passed into the heart by the lungs; but very erroneous ideas concerning the functions of the latter organs continued to prevail, till Malpighi ascertained their real structure, and Mayow proved the necessity of oxygen gas for the due performance of respiration. Lower, adopting the doctrines of Mayow, was led to the conclusion, that the red colour of the blood depended on the presence of the "*nitro-aëricus* particles" of the atmosphere. Borelli, however, had the merit of giving the first complete explanation of the mechanism of respiration; shewing how the ribs and sternum are elevated by the action of the intercostal muscles, and how the cavity of the thorax is in that manner enlarged, while the lungs remained in a great measure passive; and how the air, which is inspired, is never entirely expired, though it becomes more rarefied. He rejected the hypothesis of a vital heat in the heart, and referred the exhalation from the lungs to an excretion from the bronchial glands. These opinions were adopted and extended by Pitcairn, Strœm, and Lister. In the year 1715, Muschenbroek published his dissertation "De Aëre in Humoribus," in which he refuted several erroneous notions that had been entertained on the subject of respiration, particularly the doctrine of the admixture of the air with the blood, and of the presence of air between the pleura and the lungs. A controversy that arose between Hamberger, a disciple of the mechanical school, and Haller, had the effect of determining some disputed points relative to the action of the intercostal muscles and the state of the lungs in respiration; and the experiments, which Hales instituted with the air-pump, shewed the effects of the deprivation of air on the sensible properties of the blood.

On the 23d of July, 1622, Caspar Aselli, while dissecting a live dog, at the request of some friends, in order to demonstrate the recurrent nerves, observed a number of small white threads crossing the mesentery. At first he conceived they were nerves; but happening to cut into one of them, he remarked a small portion of a milky fluid flowing from the opening. Full of joy at this unexpected discovery, he cried out to the bystanders εὕρηκα, and resolved to lose no time in repeating the experiment. Finding, accordingly, that these vessels were observable in living animals, only after a full meal, he concluded that they were the true *vasa chylifera*; which was further proved by their origin in the villous coat of the intestines, and by the valves with which they were furnished: but he erroneously supposed them to unite in the pancreas, and from that to pass into the liver. The observation of Aselli was soon afterwards confirmed in the human body by Peiresc, Vesling, and others;

others; but the same false notions of their termination continued to prevail, till Pecquet, in the year 1647, struck with the appearance of a milky fluid in the vena cava of a dog, was led to the discovery of the thoracic duct. This great discovery, like that of the circulation of the blood, was disputed with much warmth; and it is a blot in the character of Harvey, that he sided with the opponents of Aselli, and would not even be convinced by the demonstrations of Pecquet and Vesling. How different the conduct of his own adversary, Plempius, who, after having long contended against the circulation, made a voluntary acknowledgment of his error, and freely embraced the new doctrine; and who, upon the present occasion, displayed the same amiable candour. In 1651, Olaus Rudbeck discovered the absorbent vessels of the large intestines, and remarked, that the supposed lacteal vessels of the liver served only to convey a lymphatic fluid to the hepatic glands; whence he conjectured, that the received opinion concerning the assimilating powers of that organ was altogether wrong. Shortly afterwards, Glisson and Wharton produced their respective works on the Liver and on the Glands, in which their structure and functions were more fully described. The latter gave the first account of the ducts of the parotids. Experiments were undertaken by Lower, Drelincourt, Lister, and Musgrave, to determine the motion of the chyle, and the changes to which it is subjected in its course; and before the close of the century the anatomy of the absorbent system was brought to a great degree of perfection by the labours of Nuck, Pacchioni, and Duverney.

The discoveries relating to the nervous system, and the organs of sense, were not less remarkable. Casserius, Sylvius, and Willis, applying themselves to the dissection of the brain, gave accurate views of its different parts, and of their relative position, and shewed the difference between the human brain and nerves, and those of other animals. Willis gave to the hypothesis of a nervous fluid a degree of consequence, which it had never before attained, supposing it to be the vehicle of the animal spirits, and the cause of various disorders, when it became vitiated; and he may be regarded as the precursor of Dr. Gall, in referring particular faculties of the mind to certain parts of the brain. His ideas on the former of these subjects were controverted by Malpighi, who investigating, with great industry, the nature of the cortical substance, shewed, that it extended to the innermost parts of the brain, and in some animals even to the *medulla oblongata;* that its structure was fibrous; and that the fibres of which it consisted united in the great commissure and medulla oblongata, and again diverged into the brain; whence he infers, that the brain is to be considered as the appendage of the spinal marrow. The *tunica arachnoides* was described by Blaes and Swammerdam; and Leeuwenhoek and Ruysch ascertained, by the microscope, and by injections, the vascularity of the substance of the brain. The theory of vision had received considerable improvement from the labours of Kepler, who had pointed out the true use of the crystalline lens, and shewn how the images of external objects were formed, in an inverted position, on the retina. A public experiment with the eye of an ox, which was made at Rome, in 1625, by the Jesuit Scheiner, fully confirmed Kepler's theory; but afterwards Mariotte, having found that the images of objects disappeared when they fell on the spot where the optic nerve enters the eye, called in question the sensibility of the retina, and maintained that the choroid coat was better calculated to receive and transmit the perceptions of sight; and a controversy arose concerning the actual seat of vision, which was carried on, with great eagerness, by Pecquet, Perrault, and St. Yves, and which had the effect of eliciting many valuable observations. The Newtonian discoveries, respecting the properties of light, contributed still more to the accurate analysis of the functions of the eye; and the treatises of Du Petit, Porterfield, and Zinn, which followed soon after, have left little for their successors to accomplish.

Passing over the improved descriptions which Casserius, Duverney, Riverius, Vieussens, and others, gave of the structure of the ear; the interesting experiments of Harvey, Malpighi, and Redi, on the generation of animals; the discovery of the seminal animalculæ by Leeuwenhoek; and the various discussions and theories to which they severally gave rise; we conceive that we have adduced sufficient proofs of the great increase which took place in anatomical knowledge, and of the indirect advantages which medical science derived from the application of mathematics, and from the improved methods of physical research, which came into use after the time of Bacon. Wherever the laws of mechanics were properly applied, as they were by Borelli to muscular motion, and by Kepler and his followers to the theory of vision, they explained and illustrated the phenomena of life; and even when they were transferred to questions, which they were altogether incompetent to determine, as in the calculations of Borelli, Keil, Hales, and Wintringham, respecting the action of the heart and arteries; they suggested and led the way to many luminous experiments. In these respects the mechanists had greatly the advantage over their chemical brethren, whose speculations being founded on vague and puerile hypothesis, and implying no acquaintance with the laws of nature, led only to an accumulation of errors.

Descartes had taught his followers to consider matter as purely passive, and to refer all the changes to which it is subjected to a spiritual cause: the union of body and spirit was, in his estimation, merely one of its modes, or accidental conditions. Malebranche, extending the Cartesian doctrine, endeavoured to explain more fully the nature of this union, and to shew that the soul had a more or less distinct consciousness of all the movements and affections of the body. The part which the animal spirits were made to perform has been already frequently noticed. From these tenets, the transition to the system which came to be afterwards developed by Stahl was very easy; and an attentive review of the progress of the opinions in question must convince every one that the Stahlian hypothesis, far from being entitled to the merit of originality which its author claimed, was nothing more than an offspring of the Cartesian philosophy. Educated under Wedel, who was a devoted adherent of Sylvius, and an assiduous teacher of his doctrines, Stahl began very early to question the sufficiency of those chemical explanations, which he heard applied to all the phenomena of life. It appeared very wonderful to him, that the humours of the body, which are, of themselves, so disposed to putrefaction, should yet so seldom fall into that state; and that the daily presence of so many saline substances, as we are in the habit of receiving in our food, should produce so few symptoms of acrimony. He also remarked the great influence which the passions of the mind had in the production of diseases, and their instantaneous operation, in general, on the corporeal frame. The intervention of animal spirits he conceived to be a very unsatisfactory supposition; and all the attempts which had been made to explain the theory of life on pure chemical and mechanical principles he held very cheap. Taking the passiveness of matter for the basis of his system, he maintained, "that the body, as body, had no power to move itself, but was put in

motion

motion only by immaterial subſtances; that all motion, therefore, was immaterial, and a ſpiritual act." The origin of all the actions of the living ſyſtem, by which it is enabled to preſerve itſelf, and to fulfil the ends for which it is created, muſt, according to Stahl, be ſought for in the *ſoul*, or immaterial principle which animates it,—the nature, or ψυχη of the ancients. A little obſervation will teach us, that many ſenſations are experienced, and many corporeal actions performed, which are either altogether unnoticed at the time, or of which we have only an obſcure conſciouſneſs; but in which it cannot be doubted, that the mind more or leſs participates. Finding this to be the caſe with reſpect to our perceptions, and the anatomical movements, as they have been termed, of the body, Stahl thought himſelf juſtified in ſuppoſing the ſame power to preſide over all the other functions, and accordingly referred the performance of digeſtion, abſorption, and aſſimilation, to the immediate agency of the ſoul. As the ſoul regulates thus inceſſantly the ordinary movements of the animal machine, and is thus conſtantly intent on its preſervation, the ſame ſalutary vigilance may be naturally expected during diſeaſe. In fact, diſeaſe may be generally ſaid to conſiſt in a deranged idea (*perturbata idea*) of the regulation of the animal economy; and this poſition Stahl conceives to be proved by the greater frequency of diſeaſes in the human ſpecies, than among the inferior animals, and from their attacking, moſt readily, thoſe perſons who are endowed with a high degree of ſenſibility. Several ſecondary cauſes, however, appeared neceſſary to the further illuſtration of this peculiar pathology, among which plethora had the moſt extenſive agency aſſigned to it. To this condition, Stahl believes that there is a conſtant tendency in the human body, and that it proceeds from the quantity of aliment received being always greater than is neceſſary for the ſupport of the organs: it ſhews itſelf in different parts of the frame, at different periods of life; in infancy, for example, in the head; afterwards in the lungs; and finally in the digeſtive organs. Hemorrhages were, for the moſt part, occaſioned by an effort of nature to moderate this diſpoſition to plethora, by what Stahl called the *tonic vital action*; as exemplified in menſtruation, and in the hemorrhoidal diſcharges which occur in advanced age, and which Stahl aſcribed to the tonic action of the *vena portæ*, the ſource of the great majority of chronic diſtempers, "porta malorum." Rejecting, as altogether unfounded, the doctrine of the acidity and alcaleſcence of the humours, Stahl inculcated the neceſſity of ſtudying, in diſeaſe, the organic movements of the ſyſtem, and of obſerving the proceſſes by which nature effects a cure. Fever, according to his view, was merely an autocratic effort of nature, to conquer the morbific cauſe, and to expel it from the body, and all the ſymptoms, not excepting *rigor*, were only ſo many proofs of the tonic action which was thus excited. Congeſtions were ſuppoſed, in contradiſtinction to obſtructions, to reſult from an afflux of the fluids occaſioned by the ſame tonic power; when obſtruction followed, or when the object of the congeſtion, *i. e.* evacuation, was not accompliſhed, inflammation took place; and the tendency of the violent actions, which accompanied it, was to diſperſe the obſtructed humour. If this end was not attained, the obſtructed matter became vitiated, and pus was formed. Hypochondriaſis, gout, melancholy, and almoſt all cachectic diſorders, were attributed to a diminution of the tonic power of the *vena portæ*, and the conſequent ſtoppage of the blood in it; while ſpaſmodic diſeaſes were thought to indicate an exceſs of the general tonic power of the ſyſtem.

In the treatment of diſeaſes Stahl proceeded in conformity to theſe views. The chief duty of a phyſician, he maintained, was to watch the healing efforts of nature; to leave the cure to them, when they ſeemed adequate to its accompliſhment; but to aſſiſt them when they were too feeble, and to moderate their violence when they were too powerful. Thus, holding evacuation to be indicated in fevers, he recommended the aſſiduous employment of ſuch means as were likely to promote it, particularly diaphoretics. Purgation, indeed, he conceived to be ſeldom neceſſary or uſeful; but veneſection he had little heſitation in adminiſtering, as it ſerved, in his opinion, to bring about the criſis, and to favour the efforts of nature to relieve herſelf from the ſuperfluity of blood; it might, however, prove injurious, if due attention was not afterwards paid to the excitement of ſweating. The Peruvian bark was admitted by Stahl to operate in the cure of intermittents by its aſtringent qualities; but he believed it rather ſuppreſſed the diſeaſe, than effected its complete removal. Generally ſpeaking, his favourite remedies were evacuants, ſuch as antimony, aloës, rhubarb, and jalap; to the uſe of chalybeate medicines in chronic complaints, he objected, that they cauſed too powerful contractions of the parts; and opium tended, as he thought, to counteract too much the tonic vital action; yet he preſcribed hyoſcyamus, without any ſcruple.

"The ideas of Stahl," obſerves M. Cabanis, "have, in general, been very imperfectly underſtood; we may even aſſert, that they have been almoſt equally disfigured by his cenſurers and by his admirers. The cauſes of this miſunderſtanding deſerve to be detailed in a particular work. It would be uſeful to exhibit the Stahlian ſyſtem, in more determinate points of view, than the author himſelf could poſſibly have done. Hitherto the points, by which it is diſtinguiſhed from the doctrines of the ancients, and thoſe by which it is related to them, have never been preciſely aſcertained. Perhaps, too, it would be adviſable to conclude a work of this deſcription by a ſyſtematic view of the progreſs of medical ſcience ſince the time of Stahl, and of the advances which we have reaſon to expect at no very diſtant period. It would probably reſult from this inveſtigation, that the reforms, which have been already effected, and thoſe which may be hereafter accompliſhed in the ſame ſpirit, muſt be aſcribed, in a great meaſure, to this extraordinary man; both on account of the ſound ideas which he directly eſtabliſhed, and of the impulſe which he communicated to public opinion. It would too, I am perſuaded, appear, that notwithſtanding the haughty manner in which the adverſaries of Stahl have attacked him; notwithſtanding the aukwardneſs with which ſome of his diſciples have defended, explained, and commented upon his works; ſtill his influence has not been leſs powerful in medicine than in chemiſtry, and that to both ſciences he has rendered everlaſting ſervices." Coup d'Œil, p. 148—9.

Of Stahl's merit as a chemiſt we ſhall have occaſion to ſpeak at large in a future volume; in this place we ſhall be content with obſerving, that, although he effected a complete revolution in chemical ſcience, and continued to lecture upon it, with great applauſe, during the whole period of his academical career; yet he had the good ſenſe to refrain from all application of chemiſtry to medicine, and repeatedly cautioned his diſciples of the futility of any ſuch attempt; contending, that the true theory of phyſic conſiſts in the ſtudy of the vital actions, and has little or nothing to do with the laws of mechanics, with the minute anatomy of the ſolids, or with the mixture of the fluids; that its chief object is to aſcertain by experience the laws of organic life; that it is therefore little elſe than rational empiriciſm;

and

and in the neglect of this empirical method is to be found the origin of all the controversies of physicians. Notwithstanding these salutary admonitions, it is evident that Stahl himself forsook this empirical method, when he gave "to an airy nothing a local habitation and a name," by personifying the principle of life, and ascribing to the direct agency of a rational intelligence all the corporeal functions of the system. Some persons, it is true, have imagined that they could perceive, through the obscurity of Stahl's style, the glimpses of a more enlightened physiology, and Cabanis even contends that Stahl selected the term *anima* or *soul*, merely in order to save himself from persecution; not as thinking it by any means the best calculated to express his views: but this would have been a species of deception, to which it is not probable that the haughty spirit of Stahl would have stooped; and nothing appears in his writings to warrant the belief, that he wished the phrase in question to be understood in any but the literal and vulgar acceptation.

Stahl's contemporary and colleague, Frederic Hoffmann, though endowed with less genius, was his superior in learning, and in the faculty of displaying it to advantage; and he accordingly obtained, as a teacher, a much higher degree of repute. But while he professed himself the enemy of hypothesis, and the follower of Hippocrates, he gave in to many of the prevailing errors, and supported many doctrines which had no foundation in truth. Mathematical studies had taught him to reason closely; and, if the premises be admitted on which he constructed his system, the consequences must be allowed to be, for the most part, correctly deduced: but in his illustrations he is extremely diffuse and fatiguing; and his repetitions are endless. At first a follower of the mechanical sect, he seems to have gradually approached to the opinions of Stahl, and that at the very time when he was engaged in controverting them, and was exclaiming against their supposed atheistical tendency. His theory, accordingly, is a heterogeneous mixture of speculations, few of which would be now deserving of notice, were it not for the celebrity of their author, and the tone which he gave to succeeding theorists. Vindicating the active qualities of matter, Hoffmann considered the human body as a machine, which is governed by the laws of mechanics, and put in motion by a nervous fluid, or ether, contained in the brain and nerves, and the blood. The heart and all the organs of the system were supposed by him to receive their strength, their tone, their contractile and elastic power, from this subtle fluid: he even ascribed to it a certain degree of intelligence, "vim sensitivam et imaginativam," by which each particle is enabled to form a correct idea of the mechanism of the body, and to regulate its agency accordingly! Medicine, he believed, was to be improved, not so much by experience, as by the skilful application of mechanical principles, and by the sedulous study of proximate causes. All disease he held to consist in irregularity of action: when too violent, spasms were produced; when too weak, atony was the consequence. Yet he agreed with Stahl in referring much to obstructions of the humours, particularly in the *vena portæ*; but maintained that they always implied relaxation, or atony, of the vessels. He even admitted the doctrine of corruption of the fluids; ascribing gout, rheumatism, calculi, and cutaneous diseases, to acids generated in the body, and converted into neutral salts, upon admixtion with the blood. Plethora was also allowed by him to be one of the chief causes of disease. The *spasm*, or constriction of the membranous and minute vessels, particularly of the skin, by which the blood is repelled to the interior parts, and the heart and larger arteries are incited to greater action, till they are enabled to overcome the resisting cause, was, according to Hoffmann, the origin of every description of fever; and inflammation was explained by him on similar principles.

As a practitioner, Hoffmann appears to have been more successful than his rival, and to have had, indeed, a just title to that fame which he enjoyed. Though he inculcated the strict observation of critical days, yet he had the courage to maintain, in opposition to the universally received opinion, that it was not always necessary to wait for the concoction of the morbific matter in fever; for he believed the disorder might be sometimes stopped, in the commencement, by the administration of powerful means. Venesection was employed by him in all violent affections of the vascular system; and he trusted much to the antiphlogistic regimen in sthenic disorders. Among sudorifics he chose only the mildest; and drastic medicines were in little repute with him. The use of Peruvian bark in intermittents was rescued by Hoffmann from the contempt with which the Stahlians affected to view it; he demonstrated the great efficacy of chalybeates in various chronic complaints, and fully refuted the notion that they produced too great a constriction of the fibres. He investigated the nature of several of the most famous mineral waters; shewed their safety and utility in disorders for which they had been thought unfit; and taught to imitate them artificially. Warm and cold bathing were much commended by him for their virtues in restoring the proper tone of the system; and wine, camphor, and the well-known *liquor anodynus*, were favourite remedies with him in most chronic diseases: the last mentioned was generally used by him in the place of opium.

While Hoffmann was thus usefully employed in diffusing more sound practical doctrines among his contemporaries, Boerhaave was labouring, with equal zeal, and even with greater success, in the same path. Like Hoffmann, he began by commending the Hippocratic method; and, like him too, he soon deviated from it, by yielding to the influence of his early studies, and by acquiescing too much in the spirit of his age. He had enjoyed but little opportunity of acquiring a practical acquaintance with anatomy; and this want, as has been justly remarked, is perceivable throughout his writings. Fancying that the best system of physic would be that which reconciled all opinions, he sought to combine the doctrines of Hippocrates with those of Sylvius and Bellini, and was therefore, in the strictest sense of the word, an *Eclectic*, and not the founder of a new theory, as he has been sometimes considered. He refuted, it is true, many of the errors of the chemical school, and, in particular, the idea of a fermentation in the stomach and blood; but he embraced, in its fullest extent, the notion of an acid and an alkaline *cacochymia*: the tenets of the mechanists were adopted by him with less reservation. In general, however, less extravagant than his predecessors, he enlarged the boundaries of medical science by his observations; while, by the charms of his style and delivery, he gave a lustre and attraction to his doctrines, which procured him disciples from all parts of the world.

To this triumvirate, as they have been called, to Boerhaave, Stahl, and Hoffmann, pathology and therapeutics owe many of their greatest improvements. All succeeding systematics have borrowed more or less from their speculations: and, in certain universities, their theories, or at least modifications of them, are still taught. However fanciful the views of Stahl may at first sight appear, it cannot be doubted that they had the effect of fixing the attention of physicians on a most important branch of the animal economy, the influence

fluence of the nervous system upon the other organs of the body, and its co-operation in the production and cure of diseases. However much we may be tempted to laugh at Hoffmann's etherial fluid, and the sagacity and prudence which he ascribed to it, a careful examination of his writings will probably teach us, that by this very hypothesis he was led to the discovery of the relations which he pointed out between the different functions of the living frame, and of the sympathies which are the consequence. Considering how little this part of pathology had been investigated, and by what erroneous notions the study of it was obscured, we must allow, that Hoffmann and Stahl had no small merit in opening the way to its illustration, though they afterwards may have cast, upon the object of their researches, the false colouring of their respective theories. Hoffmann, in particular, has collected many valuable observations, in his treatise "De consensu partium nervosarum," proving the reciprocal influence which the various organs exert upon one another, especially those which are connected by means of the sympathetic nerve.

Among the adherents of Stahl, Porterfield, Whytt, Bordeu, and Sauvages, are the most eminent. The last-mentioned is well-known as the author of the first methodical Nosology, a work of great labour and research, which, notwithstanding the imperfections of its arrangement, contains much practical information, and which has served as the model of all similar subsequent undertakings. Bordeu had the merit of pointing out the importance of the cellular membrane, and of determining many of its properties which had been overlooked; while Porterfield and Whytt endeavoured to trace the laws that govern the muscular actions of the body, and to shew their dependence on the nervous influence.

The majority of the physicians of the age, having studied under Boerhaave, or his immediate disciples, followed the system of the Dutch professor. But the new light which was thrown on physiological science by the experiments and the splendid discoveries of Haller, tended to wean them from opinions which were but little consonant to experience, and the fallacy of which they were now in many instances compelled to acknowledge. Boerhaave, in his posthumous work "De Morbis Nervorum," had espoused the ancient dogma of an ἐνορμων, or *impetum faciens*, which he figured to himself as an intermediate substance between matter and spirit, and to which he attributed all the sensations and motions of the animal frame. His nephew, Kaau-Boerhaave, developed more fully his ideas on this subject; and De Gorter and Gaubius, taking up the same views, and giving them somewhat greater precision, obtained for the hypothesis of a *vital principle* that distinction which, unfortunately for the interests of science, it has, till within these very few years, been allowed to claim in physiological disquisitions.

Such was the state of things, when Cullen ascended the professorial chair. Led, by the duties of his office, to review and examine the various systems of physic which were in vogue, he soon perceived the inconsistencies of the Boerhaavian theory, and accordingly resolved to abandon it. Stahl's doctrines, to which some of his contemporaries adhered, did not appear to him more satisfactory; and, in particular, he deemed them objectionable on account of the inert practice which they countenanced. Nor could he altogether assent to the system of Hoffmann, though he conceived it to approach nearer to the truth, and was induced to adopt some of its fundamental principles. Among others, he took up the doctrines of spasm and debility, from which he deduced all the phenomena of febrile disorders; and he endeavoured to confirm his theory by proofs drawn from the laws of the nervous system, and from the consideration of the remote causes of the diseases in question. Rheumatism was referred by him to a spasm of the muscular fibres, arising from an increased afflux of blood; but gout he conceived to originate in atony, especially in atony of the digestive organs. In these latter diseases, he rejected the idea of a peculiar morbific matter; yet in his explanations of certain other complaints, as, for instance, of scrofula, he had recourse to the supposition of an acrimony of the fluids. He laid much stress on the efforts of the *vis medicatrix naturæ*, advocated the hypothesis of a nervous fluid and vital principle, and ascribed to the brain a peculiar faculty, by which it was enabled to excite the muscles to action, independently of the mind, and to which he gave the name of *irritability of the sensorium*. As we have had frequent occasion to review the opinions of Cullen, in various parts of this work, especially under the article FEVER, we may be excused from entering more fully into detail in this place; particularly as there is so little essential difference between them and those of his predecessor Hoffmann, and as the great majority of them have been exploded by the more recent improvements in physiology. Cullen, indeed, seems to have been much in the same situation with Boerhaave, as to anatomical and physiological learning, of which many of his speculations betray a miserable deficiency. Yet his system continues to be taught, and, in some measure, to form the present creed of the Edinburgh school; a distinction which it would scarcely have maintained, had it not been for the transcendant merits of the author as a practitioner, and for the rational and consistent method of treating diseases which he inculcated.

In another point of view, however, the speculative doctrines of Cullen seem to deserve notice, *viz.* as having afforded the first hint of the Brunonian theory of *excitability*. In a passage of his "Institutions of Physiology," Cullen speaks of a state of *excitement*, or *collapse*, of the brain and nervous system, on which he supposes the strength or debility of the other parts of the body to depend; and in his other writings, he is constantly labouring to prove in what manner these conditions may be occasioned by the agency of various causes. Brown, seizing upon this idea, set about the formation of a new theory, according to which all the actions of life were to be referred to the *excitement* of the body by *stimuli*, and all diseases reduced to the two general heads of *direct* and *indirect debility*, or debility arising from a deficiency, or a previous excess of excitement. That the doctrine of morbid excitement is so far founded on truth, and that many of the leading symptoms of disease may be referred to it, we are not inclined to dispute; but when Brown proceeds to account for all the deviations from health upon this simple principle, we conceive that he has generalised too much, and evinced but small power of discrimination. The excitability and the excitement of the living body doubtless vary much at different times, and disease is often the consequence; but it is not true, as Brown contends, that when the excitement of any part has been unusually increased or diminished, a correspondent increase or diminution of excitement must take place in all the rest of the system: on the contrary, it will be found, that when one part or series of organs has been incited to greater action than common, the other parts generally exhibit a decrease of action; and *vice versâ*. The Brunonian theory, in truth, takes but a gross view of the laws of organic life; and, with respect to the classification of diseases, it cannot be considered as much more refined and satisfactory than the theory

theory of the *strictum* and *laxum*, as taught by Themison and his followers. To the practical maxims which its author laboured to establish, the same observation applies. Brown mistook a single property of animal matter for the primary cause of life and disease; neglecting the consideration of those various powers which the different organs possess, according to their peculiarities of structure, and overlooking entirely those laws by which they influence each other, and communicate or modify the affections to which they are severally liable. This has been the grand defect of almost all pathological systems; and it was not to be expected that Brown, whose practical knowledge was confined, and whose acquirements in general were superficial, should have outstripped his predecessors. Many of those who were most zealous in their devotion to his system, and who defended it most strenuously on its first promulgation, have found it so incompetent a guide at the bed-side of the patient, that they have deemed it advisable to qualify their belief in several essential articles; while others, as Frank and Reid, have been reduced to the necessity of completely recanting their faith. But we are, nevertheless, disposed to think, that the general spread of Brunonianism, especially on the continent, has had the beneficial effect of loosening the attachment of physicians to ancient prejudices, and of simplifying their complex, and too often incongruous, modes of practice. See EXCITABILITY.

Previous to Darwin, no one seems to have conceived the idea of applying the doctrine of *association* to the theory and the treatment of disease; although the tenets of Hartley were embraced by a large proportion of his countrymen, and his illustrations of the associative actions of the nervous and muscular systems were universally received. It is true that Hoffmann, and even some writers before his time, had remarked the sympathy, or *consensus*, which subsists between particular organs of the body; but their observations were blended with much erroneous hypothesis, and the rude state of physiological science, at the time, prevented them from discovering the extensive application of which they were susceptible. Darwin saw that the chief errors of preceding theorists had arisen from the partial views which they had taken of the animal economy; from their considering the living system as a simple whole, and not paying due regard to the reciprocal influence which the different organs, of which it is composed, have upon one another: he saw, too, that it was only by the same organic powers, by which the body is preserved and developed, that disease was generated, and formed, and finally removed from the system. Taking advantage of all the facts which had been accumulated by his predecessors, placing them sometimes in new lights, and at other times confirming and illustrating them by his own observations and experiments, he proceeded to the construction of a system of pathology and therapeutics, founded on the general laws of animated nature. Unfortunately, however, as he advanced in his design, he fell into many incongruities; and the difficulties increasing upon him, he was led to assume positions, which were not supported by any evidence, or countenanced by the slightest analogy. Such are his doctrine of the configurations of the organs of sense, many of his remarks on the exertions of the sensorial power, and the hypothesis of a retrograde action of the absorbents. Add to this, that the language which he employed is vague and inconsistent, and has occasioned much confusion and contradiction in his statements. Nor can we highly commend his division of diseases into those of irritation, sensation, volition, and association; the distinctions being frequently arbitrary and inconclusive, and the whole arrangement savouring of metaphysical subtlety. The best part of his works, and that in which he has evinced the most penetration, is unquestionably his account of the "Catenation of Animal Motions," and of the "Diseases of Association," particularly his "Theory of Fever." Rejecting, as illusive, all the explications which had been given of febrile disorders, on chemical and mechanical principles, Darwin has traced the succession of the symptoms of fever to the irregular actions of the nervous, vascular, and absorbent systems; shewing how the derangement of one part produces a similar or opposite affection of other parts, in consequence of the intimate connection of the organs in question, and the influence which they mutually possess. (See FEVER.) This was a great improvement in pathology, and it is only to be regretted that it should have been disfigured by the imperfections to which we have before adverted. Had Darwin possessed the profound anatomical knowledge, and the acute discernment of Bichat, he would have probably erected a system as finished in its parts, and capable of as extensive application, as the theory of gravitation; and as superior to the feeble creations of his predecessors, as the philosophy of Newton is to that of Descartes. But in his eagerness to explain every thing, he sometimes mistook words for facts; and his ardent imagination too often got the better of his judgment. It cannot, however, be doubted, that he had struck into the right path, and pursued it to a certain extent; and that his views have served to elucidate the nature of many disorders, which before had been greatly misunderstood. His writings contain a rich store of physiological observations, and many useful practical hints. If his theoretical doctrines have been regarded with distrust by his countrymen, they have experienced a more favourable reception on the continent: they have been partially adopted and improved upon by some enlightened physicians, particularly by Brandis and Hufeland; and when stripped of the hypothetical phraseology in which they are enveloped, they bid fair to become the foundation of a rational system of physic.

To complete the history of medical science, of which we have now pointed out the principal revolutions, it would be necessary to enumerate and investigate the merits of the different discoveries and improvements which have taken place, in all its different branches, during the present age. But not to speak of the delicacy of such an undertaking, and the abilities requisite for its correct and impartial performance, it is obvious that this would be, in a great measure, to describe the existing condition of the art, of which the plan of our work already comprehends the details. We shall, therefore, content ourselves in this place with remarking, that however much the continental nations may have extended the boundaries of the auxiliary sciences, and however great their claims in other respects may be, this country has taken a decided lead in the reform of medical practice. It may boast of setting the example to Europe in the employment of the cold affusion, and in the generally improved treatment of fever, in the revival and extension of the purgative method of cure, in the free use of mercury in cachectic disorders, and, above all, in the introduction of the vaccine inoculation. But we must acknowledge, that much still remains for us to accomplish; that the theory of medicine is yet in an unsettled state; that its practical application is too often wavering and fallacious: and taking a survey of the various fortunes of the art, we may say, with Bacon, that "*medicine* is a science, which hath been more professed than laboured, and yet more laboured than advanced; the labour having been rather in circle, than in progression."

We fubjoin a lift of the beft works on medical hiftory, with their refpective characters.

1. Hiftoire de la Médecine, où l'on voit l'Origine et les Progrès de cet Art—avec fig. par Daniel le Clerc, 12mo. Genev. 1696—4to. 3d Part, Amfterdam, 1723.

A work of confiderable merit for the time when it firft appeared. It gives a very full view of the doctrines of the ancients to the time of Galen, and, generally fpeaking, is written with great impartiality; though, on fome occafions, the author fhews a want of difcernment. "Nemo candidius et plenius fcripfit *Clerico*," was the favourable judgment of Haller.

2. The Hiftory of Phyfic, from the Time of Galen to the Beginning of the Sixteenth Century. By J. Freind. 2 Parts. London 1725—26.

This is a ufeful commentary on the hiftory of Le Clerc, and gives, befides, a minute account of the practice of the Arabian and middle ages; but the arrangement is defective.

3. J. H. Schulzii Hiftoria Medicinæ, a rerum initio ad A. U. C. 535 deducta, 4to. Lipf. 1728. Ej. Compendium Hiftoriæ Medicæ, a rerum initio ad Hadriani exceffum, 8vo. Halæ, 1742.

As far as this hiftory extends, it deferves unqualified commendation for the learning, the accuracy, and the difcrimination which it difplays. The account of the ftate of medicine in ancient Egypt is the beft which we poffefs; and the whole is compiled with fuch care, that, as Ackermann obferves, it would be difficult to detect a fingle error in it.

4. Dictionnaire Hiftorique de la Médecine ancienne et moderne. Par N. F. J. Eloy, 2de Ed. 4 tomes 4to. Mons. 1778.

A valuable book of reference, particularly for the lives and writings of the French phyficians.

5. Biographical Memoirs of Medicine in Great Britain, from the Revival of Letters to the Time of Harvey. By John Aikin, 8vo. Lond. 1780.

It was the defign of the author to furnifh a complete medical biography of Great Britain; but not meeting with fufficient encouragement, although this part of his labours is highly creditable, he has never accomplifhed his fcheme.

6. Inftitutiones Hiftoriæ Medicinæ. Auctore J. C. G. Ackermann, 8vo. Noriberg. 1792.

All Ackermann's writings bear the marks of great erudition and intelligence: his contributions to the new edition of Fabricius's "Bibliotheca Græca," have, in particular, thrown much light on the lives and writings of the Greek phyficians. It is to be regretted, that his elegant compendium of medical hiftory does not extend beyond the period of the Arabians.

7. Verfuch einer pragmatifchen Gefchichte der Arzneykunde, von Kurt Sprengel. 2te Aufl. 5 Th. Halle, 1800—1803.

This is by far the completeft hiftory of medicine which we have; but, though the labour of fourteen years, the execution of it is very unequal. Where Sprengel could avail himfelf of the labours of others, he has given a very fatisfactory view of the advances of the art; and his refearches concerning its condition among the Arabians claim the merit of fulnefs, and alfo, in fome meafure, of originality: but there is a great falling off in the latter parts of the work; and the concluding volume proves that the author has no pretenfions to any thing like a philofophic mind. His "View of the State of Phyfic during the laft ten Years of the Eighteenth Century," publifhed in 1801, is a hafty and extremely feeble performance, to call it by no feverer name. A French tranflation by Geiger, of the firft volume of the hiftory, appeared in 1809; but according to the account given of it by Millin, it is very carelefsly executed

8. Coup d'Œil fur les Revolutions et fur la Réforme de la Médecine. Par P. J. G. Cabanis, 8vo. Paris 1804

A work well worthy of perufal, on account of the philofophical fpirit in which it is compofed, and the ufeful views which it fuggefts concerning the reform of the art. The hiftorical part, however, is fuperficial, and badly arranged. A tranflation, with fome notes by Dr. Henderfon, was publifhed in 1806.

9. J. F. Blumenbachii Introductio in Hiftoriam Medicinæ Litterariam, 8vo. Gœtting. 1786.

10. Verfuch einer Chronologifchen Ueberficht der Literärgefchichte der Arzneiwiffenfchaft, verfaaft von D. J. G. Knebel, 8vo. Breflaw, 1799.

Thefe are two convenient manuals of the literary hiftory of medicine. The former efpecially is diftinguifhed by its neatnefs and accuracy.

The "Bibliothecæ" of Haller are too well known to require commendation in this place.

Among the minor and lefs important works the following may be mentioned.

J. C. Barchufen Hiftoria Medicinæ, in qua pleraque Medicorum Ratiocinia, ab Exordio Medicinæ ufque ad noftra Tempora pertractantur, 4to. Traj. ad Rhen. 1723. H. Conringii Introductio in univerfam Artem Medicam, 4to. Hal. 1726. J. C. Lettfom, Hiftory of the Origin of Medicine, an Oration, 4to. Lond. 1778. Walker's Memoirs of Medicine, Lond. 1799. R. Scuderi, Introduzione alla Storia della Medicina antica e moderna, 8vo. Venezia, 1800. Millar's Difquifitions in the Hiftory of Medicine, 8vo. Glafgow, 1811.

MEDICINE, *Clinical, Medicina clinica*. See CLINIC

MEDICINE, *Characters in*. See CHARACTERS.

MEDICINE, *Pandects in*. See PANDECT.

MEDICINE-*Cheft*, is a portable cheft, containing all forts of medicines neceffary for a campaign or voyage, together with fuch inftruments as are moft neceffary and ufeful for the purpofes of furgery.

MEDIEDNIK, in *Geography*, a mountain of Bofnia; 10 miles N. of Zwornik.

MEDIES, or MEDGIES, a town of Tranfilvania; 20 miles N. of Hermanftadt. N. lat. 46° 20′. E. long. 23° 58′.—Alfo, a town of Hungary; 10 miles N. of Zatmar.

MEDIETAS LINGUÆ, in *Law*, an inqueft impanelled, whereof the one half confifts of natives or denizens, the other of aliens.

It is ufed in pleas, wherein the one party is a ftranger, and the other a denizen. Solomon de Stanford a Jew, in the time of Edward I. had a caufe tried before the fheriff of Norwich, by a jury of *fex probos & legales homines, & fex legales Judæos de civitate Norvici*. See JURY.

This manner of trial was firft given by the ftat. 28 Ed. III. c. 13; before which it was obtained by the king's grant. He that will have the advantage of trial "per medietatem linguæ," muft pray it; for it is faid he cannot have the benefit of it by way of challenge. (Staundf. P. C. 158. 3 Inft. 117.) In petit treafon, murder, and felony, "medietas linguæ" is allowed; but for high treafon, an alien fhall be tried by the common law, and not "per medietatem linguæ." (H. P. C. 261.) And a grand jury ought not to be "de medietate linguæ" in any cafe. (Wood's Inft. 263.) A jury "de medietate" is alfo allowed in fome other cafes, by analogy to this rule "de medietate linguæ." As on a "Jus Patronatus," the jury muft confift of fix clergymen and fix laymen.

So alfo under ftat. 8 Henry VI. c. 12. againft embezzling records, the jury fhall confift of fix perfons, who are officers of any of the fuperior courts, and fix common jurors. So on a criminal trial in the univerfity courts, the jury muft be half freeholders of the county, and half matriculated laymen of the univerfity. See *Univerfity* Court. Bl. Com. book iv.

MEDIMNUM, Μέδιμνον, among the Greeks, a meafure of capacity holding fix Roman *modii* or bufhels.

MEDIN, in *Commerce*, called alfo Para, Fadda, Kata, and Mefria, a coin of Syria, of the fize of an Englifh filver threepence, worth a little above a halfpenny.

MEDINA, Peter de, in *Biography*, a Spanifh mathematician, who flourifhed in the fixteenth century, but of whofe perfonal hiftory we only know that he was a native of Seville, and the friend of the learned John Vafæus during his refidence in that city, who, in his "Chronicon Hifpaniæ," fpeaks in the higheft terms of his fkill in the mathematical fciences, and particularly as they were applicable to the art of navigation. His works are, 1. "Arte de Navigar," which met with a very favourable reception, and which was tranflated into the German, French, and Italian languages. 2. "Libro de las Grandezas y cofas memorables de Efpanna :" this work, which is defcriptive of the objects that are chiefly deferving of attention in Spain, Florian Docampo has tranfcribed into his "Hiftory of Spain." 3. "A Map of Spain," and many other pieces.

Medina, in *Geography*, a city of Arabia Felix, in the province of Hedsjas, about a day's journey from Jambo, on the Red fea. It is fituated in a fandy plain, of moderate extent, and furrounded with indifferent walls. It belongs to the fherriffe of Mecca, but of late has been governed by a fovereign of its own, of the family of Darii Berkad. At prefent the fherriffe rules it by a vizir, who muft be of the royal family. Before the days of Mahomet, it was called Jathreb ; but it was called Medined en Nebbi, the city of the prophet, from the period at which Mahomet, upon his expulfion from Mecca by the Koreifhites, took refuge here, and continued to make it the place of his refidence for the reft of his life. The tomb of Mahomet at Medina is held in refpect by the Muffulmans ; but they are not obliged to vifit it in order to the performance of any devotional exercifes; however, as the caravans from Syria neceffarily pafs near it in their return from Mecca, they turn afide to view the prophet's tomb. This tomb is fituated in a corner of the great fquare ; whereas the Caaba is in the middle of the fquare at Mecca. In order to prevent the people from fuperftitioufly offering worfhip to the afhes of the prophet, the tomb is inclofed within iron rails, and is only to be feen by looking through thefe. It is of plain mafon-work in the form of a cheft ; placed between the two tombs, in which are depofited the afhes of the two firft caliphs. It is an idle ftory, of unknown origin, that vaft magnets fupport the coffin of Mahomet in the air. Although it is not more magnificent than the tombs of the founders of moft other mofques, the building that covers it is hung with a piece of filk ftuff embroidered with gold, which is renewed every feven years by the pacha of Damafcus. This building is guarded by 40 eunuchs, chiefly for the fecurity of the treafure which is faid to be kept in it. This treafure confifts chiefly of precious ftones, the offerings of rich Muffulmans. But the account given of this treafure is blended with much fable. Niebuhr was informed by an eminent Arabian, that the guard was pofted for no other purpofe but to keep off the populace, who had begun to throw dirt upon the tomb, which they afterwards fcraped off, and preferved as a fort of relic.

Medina, a town of the Arabian Irak, feated on the Euphrates ; 60 miles N.W. of Baffora.

Medina, a town of Africa, the capital of the kingdom of Woolli ; it is a town of confiderable fize, furrounded by a high wall of clay, guarded by an outward fence of pointed ftakes and prickly bufhes, and containing from 800 to 1000 houfes. N. lat. 13° 38'. W. long. 12° 50'.—Alfo, a town of Africa, in Kaffan. N. lat. 14° 45'. W. long. 9° 15'.—Alfo, a fmall ifland in the Atlantic, near the coaft of Africa. N. lat 19° 45'.

Medina *del Campo*, *Methymna Campeftris*, an ancient town of Spain, in the province of Leon, fituated on the Zapardiel, a fmall river communicating with the Duero, between Toro and Tordefillas. This town was formerly celebrated for the refidence of feveral monarchs, and was then more confiderable than it is now, and both commercial and opulent. It has ftill three confiderable fairs, and feveral great privileges : it is free from all taxes, and the inhabitants have a right to fill all offices, both in the church and civil magiftracy, without the interference of the pope or the king. It is ftill large, though decaying ; it has a handfome fquare, in the middle of which is a fountain ornamented with a ftatue of Neptune. Medina del Campo is faid to have contained 14,000 families, though the number is now reduced to 1000. Although the population is much diminifhed, the ancient churches and convents are ftill remaining. According to Townfend it has 9 parifh churches, 70 priefts, 17 convents, and two hofpitals. The collegiate church, built of brick, is much admired for its roof. The old handfome houfe of the Jefuits is ftill to be feen. This town was the birth-place of the Jefuit P. J. Acofta, and of the philofopher Gomefius Pereira. Cardinal Ximenes had made this place one of his principal magazines for military ftores, collected with a view to curb the great nobility ; but when, A.D. 1520, the commons of Caftile fought redrefs of grievances, they feized the magazine, and defended the city with fuch obftinacy, that they forced Fontefca to retire and to leave them in quiet poffeffion of the ruins. The furrounding country is naturally fertile ; 20 miles S.S.W. of Valladolid. N. lat. 41° 23'. W. long. 5°.

Medina *Celi*, a town of Spain, in Old Caftile, on the Xalon, anciently called "Segoncia." N. lat. 41° 21'. W. long. 2° 27'.

Medina *del-Rio-Seco*, an ancient town of Spain, in Leon, fituated on a plain, watered by the river Sequillo. The ftreets are narrow and ill-paved. It has three parifh churches, four convents, an afylum for monks, and two well-endowed hofpitals. This place was formerly famous for its population, manufactories, and fairs, on which account it was furnamed Little India, in Spanifh India-Chica. In 1638, it was honoured with the title of city by Philip IV. It is furrounded by mountains, and the air of it is very falubrious. Its population, which is faid to have confifted of 30,000 perfons, is now reduced to a fourth of that number. The furrounding country abounds in corn and wine ; 15 miles W. of Palencia.

Medina *Sidonia*, a town of Spain, and capital of a duchy, in the province of Seville, anciently the fee of a bifhop, transferred to Cadiz ; 20 miles S.E. of Cadiz. N. lat. 36° 25'. W. long. 6°.

Medina *de los Torres*, a town of Spain, in Eftramadura ; 24 miles N. of Llerena.

MEDINET Fars, a ruined town of Egypt, fuppofed to have been the ancient Arfinoé, a little N. of Fayoum.—Alfo, a town of Egypt, on the right bank of the Nile, oppofite to Fefhn.

Medinet *Habu*, or, according to Mr. Bruce, *Medinet-Tabu*, a village of Egypt, near the W. bank of the Nile, where are found the remains of four temples, shewing the place where once stood the magnificent city of Thebes; 28 miles N. of Asna.

MEDINGEN, a town of Westphalia, in the duchy of Luneburg; 14 miles S.S.E. of Luneburg.

MEDINSK, a town of Russia, in the government of Kaluga; 32 miles N.N.W. of Kaluga. N. lat. 54° 58'. E. long. 53° 30'.

MEDIOLANUM, in *Ancient Geography*. See Milan.

MEDIR, in *Geography*, a town of Persia, in the province of Kerman; 60 miles E. of Sirjian.

MEDITATION, an act by which we consider any thing closely, or wherein the soul is employed in the search or consideration of any truth.

In our religion, it is used to signify a consideration of the objects and grand truths of the Christian faith.

Mystic divines make a great difference between meditation and contemplation: the former consists in discursive acts of the soul, considering methodically, and with attention, the mysteries of faith, and the precepts of morality; and is performed by reflections and reasonings, which leave behind them manifest impressions on the brain. The pure contemplative have no need of meditation, as seeing all things in God at a glance, and without any reflection.

When a man, therefore, has once quitted meditation and is arrived at contemplation, he returns no more; and according to Alvarez, never resumes the oar of meditation, except when the wind of contemplation is too weak to fill his sails.

MEDITERRANEAN, something inclosed within land; or that is remote from the ocean.

Mediterranean is more particularly used to signify that large sea which flows between the continents of Europe and Africa, entering by the straits of Gibraltar, and reaching into Asia, as far as the Euxine sea, and the Palus Mæotis.

The Mediterranean was anciently called the Grecian sea, and the Great sea. It is now cantoned out into several divisions, which bear several names. To the west of Italy it is called the Ligustic or Tuscan sea; near Venice, the Adriatic; towards Greece, the Ionic and Ægean of the ancients, now the gulf of Archipelago. From this last a strait, called the Hellespont, conducts to the sea of Marmora, the ancient Propontis; and another, now denominated the strait of Constantinople, the ancient Bosphorus, leads to the Euxine, or Black sea; which to the north presents the shallow Palus Mæotis, or sea of Azof, the utmost maritime limit of Europe in that quarter. The breadth of this sea is very various, from 80 to 500 miles; and its length is about 2000 miles to its farthest extremity in Syria. This wide expanse of sea is beautifully sprinkled with islands, and environed with opulent coasts. Tides are not perceivable, except in the narrowest straits; but, according to physiologists, there is a current along the Italian shore from W. to E., and towards the African coast in an opposite direction. In the Adriatic the current runs N.W. along Dalmatia, and returns by the opposite shore of Italy. (See Current.) The chief fisheries of this sea are those of the tunny, of the sword-fish, of the sea-dog, and of the diminutive anchovy. This sea is also the chief seminary of the *coral*; which see.

According to the learned Buffon, the Mediterranean sea was originally a lake of small extent, and had received, in remote ages, a sudden or prodigious increase, at the time when the Black sea opened a passage for itself through the Bosphorus, and at that period when the sinking of the land which united Europe to Africa, in the part that is now the straits of Gibraltar, permitted the water of the ocean to rush in. It was also his opinion, that most of the islands of the Mediterranean made a part of the continents, before the great convulsions that have taken place in this quarter of the world. Sonnini, at his request, and with a view of ascertaining his opinion, sounded the depth of the sea between Sicily and Malta; and he found the depth from 25 to 30 fathoms, and in the middle of the channel, where the water is deepest, never exceeding 100. On the other hand, between the island of Malta and cape Bon, in Africa, there is still less water, the lead indicating no more than from 25 to 30 fathoms throughout the whole breadth of the channel which separates the two lands.

The British trade carried on by means of the Mediterranean sea is of great consequence to Great Britain; and the permanent preservation of it depends on the possession of the town and fortifications of Gibraltar.

The counterfeiting of Mediterranean passes, for ships to the coast of Barbary, &c. or the seal of the admiralty office to such passes, is felony, without benefit of clergy. Stat. 4 Geo. II. cap. 18.

MEDITRINALIA, among the Romans, feasts instituted in honour of the goddess Meditrina, and celebrated on the thirtieth of September. They were so called from medendo, because the Romans then began to drink new wine, which they mixed with old, and that served them instead of physic.

MEDIUM, a Latin term, signifying *middle*, or *mean*.

Medium, in *Arithmetic*, or an *arithmetical medium* or *mean*, called in the schools *medium rei*, is that which is equally distant from each extreme; or which exceeds the lesser extreme, as much as it is exceeded by the greater, in respect of quantity, not of proportion.

Thus nine is a medium between six and twelve.

Medium, *Geometrical*, or *mean*, called in the schools *medium personæ*, is that where the same ratio is preserved between the first and second, as between the second and third terms; or that which exceeds in the same ratio, or quota of itself, as it is exceeded.

Thus, six is a geometrical medium between four and nine. See *Geometrical* Proportion.

This is a medium which virtue is supposed to observe; whence some call it *medium quoad nos*, as having a view to circumstances, times, places, persons, &c. Distributive justice observes a geometrical medium; commutative justice, an arithmetical one.

Medium, in *Botany*, a name which has been applied, at different times, to different species of Bell-flower; see Campanula. Linnæus retained it for the common biennial Canterbury bell, *Viola mariana* of old authors; because that plant had most generally received this appellation, and was universally believed to be the μηδιον of Dioscorides. The real μηδιον however, though sufficiently well figured under that name, with the synonym of *Mindium Rhasis*, in Rauwolf's Travels, t. 284, was never known to Linnæus, who erroneously referred Rauwolf's plant to his own *Campanula laciniata*. This error was detected a few years since, when the late Andrew Michaux sent seeds of the Mindium, or μηδιον, from Aleppo to Paris, and the fine plant they produced was described and figured by l'Heritier, in one of his Monographs, under the name of *Michauxia campanuloides*, in honour of the meritorious botanist and traveller who recovered this long lost rarity. We cannot but think, as we suggested at the time, with all possible respect for M. Michaux, that the ancient name *Medium* ought to have been retained for this newly recovered genus; nor could we wish to call it *Mindium*, with Adanson, the description in Dios-

X 2 corides

corides being, in this case, sufficient to leave no doubt; and *Mindium* is apparently a barbarous corruption of an Arabian writer. See MICHAUXIA and MINDIUM.

MEDIUM, in *Logic*, or *medium of a syllogism*, called also the *mean*, or *middle term*, by the Italians *mezzo termino*, is an argument, reason, or consideration, for which we affirm, or deny any thing: or, it is the cause why the greater extreme is attributed to, or denied of the less, in the conclusion.

Thus, in the syllogism, "Every good thing is to be desired: but all virtue is good; therefore all virtue is to be desired:" the term *good* is the medium: *virtue* the less extreme, and *to be desired* the greater.

It is called medium, as being a kind of mediator between the subject and predicate; or because the extremes are so disposed as to affirm or deny, by means hereof. Some call it *argumentum tertium*, a third argument; and others simply *argumentum*, as being the cause why we assent to the conclusion.

Mediums, or middle terms, are the things principally sought for, in discoursing; so that the invention of mediums makes the most essential part of logic. But the rules commonly given by logicians for that purpose, are mere impertinencies. In effect, no such rules can be given; nor have we any way of coming at such mediums or reasons, but by a close attention to clear ideas.

MEDIUM, in *Music*. Rousseau has made an article of this word in his dictionary, calling it "that part of the voice which is most distant from the extremities of its compass, and which is generally the most full, sweet, and powerful." The same might be said of the middle tones of most instruments. The top of the voice is the most brilliant, but almost always in falset; the bottom is grave and majestic, but less clear and compact. The middle tones of the voice are not only produced with the greatest facility, but are the most melodious and grateful to the ear.

MEDIUM, in *Mechanical Philosophy*, is that space or region through which a body passes in its motion towards any point.

Thus ether is supposed to be the medium in which the heavenly bodies move. Air is the medium in which bodies move near our earth. And water is the medium in which fishes live and move. And glass is also a medium of light, as it affords a free passage.

That density or consistence in the parts of the medium, by which the motion of bodies in it is retarded, is called *the resistance of the medium;* which, together with the force of gravity, is the cause of the cessation of the motion of projectiles.

MEDIUM, *Subtile*, or *Ætherial*. Sir Isaac Newton makes it probable, that, besides the particular aerial medium in which we live and breathe, there is another more universal one, which he calls an *ætherial* medium; vastly more rare, subtile, elastic, and active, than air; and by that means freely permeating the pores and interstices of all other mediums, and diffusing itself through the whole creation; and by the intervention of this he thinks it is, that most of the great phenomena of nature are effected. See ÆTHER.

This medium he seems to have recourse to as the first and most remote physical spring; and the ultimate of all natural causes. By the vibrations of this medium, he takes heat to be propagated from lucid bodies; and the intenseness of heat increased and preserved in hot bodies, and from them communicated to cold ones.

By this medium he takes light to be reflected, inflected, refracted, and put alternately in fits of easy reflection and transmission; which effects he also elsewhere ascribes to the power of attraction; so that this medium appears the cause and source even of attraction.

Again, this medium being much rarer within the heavenly bodies, than in the heavenly spaces, and growing denser, as it recedes farther from them, he supposes the cause of the gravitation of these bodies towards each other, and of the parts towards the bodies.

Again, from the vibrations of this same medium, excited in the bottom of the eye by the rays of light, and thence propagated through the capillaments of the optic nerves into the sensory, he takes vision to be performed; and so hearing, from the vibrations of this or some other medium, excited in the auditory nerves by the tremors of the air, and propagated through the capillaments of those nerves into the sensory; and thus of the other senses.

And again, he conceives muscular motion to be performed by the vibrations of the same medium, excited in the brain at the command of the will, and thence propagated through the capillaments of the nerves into the muscles; and thus contracting and dilating them.

The elastic force of this medium, he shews, must be prodigious. Light moves, according to the estimated distance of the earth from the sun in his time, at the rate of considerably more than 70,000,000 miles in about seven minutes; yet the vibrations and pulses of this medium, to cause the fits of easy reflection, and easy transmission, must be swifter than light, which is yet 700,000 times swifter than sound. The elastic force of this medium, therefore, in proportion to its density, must be above 490,000,000,000 times greater than the elastic force of the air, in proportion to its density; the velocities and pulses of the elastic mediums being in a subduplicate ratio of the elasticities and the rarities of the mediums, taken together. And thus may the vibration of this medium be conceived as the cause also of the elasticity of bodies.

Farther, the particles of this medium being supposed infinitely small, even smaller than those of light; if they be likewise supposed, like our air, to have a repelling power, whereby they recede from each other, the smallness of the particles may exceedingly contribute to the increase of the repelling power, and consequently to that of the elasticity and rarity of the medium, and so fit it for the free transmission of light, and the free motions of the heavenly bodies. In this medium may the planets and comets roll without any considerable resistance. If it be 700,000 times more elastic, and as many times rarer, than air, its resistance will be above 600,000,000 times less than that of water; a resistance that would make no sensible alteration in the motion of the planets in ten thousand years.

And is not such a medium better disposed for the heavenly motions than that of the Cartesians, which fills all space adequately, and without leaving pores, and is vastly denser than gold, and therefore must resist more?

If any ask how a medium can be so rare? let him tell how the air, in the upper regions of the atmosphere, can be above a hundred thousand times rarer than gold; how an electrical body can, by friction, emit an exhalation so rare and subtile, yet so potent, as though its emission occasions no sensible alteration in the weight of the body, yet it shall be diffused through a sphere of two feet in diameter, and carry up leaf-copper, or leaf-gold, at the distance of a foot from the electrical body: or how the effluvia of a magnet can be so subtile, as to pass a plate of glass without any resistance or diminution of force; yet so potent, as to turn a magnetic needle beyond the glass. That the heavens are not filled with any other, but such a subtile ætherial medium, is evident from phenomena: whence else are those lasting and regular motions of the planets and comets, in all manner of courses and directions; and how are such motions consistent confiftent with that refiftance which muft refult from that denfe fluid medium, wherewith the Cartefians fill the heavens?

The refiftance of fluid mediums arifes partly from the cohefion of the parts of the medium, and partly from the vis inertiæ of matter. The firft, in a fpherical body, is nearly as the diameter, or, at moft, as the factum of the diameter, and the velocity of the body. The latter is as the fquare of that factum. Thus are the two kinds of refiftance diftinguifhed in any medium; and, being diftinguifhed, it will be found that almoft all the refiftance of bodies, moving in ordinary fluids, arifes from the vis inertiæ. The part which arifes from the tenacity of the medium, may be diminifhed, by dividing the matter into fmaller parts, and making thofe more fmooth and flippery; but the other will ftill be proportional to the denfity of the matter, and cannot be diminifhed any other way, but by a diminution of the fame.

Thus the refiftance of fluid mediums is nearly proportional to their denfities; and thus the air we breathe, being about nine hundred times lighter than water, muft refift about nine hundred times lefs than water: as, in effect, the fame author has found it does by experiments on pendulums. Bodies moving in quickfilver, water, or air, do not appear to meet with any other refiftance but what arifes from the denfity and tenacity of thofe fluids; which they muft, were their pores filled with a denfe and fubtile fluid.

Heat, it is found, diminifhes the tenacity of bodies very much; yet does it not decreafe the refiftance of water fenfibly. The refiftance of water, therefore, arifes chiefly from its vis inertiæ; confequently, if the heavens were as denfe as water, or as quickfilver, they would not refift much lefs: if abfolutely denfe, without any vacuum, be the particles never fo fubtile and fluid, they would refift much more than quickfilver. A folid globe, in fuch a medium, would lofe above half its motion, while it moves thrice the length of its own diameter; and a globe not perfectly folid, fuch as the planets, would lofe more.

To make way, therefore, for the lafting motions of the planets and comets, the heavens muft be empty of all matter, except, perhaps, fome very fine effluvia, from the atmofpheres of the earth, planets, and comets; and fome fuch ætherial medium as we have defcribed. A denfe fluid can ferve for no purpofe, in the heavens, but to difturb the celeftial motions, and make the frame of nature languifh; and in the pores of bodies, it can only ferve to check the vibrating motion of their parts, wherein their heat and activity confift. Such a medium, therefore, unlefs we had fome evidence of its exiftence, muft be given up; and, that given up, the hypothefis of light confifting in a preffion falls alfo to the ground.

Medium *Participationis*, in the *Schools*, is that faid to be compounded of the two extremes. Thus, man, who is partly body, partly mind, is a medium by participation of the two extremes; fo is warmth the medium of heat and cold, &c.

Medium *Negationis*, or *Remotionis*, is that from which both extremes are derived; or it is a fubject capable of receiving both extremes, and yet not neceffarily poffeffed of either.

In which latter fenfe, the will is a *mean* with refpect to virtue and vice; and the underftanding, with refpect to knowledge and ignorance.

Medium *Quod*, or *Medium Suppofiti*, is fomewhat between the agent and patient, which receives the action of the one before it arrive at the other.

In this fenfe, air is a medium between the fire and the hand heated thereby.

Medium *Quo*, is the form, or faculty, whereby an agent produces an effect: in which fenfe, heat is faid to be the medium or mean whereby fire acts on the hand.

Medium *fub Quo*, is that which renders the power to act complete in general, without determining it to any particular object: in which fenfe, light is the medium under which the eye perceives any colour.

Medium *in Quo*, is that, by infpection whereof a power is produced in any thing, of knowing or perceiving another: fuch is a fpeculum, as it fhews an object; an image, as it reprefents the reality, &c.

MEDIUS, in *Geography*, a town of Perfia, in Farfiftan; 30 miles S.W. of Yefd.

Medius *Harmonicus*, Lat., in *Mufic*, with the Germans implies the middle found of a triad or common chord, as E in the chord of C. (Walther.) See Mediante.

MEDLAR, in *Botany*. See Mespilus.

Medlar, *Parfley-leaved*. See Service-*Tree*.

MEDLE, in *Geography*, a town of the ifland of Cuba; 62 miles N. of St. Yago.

MEDLERSLO, a fmall ifland in the N. part of the gulf of Bothnia. N. lat. 61° 13′. E. long. 21° 39′.

MEDLEY. See Chance-*Medley*.

Medley, in *Mufic*, during the early part of the laft century, a piece of pleafantry, or rather mufical buffoonery, was frequently practifed by Englifh compofers in compofing fymphonies from fragments of vulgar tunes, and popular compofitions, which were called *medley overtures*. Charke, Jack James, and even Arne, in his early days, condefcended to divert himfelf, more, perhaps, than the public, by thefe mufical falmagundies; of which, however, no one of thefe muficians can be ftyled the inventor. Dr. Pepufch feems to have given them the hint in his pleafant and appropriate overture to the Beggar's Opera; of which the firft movement is a burlefque of the beginning of Handel's overture in Otho; and the fubject of the fugue in the firft part of "I'm like a fkiff in the ocean toft," and the folo paffages for hautbois, the fecond part.

MEDMAN, in *Geography*, a town of the duchy of Berg, containing three churches for perfons of different religious profeffion; fix miles E.N.E. of Duffeldorp. N. lat. 51° 17′. E. long. 6° 43′.

MEDNIKI, a town of Samogitia, the refidence of the bifhop; 28 miles N.E. of Konigfberg.

MEDNOE, a town of Ruffia, in the government of the Tver, on the Tvartza; 32 miles W.N.W. of Tver.

MEDOC, a county of France, fo called before the Revolution, in form of a peninfula, between the Garonne and the fea, the north part of which is overflowed by the fea. On a rock at the mouth of the Garonne is a fine light-houfe, called "La Tour de Cordouan."

MEDOCTU, a fettlement of America, in New Brunfwick, fituated on the W. fide of St. John's river; 35 miles above St. Anne's. N. lat. 46° 12′. W. long. 67° 35′.

MEDOLA, a town of Italy, in the department of the Panaro; 18 miles S. of Modena.

MEDOLI, a town of Italy, in the department of the Mincio; 17 miles N.W. of Mantua.

MEDRA, a town of Africa, in Lower Guinea, capital of a country near the river Camerones.—Alfo, a town of Perfia, in the province of Mekran; eight miles N. of Kich.

MEDRASHEM, a town of Algiers; 40 miles S. of Conftantina.

MEDSHETISAR, a village, being one of the Perſian havens on the Caſpian, is ſituated, as is alſo Farabat, on the ſouthern coaſt, in the province of Mazanderan. Of theſe two villlages Medſhetiſar is the moſt convenient, from its vicinity to Balfruſch, capital of the province, where the Ruſſians and Armenians convey their merchandize: the traffic, however, is much diminiſhed on account of the impoſitions of the khan of Mazanderan. The chief productions of this country are ſilk, far inferior to that of Ghilan, rice and cotton, which are largely exported. Merchants from Kaſhan, Iſpahan, Schiras, and Khoraſan, reſort to Balfruſch, and bring for ſale the Perſian and Indian commodities.

MEDUA, a town of Algiers, at the foot of mount Atlas, in the midſt of ſprings; 180 miles S.W. of Algiers.

MEDVADITZA, a river of Ruſſia, in the country of the Coſſacks, which riſes about ten miles N. from Saratov, and runs into the Don, about eight miles N.W. from Spaſkaia.

MEDVEDIVA, a town of Ruſſia, in the government of Irkutſk, on the Ilim; 64 miles S.W. of Orlenga.

MEDVEZEI, a cape on the N. coaſt of Nova Zembla. N. lat. 77° 20′. E. long. 68° 34′.

MEDVEZHI, five ſmall iſlands of Ruſſia, in the Frozen ſea; 60 miles from the mouth of the Kolima. N. lat. 72° to 72° 20′. E. long. about 156°.

MEDVEZI, a ſmall iſland of Ruſſia, in the ſea of Ochotz, at the mouth of the river Uda. N. lat. 55° 10′ to 55° 16′. E. long. 137° to 138°.

MEDUKKA, a town of Arabia, in the province of Yemen; 36 miles S. of Saade.

MEDULLA, in *Anatomy*, the fat ſubſtance which fills the cavity in the middle of a long bone. See MEDULLARY *Syſtem*.

MEDULLA *Oblongata*, one of the diviſions of the contents of the cranium. See BRAIN.

MEDULLA *Spinalis*, the medullary cord contained in the canal of the vertebræ. See BRAIN.

MEDULLA, in *Vegetable Phyſiology*, the Pith of plants, is lodged in the centre or heart of the vegetable body, where it is as aſſiduouſly protected as the brain and ſpinal marrow of animals. In parts moſt endued with life, like the root, or eſpecially young growing ſtems or branches, the *medulla* is uſually of a pulpy ſubſtance; but tolerably firm though rather brittle. Its colour is pale green or yellowiſh, with a watery tranſparency, the ſubſtance being very juicy. Its juices partake but little, or not at all, of the peculiar flavour of the plant, they being more of the nature of ſap. Still there is no perceptible flowing from this part when wounded, at any time of the year, as far as we have obſerved. In branches or ſtems more advanced in growth, the *medulla* is found of a drier, more white, and evidently cellular texture. In this ſtate it is known to every body in the full-grown branches of Elder, and the ſtems of Ruſhes, *Juncus conglomeratus*, *effuſus*, &c. In theſe it is dry, highly cellular, ſnow-white, extremely light and compreſſible, though but ſlightly elaſtic. Such are its different appearances, at different periods of growth, in many common ſhrubs, as the Currant-tree, Lilac, Mock-orange, *Hydrangea*, &c. In the laſt-mentioned ſhrub, though nearly akin to the Elder, as well as in the *Aucuba japonica*, the pith is very abundant, and remains unuſually long in its primary green juicy ſtate. The pith of many annual ſtems, abundant and highly ſucculent while they are growing, becomes little more than a web, lining the hollow of the adult ſtem, as in ſome Thiſtles. Many Graſſes and Umbelliferous plants, as the Hemlock and Chervil, have always hollow ſtems, lined only with a thin ſmooth coating of pith, exquiſitely delicate and brilliant in its appearance. The inner part of ſuch hollow ſtems is, in ſome inſtances, divided into ſeparate cavities, by tranſverſe partitions. Such is the caſe at every joint, knot, or ſubdiviſion of the ſtem. There are a few graſs-like plants, with unbranched hollow ſtems, internally divided by numerous membranous partitions, perceptible to the touch in the living plant, and to the ſight in the dry one; witneſs *Juncus articulatus* and its allies, in which the longitudinal hollow of the ſtem is ſimple; and *Cyperus articulatus*, in which it is a congeries of parallel tubes. We mean not to ſay that the tubes in this laſt-mentioned inſtance are certainly medullary. They may or may not; but obſervations on the living plant could alone determine this. It is poſſible they may be ſap-veſſels, and that the tranſverſe ſtricture is not complete, ſo as to prevent the paſſage of fluids along this highly vaſcular ſubſtance. But as other ſpecies of this tribe have the central part of their ſtems filled with cells, or tubes frequently interrupted, through which no fluid can run, it is moſt probable that *Cyperus articulatus* differs from ſuch merely in having all its tubes interrupted at the ſame point of elevation, and that the aſſemblage of numerous partitions gives a frequently jointed appearance to the whole ſtem. *Andromeda acuminata*, Sm. Exot. Bot. t. 89, is found to have its hollow ſtem intercepted by very numerous tranſverſe partitions; and the ſame may be ſeen in other inſtances. The diſtinction between a hollow ſtem, only lined with *medulla*, and a ſolid one, entirely filled up with that ſubſtance, by no means indicates any material difference between the plants ſo circumſtanced. Some ſpecies of *Hieracium* have the one ſort of ſtem, others the other, and this difference is often of uſe, for ſpecific diſtinction, in that difficult genus.

It is much eaſier to deſcribe the appearances of the *medulla*, which are few and but little varied, than it is to underſtand the true nature, or phyſiology, of this part. There is ſcarcely any concerning which a greater variety of opinions, or at leaſt more oppoſite ones, have been held.

Du Hamel, an excellent obſerver, though not always a correct theoriſt, conſidered this part as not in any reſpect different from the reſt of the cellular ſubſtance, diſperſed through the vegetable body, and ſerving to hold its different parts together; nor did he attribute any particular function, in the vegetable economy, to any part of this ſubſtance.

Linnæus on the contrary thought the *medulla* the ſeat of life, and prime ſource of vegetation. He conceived that its vigour was the main cauſe of the propulſion of the branches. His lively fancy formed to itſelf an idea of this organ altogether his own, as a living body of peculiar vivacity and energy, ſtriving to enlarge itſelf in every direction, and ſucceeding beſt where it found leaſt reſiſtance. Thus he explains the growth of plants, and eſpecially of trees, at their extremities only; the cortical ſubſtance, as he terms it, of the vegetable being, (conſiſting of its wood and bark, including the vaſcular ſyſtem,) affording leſs reſiſtance where it is younger and thinner, while it derives energy itſelf from the powers of the ſubſtance it confines. His idea of the animal phyſiology was ſimilar. He conceived the brain and nerves of animals to be analogous to the pith of plants, and that it was confined by their cortical ſubſtance, for ſo he called their bones and muſcles, as the pith is by the more ſolid parts of plants. He thought he traced the origin of the ſtamens, or male organs of vegetables, to their wood; and that of the piſtils, or female ones, to their pith. Hence he deduced

deduced a fine fanciful hypothesis, that the mule offspring of crofs impregnation fhould refemble its father in external habit and characters, and its mother in internal qualities, which opinion he alfo extended to the animal creation; nor did he want facts to fupport it. Both kingdoms were ranfacked to fupply them; for fome facts may be found to fupport any hypothefis, any at leaft conceived by a mind fo able, ingenious, and intelligent as that of Linnæus. Mule animals, whether thofe properly fo called, produced between different fpecies, or whether thofe engendered between varieties of the fame fpecies, are often found to refemble the father in their form or coat, while their conftitution and difpofition are more like the mother. The fame thing may be obferved in mule plants. Linnæus is unqueftionably right in attributing the origin of the fubftance of the feed of plants to the female part of the flower, the function of the pollen being only to communicate life, or a power of vegetation, to the embryo, and not to convey any fubftance, or corpufcule, out of which the rudiments of the future plant are to be formed. At leaft this feems the moft reafonable opinion, even from a contemplation of the experiments of thofe who have laboured to overfet altogether his doctrine of the fexes of plants. It is difficult to fay whether the embryo of a feed be formed at all before impregnation, becaufe, if formed, it is very foon obliterated in cafe impregnation fails, a mere cavity being found in its place when the feed is at all advanced. But we have feen much more reafon to believe its obliteration, rather than the contrary; and in moft cafes of non-impregnation, the cotyledons are obliterated alfo. See COTYLEDONES, EMBRYO, and FECUNDATION *of Plants*.

In another office which he attributed to the *medulla* or pith, Linnæus was unqueftionably miftaken. He thought it the origin of the wood; believing that a layer was every year added internally to the body of a tree from this fubftance. Du Hamel refuted this opinion, by experiments, which clearly proved the wood to be depofited by the bark, as we have explained in the articles CORTEX, and CIRCULATION *of the Sap*.

But while we thus reject opinions of the great Swedifh naturalift, which have been proved to want a folid foundation, it may be worth while to examine how far his general idea of the importance of the *medulla* may be defenfible. No one can deny that there is a great analogy between this part and the nervous fyftem of animals, with refpect to fituation and protection, as well as in its general uniformity of appearance and texture in widely different orders of plants; while the differences in thefe refpects which it exhibits in other tribes, are not at all greater than thofe found in the nervous fyftems and brains of different claffes of the animal kingdom. If, moreover, it be faid, that the pith is of too fimple a conftruction to allow a belief of its being of fo great importance to the vegetable conftitution, as to be the feat of life, or immediate organ of vegetation; furely we are as little able to difcover any thing in the form or texture of the brain and nerves, to account for their wonderful but undeniable properties. Scarcely any phenomenon in the animal frame is lefs intelligible, than the change in the pith of a plant from its fucculent ftate, to that dry congeries of an infinite number of clofe cells or veficles, impervious to fluids, and having no communication with each other. Yet the moifture efcapes by no means readily from the pith in its juicy ftate; for a thin flice of it in that ftate dries very flowly. The ingenious Mr. Knight has fuppofed the *medulla* to be a refervoir of moifture, to which the growing vegetable may have recourfe, when its fap-veffels are occafionally exhaufted by inordinate perfpiration. "Plants," fays this excellent writer, "cannot, like animals, fly to the fhade and the brook." This is undoubtedly true; but, inftead of fuch a refource, their leaves when exhaufted droop, or fold over each other; fo that their pores are contracted, and the very check which their energy receives prevents further exhauftion, and gives time for frefh fupplies from the root. Mr. Knight has indeed fhewn that the part in queftion may, occafionally at leaft, be difpenfed with, and removed from a branch without injuring it; but, on the other hand, he has more recently fhewn the importance, if not of the *medulla*, of its analogous organ, the cellular fubftance; having found that fubftance capable, as he thinks, of affuming the vafcular ftructure, and actual vegetation, of what Linnæus terms the cortical fubftance of a plant.

The writer of the prefent article has always been partial to the opinion of the *medulla* being, fome how or other, an organ fubfervient to the vital energy of the vegetable frame; but we can ftill lefs, if poffible, comprehend its mode of action, than that of our own brain and nerves. It is branched off and diffufed, like the nervous matter, to every part of the vegetable body, and hence may eafily be fuppofed to give life and vigour to the whole, though, no more than nerves, the organ or the direct fource of nourifhment; for its ftructure is fuch that it can tranfmit no fluids for that purpofe from the vafcular fyftem; at leaft not in any way that we can comprehend, till it has taken upon itfelf a different organization from what is natural to it. The pith however is certainly moft vigorous and abundant in young and growing branches, and muft be fuppofed fubfervient, in fome way or other, to their increafe. Mr. Lindfay of Jamaica (fee LINDSÆA), many years ago communicated a paper to the Royal Society, which, for fome reafon unknown to us, was never printed, the object of which was to prove a medullary knot in the leaf-ftalk of the *Mimofa pudica*, or Senfitive Plant, to be the feat of that remarkable irritability for which the plant in queftion is celebrated. We are not however able to trace any thing of this nature in the ftamens of the Barberry, which are no lefs remarkable for their irritability. Nor can we trace, to any great extent, the nervous fyftem of the infect tribe, even where we are not prevented by the minutenefs of the object of our examination; though the animals of that tribe yield to none in the fufceptibility and energy of their nervous fyftem. In both cafes the tranfparency of the parts may account for this difficulty.

We can therefore only reafon by analogy concerning the functions of parts, whofe ftructure cannot be afcertained, much lefs their mode of action. We fhall conclude this article with the mention of one phenomenon, eafily obfervable by any perfon who will beftow attention upon it. There are feveral fpecies of Grafs, amongft which are the Common Cat's-tail, *Phleum pratenfe*, and the Floating Fox-tail, *Alopecurus geniculatus*, whofe nature is to have an entirely fibrous root. Their proper ftation is in moift, or even watery fituations. But if they chance to eftablifh themfelves in ground whofe degree of moifture varies occafionally, or efpecially in very dry fpots, as on the top of a wall, they acquire bulbous roots, of a very juicy nature. This is evidently a provifion of Nature, to guard the plant againft deftruction from drought; as the tribe of naturally bulbous plants are, for the moft part, intended to occupy dry, fandy, or barren ground, under a burning fun. The naturally bulbous grafs *Poa bulbofa*, if cultivated in the rich and regularly watered foil of a garden, gradually lofes its bulbous habit, becomes exceffively luxuriant, and in time perifhes, in confequence of exhauftion from that very luxuriance, to which the annual formation of bulbs, in its proper fandy fituation, is a feafonable check. All thefe inftances furely prove

prove the accumulation of *medulla* in ſuch bulbous roots, to be equivalent to an accumulation of vital energy. They cannot be mere reſervoirs of moiſture, for all that they can poſſibly contain is not adequate to the ſupply of a few minutes perſpiration from the herbage. They may indeed huſband that moiſture, ſo as to render the ſcanty ſupplies obtained by the fibres below, or by abſorption through the leaves, ſufficient to keep the half-ſtarved plant from abſolute deſtruction; their own extraordinary luxuriance proving the ſalvation of the parts which they ſeem to ſtarve, but to which they are a neceſſary and certain reſource. The juſt conſideration of fleſhy roots in general will be found to illuſtrate this ſubject; for though thoſe of biennial plants muſt be conſidered as reſervoirs of nutriment, hoarded up by the growth of the firſt ſeaſon, for the inordinate ſupply of the next; the phyſiology of perennial bulbous roots ſeems to indicate, that all are likewiſe reſervoirs of vital energy, of which the *medulla* is the immediate organ, and probably the excluſive reſidence. S.

MEDULLARY ARTERIES, in *Anatomy*, the arteries diſtributed on the ſubſtance which fills the interior of bones. See MEDULLARY *Syſtem*.

MEDULLARY *Subſtance*, is the white matter of the brain and nerves. See BRAIN.

MEDULLARY *Syſtem*, is the expreſſion employed by Bichat to denote the tiſſue that occupies the interior of the bones. Its organical arrangement, vital properties, functions and diſeaſes, are imperfectly underſtood. Some remarks on it will be found under the article BONE. It is found only in the bones, and its uſes ſeem only relative to thoſe organs: yet its organization and properties are ſo different as to juſtify us in conſidering it ſeparately.

There are two kinds of it very diſtinguiſhable from each other: one occupies the cellular ſtructure in the extremities of the long bones, and in all the interior of the ſhort and flat bones: the other is found only in the middle of the former.

The firſt appears to conſiſt of the ramifications of thoſe veſſels, which enter by numerous ſmall holes of the ſurface into the common cellular tiſſue of the bone. They divide very minutely on the internal ſurfaces of the cells, producing the red appearance which characterizes that part, and which is more ſtrongly marked in proportion as the ſubject is younger. To them, and the blood which they contain, is owing the red colour of the powdery ſubſtance produced in ſawing through a bone. Fine injections propel the blood contained in this tiſſue, and make it appear in the adult as red as that of the fœtus when uninjected.

Authors have generally admitted the exiſtence of a fine membrane in theſe bony cells, and have aſſigned to it the office of exhaling the medullary fluid. Bichat repreſents it as a merely vaſcular texture, without any continuous ſurface; and obſerves, that the bone itſelf, in many points, is in contact with the medullary fluid. It poſſeſſes merely the organic ſenſibility and contractility neceſſary for the ſecretion of its fluid, and is diſtinguiſhed in that reſpect from the medullary ſyſtem of the middle of long bones, which is the ſeat of well-marked animal ſenſibility. There is no ſign of pain when it is irritated in a living animal. If it be very extenſively injured, necroſis may enſue: but ſmaller injuries have not this conſequence. Bichat perforated the extremity of a long bone in an animal, and then introduced a hot wire: it healed without necroſis.

The vaſcular network forming this ſyſtem is obſcured in the cartilaginous ſtate of the bone by the gelatine: as that is removed, the cells and veſſels become manifeſt. In the fœtus, and in the early years of life, it contains no oily fluid: at this time the blood is more abundant, and the cells are filled with ſome fluid, of which the nature is not well underſtood. Medullary oil is afterwards depoſited, and its proportion increaſes until the growth is completed. The cellular ſtructure of an adult bone expoſed to a pretty conſiderable heat parts with a large quantity of oily fluid: the ſame experiment tried on a fœtal bone produces only deſiccation of the tiſſue from evaporation of its fluids. When the extremity of a long bone of the adult is ſet on fire, the contained medullary ſubſtance keeps up the combuſtion; in the fœtus, the bone ceaſes to burn as ſoon as it is removed from the fire, as the fluids will not maintain the combuſtion. The bones, when dried, remain white and dry in the fœtus: they are yellow and greaſy in the adult at their extremities. Ebullition extracts much oil from the cellular tiſſue of adult bones, but none from thoſe of the fœtus.

The ſecond medullary ſyſtem occupies the large cavity in the centre of the long bones. Each of ſuch cavities is lined by a thin membrane, prolongations of which cover the thin portions of cellular tiſſue that project into the cavity, or paſs from one ſide to the other, and form cells in which the medullary fluid is contained. The ſituation in which it exiſts, gives to it, when conſidered altogether, a nearly cylindrical form.

It does not appear that the ends of this ſyſtem have any communication with the former; the two are ſeparated by a marked line of diſtinction, and not gradually confounded: yet it is difficult to prove the point clearly.

The great delicacy of the membrane conceals the nature of its texture: it cannot be referred either to the ſerous, mucous, or fibrous claſs, and has no analogy in its functions, &c. with the perioſteum, to which it has been often compared. A principal artery enters at the chief hole of each long bone, and ramifies on this membrane. Its branches give it, in the fœtus, a reddiſh colour, which diſappears afterwards. Expoſure of the containing cylinder to fire renders the membrane more apparent by corrugating and curling it up.

We have no means of bringing the properties that ariſes from ſtructure (proprietés de tiſſu) in this ſyſtem under our obſervation.

It enjoys animal ſenſibility in a very conſiderable degree, as we may prove by introducing a probe into the medullary cavity of a bone, by injecting an irritating fluid, or uſing any other mode of irritation.

The ſecretion and abſorption of the medullary fluid prove the exiſtence of organic ſenſibility, and of inſenſible organic contractility.

It is obvious from the preceding account, that the vital powers are more active in this than in the bony ſyſtem, conſequently that the vital phenomena muſt be more rapid, and the diſeaſes leſs prone to aſſume the chronic form, than thoſe which affect the bones.

The medullary membrane appears to exiſt in the cartilaginous ſtate of the middle of long bones; but gelatine is then depoſited in it, ſo that the whole bone is homogeneous in appearance. When oſſification begins, the gelatine is abſorbed, and the medullary cavity formed: the membrane admits red blood. At firſt, however, no oily matter is depoſited in the cells: inſtead of it, there is a reddiſh mucilaginous fluid, which exhibits nothing of a greaſy appearance when preſſed between the fingers. No particles of oil ſwim in the water after it has been boiled. The middle of a long bone expoſed to heat burns with the formation of inflamed drops: nothing of this kind occurs in the fœtus.

The function of the medullary membrane is to depoſit, by exhalation, the medullary fluid, and to convey it again into the blood by abſorption. It muſt therefore poſſeſs

exhalants

exhalants and abſorbents as well as blood-veſſels, although we cannot demonſtrate them anatomically. In this point of view the medullary ſyſtem reſembles the fat. It is hardly poſſible for us to know whether the exhalation be augmented or diminiſhed by any cauſes. It is however certain, that in phthiſis, dropſy, or other affections in which extreme general debility is produced by a gradual reduction of the vital powers, the medullary fluid loſes its eſſential characters, and aſſumes an appearance altogether different from its natural one, without any alteration in the texture of the membrane. It has a mucilaginous or gelatinous appearance, almoſt like that of the fœtus.

That the medullary membrane has a cloſe connection with the nutrition of the bone is rendered evident by the experiments of Troja, in which it is ſhewn that its deſtruction is followed by the death of the bone, and the formation of a new one, to which the perioſteum ſerves as a nutritive parenchyma. The common way of proceeding has been to ſaw off the extremity of a long bone, and to introduce a red-hot wire into the medullary cavity, ſo as to diſorganize the part completely. Soon after the perioſteum ſwells, becomes inflamed, and extremely ſenſible to the touch. The inflammation diſappears, and the ſenſibility is gradually rendered leſs acute. The internal layers of the membrane receive a depoſition of gelatine, and thus a cartilaginous ſheath is formed including the dead bone. After a certain time, of which the length may vary from many cauſes, phoſphat of lime is depoſited, and converts the cartilaginous into a bony ſheath. The inner bone is now a dead body ſurrounded on all ſides by a living one. Bichat, Anatomie Generale, tom. ii.

Medullary *Sarcoma*, in *Surgery*, a name given by Mr. Abernethy to a kind of ſarcomatous ſwelling, the conſiſtence of which reſembles that of the medullary ſubſtance of the brain. It is ſuppoſed by ſome to be a ſpecies of fungus hæmatodes. See Fungus and Tumour.

MEDUMACK, in *Geography*, a river of America, in the diſtrict of Maine, which runs into the ſea, N. lat. 44°. W. long. 69° 15′.

MEDUNA, a town of Italy, in the country of Friuli; 12 miles W. of Concordia.

MEDUNCOCK, a plantation of America, in Lincoln county, Maine; 40 miles E.S.E. of Wiſcaſſet, containing 380 inhabitants.

MEDUS, or Medinus, a name given by the writers of the middle ages to a ſtone brought from Media, of which they ſay there were two kinds, the one black, and the other green. They attribute many ſtrange virtues to theſe ſtones; the black they ſay was a fatal poiſon when taken inwardly, but that if wetted with milk, and rubbed upon the ſkin of a woman with child, it cauſed her to bring forth a boy. This ſeems to be only a falſe hiſtory of the *medea* of Pliny.

MEDUSA, in *Botany*, is a name beſtowed on this genus by Loureiro, from the long curling hairs of its capſule reſembling the ſnakes which are fabled to have covered the head of Meduſa. This name however is untenable, from its having been previouſly applied to deſignate a genus of *Vermes*. We are only acquainted with this plant as it occurs in Loureiro, and being unable to refer it to any other genus, we muſt be content to give that author's account of it. —Loureir. Cochinch. 406.—Claſs and order, *Monadelphia Polyandria*. Nat. Ord. . . . . . .

Gen. Ch. *Cal.* Perianth inferior, permanent, of five, ovate, hairy, incurved, ſpreading leaves. *Cor.* Petals five, ovate-oblong, curved, inflexed, afterwards reflexed towards the top, longer than the calyx. *Stam.* Filaments five, thread-ſhaped, united at the baſe into a tube, equal in length to the corolla; anthers incumbent. *Piſt.* Germen ſuperior, nearly round; ſtyle awl ſhaped, hairy, the ſame length as the ſtamens; ſtigma ſimple. *Peric.* Capſule ovate, three-lobed, covered with numerous, long, twiſted hairs, of one cell and three valves. *Seeds* ſix, roundiſh.

Eſſ. Ch. Monogynous. Calyx of five leaves. Petals five. Capſule with one cell, three valves, and ſix ſeeds.

1. M. *anguifera.* Snake-bearing Meduſa. Cay chôm chôm dât, of the Cochin-Chineſe. *Loureiro.*—A *tree* of middling ſize, with aſcending *branches.* *Leaves* alternate, ovate-oblong, ſerrated, pointed, ſmooth. *Flowers* red, not many on a ſtalk. *Capſule* hairy, opening in three lobes, which expand horizontally.

Medusa, in *Natural Hiſtory,* a genus of the Vermes, Molluſca claſs and order, of which the generic character is, Body gelatinous, orbicular, and generally flat underneath; the mouth central, beneath.

The animals of this genus have been commonly denominated "ſea-nettles," from the opinion that the larger ſpecies, when touched, excite a tingling ſenſation, and a ſlight redneſs of the ſkin: they are ſuppoſed to conſtitute the chief food of cetaceous fiſh; and moſt of them ſhine with great ſplendour in the water. The form of their body, while at reſt, is that of the ſegment of a ſphere, of which the convex ſurface is ſmooth, and the flat part provided with ſeveral tentacula. The body is tranſparent, and ſo gelatinous, that it is reduced almoſt to nothing by evaporation, when left on the ſhore. Several coloured lines may be ſeen within, but there is nothing that would lead one to think there is a circulation going on. The lines, which are more numerous towards the borders, ſeem to be appendages of the alimentary cavity. Theſe animals ſwim well, and appear to perform that motion by rendering their body more or leſs convex, and thus ſtriking the water. When left on the ſhore they are motionleſs, and look more like flat cakes of jelly, than living animals. There are about forty-four ſpecies diſtributed into two ſections, *viz.* A. Body with ciliate ribs: and B. Thoſe that have a ſmooth body. Many of the ſpecies are to be found in the ſeas about our own country, and will be marked as ſuch with aſteriſks.

A. *Body with ciliate Ribs.*

Species.

Infundibulum. The ſpecific character of this is, body ovate, with nine ciliate ribs. It inhabits the Indian, Mediterranean, and North ſeas; is about three inches and a half long. The body is obtuſely eight-angled, hollow, tranſparent, open at the larger extremity, and of a firm gelatinous ſubſtance. It contracts and expands with great facility: ribs purpliſh, and furniſhed with a ſingle row of ſhort and ſlender fibres.

Pileus. The body of this ſpecies is globular with ciliate ribs, and two ciliate cirri. It is found in the Mediterranean ſeas.

Cucumis. This is oblong with eight ciliate ribs, with cirri. It is found in the Greenland ſeas, and moves very ſlowly by means of the fibres on the ribs: when touched it contracts itſelf into the form of an apple. The body is white mixed with blue, and covered with irregular red ſpots: it has two apertures, terminal meeting in the oblong middle cavity. It probably derives its name from its ſhape and appearance.

Ovum. Ovate, with eight ciliate ribs and two pair of cirri, one pair of which is very long. Inhabits the Green-

land

land ſeas, and reſembles a hat, ſeldom larger than a pigeon's egg. The body is lucid and exceedingly fragile; the fragments, while alive, are blue.

B. *Body ſmooth.*

Species.

Porpita. The body of this ſpecies is flat above, beneath it is a little convex, grooved, and villous. It is found in India.

* Cruciata. This ſpecies has a body marked with a milk-white croſs. It inhabits the European ſeas. It has the appearance of a tranſparent colourleſs jelly; the body is ſurrounded at the margin with very fine fibres: the croſs is marked with a brown ſpot on each arm. It is luminous when under ſun-ſhine.

Hysocella. The body is convex, having ſixteen rays, and four united tentacula beneath. It is found in the ſea round Portugal. The body above is whitiſh, the rays compoſed of extremely minute reddiſh-brown dots; beneath it is concave; the tentacula are longer than the body, lanceolate, and marked with reddiſh ſtriæ.

* Æquorea. This is a flattiſh ſpecies, with a villous inflected tentaculate margin. It is extremely ſimple, ſoft, and fringed at the margin with white.

* Aurita. Convex above, with an inflected fringed margin; beneath with four arched cavities near the centre. It is frequently found floating on the ſurface of the ſea; is from two to four inches in diameter. When the ſun ſhines upon the animals of this ſpecies, they reflect a beautiful ſplendour.

* Capillata. The body is convex, with ſixteen indentations round the margin, and numerous ſlender filaments beneath. It inhabits the ocean, and is about eight inches in diameter. The body is deſcribed as whitiſh, ſemi-pellucid, fragile; above convex, beneath flat with a rough circle; within this there are eight pair of rays; and a number of curled fibres and appendages from the centre: the margin is divided into eight portions, each of which is emarginated.

* Pilearis. This has a capitate diſk, with eight ſmall holes on the border: beneath it is arched and hairy. The body has an irregular reflected margin.

Marsupialis This is found in the Mediterranean; is ſemi-oval with four tentacula on the margin, and reſembles a purſe.

Hemisphærica. This, as its name denotes, is hemiſpherical, with four tranſverſe ribs beneath, and marginal tentacula and globules: the margin is entire: is not a quarter of an inch in diameter, and is found in the European ſeas.

Pelagica. Hemiſpherical-concave, with a crenate incurved margin and eight tentacula. It is found in the American and Atlantic ſeas.

Noctiluca. This ſpecies is depreſſed, with reddiſh-brown warts and dots: margin with eight red tentacula.

* Fusca. The body of this has ſixteen brown rays and a brown circle in the middle; the circumference is edged with alternate crooked fangs and oval tubercles. It inhabits the coaſt of Cornwall. The tentacula are four, lacerated, and a little exceeding the body.

* Purpura. The body of this ſpecies is decorated with pale purple rays, and a light purple croſs in the centre, between each bar of which is a deep purple horſe-ſhoe-ſhaped mark.

* Tuberculata. With fifteen brown rays meeting at the centre, and ſmall oval tubercles round the margin; it has four tentacula plain, and much longer than the body. It inhabits the coaſt of Cornwall.

* Undulata. This derives its name from its undulate margin; it has fangs on the projecting parts; beneath it has four orifices, between which is a ſtem divided into eight ragged tentacula. It is found on the coaſt of Cornwall.

* Lunulata. The margin is tuberculate; beneath in the centre are four conic appendages forming a croſs, with ſeveral others, like ſerrate leaves, ſurrounding it. The tentacula are eight, not longer than the margin, and between each is a ſemi-lunar aperture. It inhabits the coaſt of Cornwall.

Nuda. Orbicular, blue, without creſt; the tentacula of the diſk are naked, with three rows of glands. It is found in the Mediterranean, and is never an inch in diameter. The body has a whitiſh diſk above, and radiate with concentric ſtriæ, the margin and border blue; the tentacula are filiform and blueiſh-hyaline.

Velelia. This alſo is orbicular, blue, with an oblique ſimple creſt or membrane, and numerous tentacula beneath. It inhabits the Atlantic and Mediterranean ſeas. The body is flat, thin oval, and marked with numerous tentacula beneath.

Spirans. Oval, blue, with oblique divided creſt or veil, and numerous tentacula beneath. It is about two inches long, and inhabits the Mediterranean. Body thin, convex, and terminating in a whitiſh central knob above, blue with a brown border; creſt two-parted and ſtriate; the tentacula are filiform.

Pulmo. Hemiſpherical-concave, with a fringed border; beneath ſtriate, the ſtem with four openings and eight arms. It inhabits the Tuſcan ſea. This has been very minutely deſcribed in the following terms:

" *Body* gelatinous, pellucid, tough, cryſtalline. The *head* is large, hemiſpherical, concave beneath, and marked with numerous ſtriæ, croſſed by ſixteen diſtant ligaments, each emitting a ſhort branch on both ſides. *Border* fringed with numerous roundiſh ſcallops. *Stem* large, thick, ſquare, with four ſemi-oval openings, each of which has a large lobe above, and a ſmaller beneath. Eight *branches* or *arms* proceeding from the lower part of the ſtem, ſub-cylindric, pendent, and wrinkled behind; beſides theſe, there are ſixteen ſubtrigonal appendages riſing from the beginning of each branch, bifid in front, and terminated on the upper ſide by a flat wrinkled ſurface; the branches end in as many ſub-pyramidical branchiæ, the two exterior ſides of which are prominent, and ending in a thickly wrinkled ſurface: theſe are terminated by eight oblong ſub-triangular thick pendent bodies, ending in three flat acute membranaceous pieces. Within the openings is a flexuous ſtriate blueiſh-yellow band."

Tyrrhena. This, as its name imports, is found in the Tuſcan ſea. It is convex; the margin crenate, and furniſhed with very long fibres or threads; beneath are four tentacula. The body is ſmooth, tender, hyaline, ſpotted with red; beneath are four cavities, each marked with a red band.

Tubercularis. The diſk of this is prominent; the margin is eight times divided and ſtriate beneath; it has eight tubercles. It is found in the Tuſcan ſea. The body is hyaline, and it is often two pounds weight; beneath fulvous, with innumerable curved fibres; tubercles blueiſh-white, ending in two ſtems, terminated by a pellucid whitiſh membrane, which is flaccid and blue or white at the tip.

Utriculus. This ſpecies is bottle-ſhaped, with a very long

long granular central tentaculum beneath; margin with numerous blue tentacula tipt with white. Inhabits the ocean; is hyaline, with about thirty marginal cirri.

Caravella. Body ovate, with very long central tentacula beneath, and a crenulate veil above. It is found in the Atlantic, and inflames the hand by its touch. The body is thin, fmooth, fhining, blueifh, hyaline, and tapering on each fide; the creft runs through the whole length of the back; it is femi-lunar, compreffed, furrowed with branched grooves, and marked with rofy veins; tentacula jointed, blue, fragile, and intermixed with fhorter tubercles.

Umbella. Tentacula of the difk naked, of the margin glandular; margin membranaceous, crenate. Inhabits the Mediterranean and Indian feas. The body is rigid, depreffed, with radiate grooves above; beneath with a clavate trunk in the middle, furrounded with fhort clavate tubes; tentacula jointed with three rows of glands.

Dimorpha. Back eminent; beneath a minute crofs furrounded with five apertures; the margin is ciliate. It is found in the North feas. The body, when expanded, is orbicular, with a fquare inflected margin; beneath it is concave; the back is divided into four parts by radiate grooves, with an elevated central crofs and white fibres.

Campanula. The difk is gibbous; the border wide and ciliate; beneath is a hairy crofs. It inhabits the Greenland feas. The body is conic-orbicular, beneath hollow and fnowy; the fringe of the margin and crofs yellow; the latter is often white.

Digitata. Hyaline, with a piftil beneath in the centre; margin ciliate. An inhabitant of the Greenland feas. It leaps with its margin bent in. Body very minute, conic, ftriate; fringe yellow or white, and hooked within; piftil ending in a yellow or white pencil.

Frondosa. Margin of the difk varied with white opaque fpots; it has eight tentacula, is dichotomous, and is befet with white pedunculate warts terminating in tufts. It is fmall, and found in the Archipelago. The body is flattifh, a little convex above; the border is membranaceous, and fringed with white fafciculi; beneath is a villous nucleus, which in the leffer ones is eight-angled, and in the larger ones ten-angled.

Tetrastyla. This is hemifpherical, without tentacula; furnifhed with four marginal tubes united into a prifm. It is found in the Red fea, and is about a fpan and a half acrofs. Body hyaline, rather rigid; the tubes of the margin are linear, three inches long, ftraight and flat.

Octostyla. Hemifpherical, without marginal tentacula; beneath is a four-folded column, with eight many-cleft lobes at the tip, and fixteen lateral appendages. This is likewife found in the Red fea. The body is of a blueifh-hyaline, and is a full foot in diameter; the column beneath is about an inch and a half long.

Andromeda. Hemifpherical, without marginal arms; beneath there are eight round ramified foliaceous arms. An inhabitant of the Red fea. The body is tranfparent, of a pale yellowifh-brown or blueifh colour, with white rays and an entire margin; in the middle is a fmall black crofs; the arms are white, and a little thicker than a goofe-quill at the infertion.

Corona. Hemifpherical, without marginal tentacula; beneath there are eight cultrate arms, toothed each fide below. It inhabits the Red fea. Body reddifh-hyaline; it is about four inches acrofs, with a blue crofs in the middle; the arms beneath are broad, and two-lobed at the tip.

Perseæ. Hemifpherical, hyaline, with an opaque white ring within, four times interrupted; there are no marginal tentacula. It is found in the Mediterranean. The body is about two inches wide, with a very prominent margin; it has four arms, fub-lanceolate, about an inch long, and undulate at the margin.

Cephea. Hemifpherical, tuberculate, reddifh-brown; beneath are eight arms villous at their extremities, and nine long filiform tentacula. It inhabits the Red fea. The body is pellucid, with eight paler rays; arms blueifh, with black extremities; the tentacula are pointed.

Proboscidalis. Hemifpherical, with a long probofcis in the middle beneath, and fix marginal tentacula. This fpecies inhabits the Mediterranean. The body is hyaline, two inches and a half broad, with a prominent equal margin; probofcis fub-flexile, and truncate at the tip, with a fringed folded verfatile membrane.

Mollicina. Depreffed, with twelve lateral apertures and tentacula. An inhabitant of the Mediterranean. The body is about an inch and a half in diameter, hyaline; the margin is prominent, with twelve plates.

Pileata. Ovate-campanulate, with a hyaline globe above; within is an oblong red nucleus; the margin has numerous tentacula that are yellow at the bafe. Inhabits the Mediterranean. The body is an inch and half high; the margin a little contracted.

Crucigera. Hemifpherical, with a reddifh crofs as wide as the body; the body is fmall, with four very minute, white, approximate rings above; the margin is thin, prominent, varioufly flexile, and often reddifh; the tentacula are numerous, but not fo long as the body is wide.

Unguiculata. Orbiculate; above flat, with fixteen rays; the margin is crenate, with fixteen flightly incurved fangs. It is found about the fhores of Jamaica, and is the fize of a nutmeg. The body is diaphanous, blueifh, and fpotted.

For a defcription of feveral of the above fpecies, as affording an exhibition of light, and for an account of certain changes, recommended by Mr. Macartney, in the arrangement of the genera, and of the names of fome of the fpecies, we refer our readers to the article Light, *Exhibition of, by living Animals*, at the clofe of the 20th volume of this work, having, in the prefent, confined ourfelves to the Linnæan reprefentation of the genus.

Mr. (now fir Jofeph) Banks, in his paffage from Madeira to Rio de Janeiro, difcovered a new fpecies of the medufa, which, when brought aboard by the cafting net, had the appearance of metal violently heated, and emitted a white light. With thefe animals were taken fmall crabs of three different fpecies, altogether new, each of which gave as much light as the glow-worm, though the creature was not fo large by nine-tenths. Thefe luminous animals gave that appearance to the fea, which has been mentioned by many navigators, and of which various reafons have been affigned. It appeared to emit flafhes of light exactly refembling thofe of lightning, only not fo confiderable, but fo frequent, that fometimes eight or ten were vifible at the fame moment.

Medusa's *Head*, in *Botany*. See Euphorbia.

MEDUSÆ Caput, in *Natural Hiftory*, a name given by authors to the *ftella marina*, called by fome, from its various branchings, *ftella arborefcens*. Rumphius, Gefner, and many other authors, have defcribed this ftrange fifh in its recent ftate; and in the Acta Eruditorum, we have an accurate figure, and a very remarkable account of one which was found foffil, and preferved in a fingularly perfect manner in ftone.

The ftone in which it was found was of the fiffile or flaty kind; and it was fo large as to extend over a piece of this ftone of four feet in length, and between three and four in breadth. The body of the fifh, from which all the reft feem

 originally

originally to have arisen, lay at one corner of this ſtone, and the arms extended themſelves lengthways in a very diſtinct and natural manner the whole length of the ſtone; and from theſe there parted, on every ſide, other ſmaller ones; and theſe were finally divided into others more minute, in ſuch a manner as to repreſent the niceſt painting. Act. Erudit. ann. 1725, p. 377.

The ſtudy of foſſils is more improved by this ſingle ſpecimen than by thouſands of others, and by the reaſonings of almoſt as many authors. The foſſils called entrochi have always perplexed the writers on theſe ſubjects to account for: ſome having judged them a ſort of ſtony vegetables; ſome a *luſus naturæ;* and others, as different things; but in this table the whole fiſh is ſo perfectly preſerved, that there can remain not the leaſt doubt of its being really the *ſtella arboreſcens;* and in this both the figure and author's words expreſs, in the plaineſt manner poſſible, that the long arms or branches, reaching from one end to the other of the ſtone, are compoſed of a number of entrochi as it were, tied together in the ſame manner as the ſingle joints of thoſe entrochi, which we meet with, are to one another: or, in plain fact, that our entrochi, which have perplexed us ſo much to account for their origin, are in reality the fragments of the arms or branches of this fiſh. Theſe branches in this famous ſpecimen were compoſed of what we call *trochitæ*, and had many rudiments of ſmaller branches, as well as perfect ones, growing from their ſides, and would have been ſo many common entrochi, if broken off.

What was moſt remarkable in this foſſile was, however, the ſeparating of ſmaller branches which ran entire to their ends, and there terminating in an infinite number of ſmall ramifications, all growing from one head, they formed cluſters of four or five inches in diameter, and of an inconceivable beauty, reſembling the compound flower of ſome elegant plant. The matter of the large branches, when examined, appeared to be the ſame with that of the common entrochi, that is, ſpar. The author calls it *ſelenites*, but that was a word indeterminately uſed by authors, till of late, for all plated and bright foſſils.

It is plain that this complete fiſh could have no way come into this ſtone but at the time when it was yet moiſt and ſoft: and the author calls it *novum diluvii monumentum, a new remembrancer of the deluge.*

Medusæ *Caput*, or *Meduſa's Head*, in *Ancient Mythology*, occurs frequently both on the breaſt-plates and ſhield of Minerva; in ſome of which it is the moſt beautiful, and in others the moſt ſhocking object. In ſome figures the face is repreſented as dead, but with the moſt perfect features that can be conceived; in others, her face is full of paſſion, and her eyes convulſed; and in many others, the look is altogether frightful, and formed on purpoſe to inſpire terror. The beauties and horrors of Meduſa's face are mentioned by the Roman poets. Ov. Met. iv. ver. 793. Lucan, lib. ix. ver. 680. Virg. Æn. viii. ver. 438. Spence's Polymetis, p. 61.

MEDWA, in *Geography*, a town of Nubia, on the borders of Dar-fûr; 80 miles N. of Cobbe.

MEDWAY, a river peculiarly connected with the county of Kent, England, was called by the Britons Vaga, a name deſcriptive of its ſinuous courſe and mazy wanderings. The Saxons changed this appellation to Medweg and Medwege, from which the preſent name is a corruption. This river has four principal ſources, one in Kent, two in Suſſex, and a fourth in Surrey. The latter riſes at Blechingly, and entering Kent, flows on to Eaton bridge and Penſhurſt, below which it is joined by one of the branches that riſe in Suſſex, and being augmented by various ſmaller ſtreams, proceeds through a beautiful country to Tunbridge. A little above this town the river ſeparates into ſeveral channels, the northernmoſt of which is navigable, and is again joined by the other diviſions about two miles below Tunbridge. Thence proceeding to Twyford bridge and Yalding, it receives the united waters of the two remaining principal branches; one of which flows from Waterdown foreſt in Suſſex, and is ſwelled by the Bewle and Theyſe rivulets; and the other of which riſes at Goldwell, near Great Chart, in Kent; this alſo receives ſeveral leſſer ſtreams in its progreſs, and is increaſed by the waters of the former branch above Hunton. From Yalding, the Medway flows in a winding direction to Maidſtone, and thence in a wildly devious channel, gradually augmenting in depth and breadth, it purſues its picturesque courſe to Rocheſter. Proceeding hence towards Sheerneſs, it paſſes Chatham, Upnor caſtle, and Gillingham fort; after which it greatly increaſes in width, and ſtill preſerving its meandering character, flows onward to the Thames, which it enters between the iſles of Graine and Shepey, having firſt united its waters to thoſe of the Swale. The Medway and its numerous tributary ſtreams are calculated to overſpread a ſurface of nearly thirty ſquare miles in the very midſt of Kent. The tide flows nearly as high as Madiſtone; but at Rocheſter bridge it is ſtrong and rapid; and below that, all the way to Sheerneſs, a diſtance of about twenty miles, the bed of the river is ſo deep, and the reaches ſo convenient, that many of the largeſt line of battle ſhips are moored here, when out of commiſſion, as in a wet dock, and ride as ſafely as in any harbour of Great Britain. In the great ſtorm of 1703, the Royal Charlotte was driven on ſhore here, and loſt.

The Medway was firſt made navigable to Tunbridge about the middle of the laſt century, under the proviſions of an act of parliament, which paſſed in the year 1740; though an act had been procured for the purpoſe in the reign of Charles II. By the laſt act, the undertakers were incorporated by the ſtyle of "The Proprietors of the Navigation of the River Medway;" and were empowered to raiſe 30,000*l.* to complete the work, in ſhares of 100*l.* each. The trade on this river is very great, and includes a vaſt variety of articles, many of them of the very firſt neceſſity, and which, before the navigation was completed, could only be obtained by a circuitous land-carriage. The river is plentifully ſtored with fiſh of various ſpecies; and was in former times much celebrated for its ſalmon and ſturgeon; the latter, in particular, were ſo abundant, that a conſiderable part of the revenues of the biſhops of Rocheſter were derived from a duty levied on their ſale. They have now in a great meaſure left the river, but are ſtill occaſionally taken of conſiderable bulk. On the Medway, and in the ſeveral creeks and waters belonging to it, within the juriſdiction of the corporation of Rocheſter, is an oyſter-fiſhery; and the mayor and citizens hold a court every year, called the Admiralty court, for regulating this fiſhery, and preventing abuſes in it. The powers of this court have been eſtabliſhed and enforced by two acts of parliament. Haſted's Hiſtory and Antiquities of Kent, 12 vols. 8vo. Beauties of England and Wales, vol. vii. by E. W. Brayley. Ireland's Pictureſque Views on the River Medway, 8vo.

Medway, a poſt-town of America, in Norfolk county, Maſſachuſetts, bounded E. and S. by Charles river, which ſeparates it from Medfield; it has two pariſhes of Congregationaliſts, and contains 1050 inhabitants; 25 miles S.W. of Boſton.

Medway, or *Midway*, a ſettlement in Liberty county, Georgia, formed by emigrants from Dorcheſter, in South Carolina, about the year 1780; 30 miles S. of Savannah.

MEDWI, a town of Sweden, in East Gothland, near the Wetter lake, much frequented on account of a celebrated mineral spring.

MEDZIBOZ, a town of Poland, in Volhynia; 20 miles S. of Constantinow.

MEDZIRON, a town of Persia, in the province of Khorasan; 60 miles E. of Meschud.

MEEADAY, or MEFOHEOUNG-YAY. See CROCODILE *Town*.

MEEKNESS, in *Ethics*, is a virtue which consists in bearing affronts, reproaches, and injuries, with a due composure of mind. Its opposite vice is *revenge*.

MEELAH, in *Geography*, a town of Algiers, in the province of Constantina, supposed to be the Milevum of the ancients, built in the midst of interspersed vallies and mountains, surrounded with gardens, and abundantly supplied with fountains; one of which bubbles up in the centre of the city, and is received into a large square basin of Roman workmanship. Its pomegranates are delicious, and it supplies Constantina with herbs and fruit; its apples are also so good, that the name of the town has been derived from that fruit; 13 miles N.W. of Constantina.

MEEN, ST., a town of France, in the department of the Ille and Vilaine, and chief place of a canton, in the district of Montfort. The place contains 806, and the canton 9905 inhabitants, on a territory of 202½ kiliometres, in 9 communes.

MEENAH EL DSAHAB, a sea-port town of Arabia Petræa, situated on the E. coast of the gulf of Accaba, in the N. part of the Red sea, with a spacious harbour, anciently "Esion-geber;" 50 miles S. of Ailah.

MEENDOR, a town of Hindoostan, in the circar of Condapilly; 18 miles W. of Masulipatam.

MEENEES, a small island in the Sooloo Archipelago. N. lat. 6° 32′. E. long. 121° 35′.

MEENKOOT, a town of Bengal; 14 miles N. of Moorshedabad.

MEER, JOHN VANDER, in *Biography*. There were three painters who bore this name. One was devoted to the study of sea-pieces, but he sometimes painted battles by land, and executed them with very considerable skill. Another was an historical and portrait-painter; but he who best deserves renown, was a disciple of Nicholas Berchem, and succeeded admirably in imitating the style of that master. The subjects he chose were generally rather of a more confined nature than Berchem's, but they are touched with nearly equal clearness and spirit; with more softness and delicacy in their effects. He is known by the name of De Jonghe, or the Young, to distinguish him from the ship-painter, who was called the Old Vander-Meer. De Jonghe died in 1688.

MEER, in *Mining*, a space containing twenty-nine yards in length in any vein.

MEER-*stake*, is a pin of wood drove into the superficies of the earth, to shew the extent or end of a meer of ground.

MEER-*swiin*, in *Ichthyology*, a name given by some to a sea-fish, more usually known by the name of *capriscus*; which see.

MEERBECK, or MELBECK, in *Geography*, a town of France, in the department of the Lys, on a small river which runs into the Mandel; eight miles N. of Courtray.

MEERCASERAI, a town of Bengal, in the province of Chittigong; 31 miles N.W of Islamabad. N. lat. 22° 47′. E. long. 91° 42′.

MEERGUNGE, a town of Bengal; five miles S.E. of Mahmudpour.—Also, a town of Hindoostan, in Benares; 20 miles S.S.W. of Jionpour.—Also, a town of Hindoostan, in Oude; 44 miles E. of Fyzabad.

MEERGUR, a town of Bengal; four miles N. of Dinagepour.

MEERHOLZ, a town of Germany, seated on the Kinzig, giving name to a branch of the house of Isenburg, called Isenburg-Meerholz; 17 miles E. of Frankfort on the Maine.

MEERJAPOUR, a town of Bengal; six miles S. of Nogong.

MEERJASERRA, a town of Bengal; 25 miles N. of Mauldah.

MEERJEE, or MEERZAW, a town of Hindoostan, in Canara, on the coast; 10 miles N. of Onore. N. lat. 14° 28′. E. long. 72° 10′.

MEEROAT, a town of Candahar; 45 miles W. of Ghizni.

MEERPOUR, a town of Bengal; 11 miles S. of Calcutta.

MEERSCHAUM, Werner, *Ecume de Mer*, Broch., and *Keffekil*, Kirwan, in *Mineralogy*, a substance of yellowish-white colour, which occurs in mass, of fine-grained structure, earthy, passing into flat conchoidal, or small slaty, with indeterminately angular, and moderately sharp-edged fragments. This mineral is opaque, soft, easily frangible, acquires a polish by friction, and is unctuous to the touch. Its specific gravity is 1.6. In acids it may be partly dissolved without effervescence, and cannot be fused without addition by the blowpipe. The analyses of Wiegleb and Klaproth give the following results, in which there is a difference, owing to Klaproth's having analysed the fresh earth, and Wiegleb's having examined that which was formed into a tobacco pipe, and consequently baked, and deprived of its water and carbonic acid.

	Wiegleb.	Klaproth.	
Silex -	54.16	50.5	41
Magnesia	51.66	17.25	18.25
Lime -	-	0.5	0.5
Water -	-	25.	39.0
Carbonic acid	-	5.	
	105.82	98.25	98.75

For the uses to which this substance is applied among the Turks, see KEFFEKIL. This latter name is derived from Kaffa, a town of the Crimea, where it is shipped for Constantinople. It is also found in Natolia, and in the islands of Samos and Negropont. When dug from its thin beds, it is soft, and hardens by being exposed to the air.

A similar substance has been discovered by Fabbroni at Castel del Piano, near Sienna. This consists of 55 parts of silex, 25 of magnesia, 12 of alumine, 3 of lime, and 0.1 of oxyd of iron: and has been formed into bricks which float in the water. This manufacture revives one of the lost arts recorded by Strabo and Pliny.

MEERSSEN, in *Geography*, a town of France, in the department of the Lower Meuse, and chief place of a canton, in the district of Maestricht. The place contains 1149, and the canton 11,530 inhabitants, on a territory of 115 kiliometres, in 16 communes.

MEERTA, a town of Hindoostan, in the Subah of Agimere; 42 miles W. of Agimere. N. lat. 26° 23′. E. long. 74° 32′.

MEES, LES, a town of France, in the department of the Lower Alps, and chief place of a canton, in the district of of Digne; 12 miles S.W. of Digne. The place contains 2021, and the canton 6305 inhabitants, on a territory of 37½ kiliometres, in 8 communes.

MEESIA, in *Botany*, a genus of Mosses, established by Hedwig, Fund. v. 2. 97. t. 9. f. 56, 57, and named by him in memory of David Meese, author of the Flora Frisica, an 8vo. of 87 pages, with two plates, published in 1760. This botanist has also published an arrangement of plants, in Latin and Dutch, founded on their cotyledons and mode of germination; and a work on the Syngenesious class of Linnæus. Hedwig celebrates him as having first seen the stamens of the *Polytrichum*, and as being the first person who ever raised that moss from seed. *Meesia* differs from the *Bryum* of Hedwig, solely in the shortness and bluntness of the teeth of its external fringe, which are not half so long as the inner one. The author indeed, in his original species, found an auxiliary character in the reticulated structure of this inner fringe; but this differs only in degree, and that very slightly, from what is observable in every *Bryum*, nor is it found in the other *Meesiæ*. Three species are all that have been referred to this supposed genus, in the latest work of Hedwig, his *Species Muscorum;* and these have been reduced by the author of the *Flora Britannica* and others to *Bryum*. They are

1. M. *longiseta*. Hedw. Crypt. v. 1. 56. t. 21, 22. (Bryum triquetrum; Turn. Musc. Hib. 115. Engl. Bot. t. 2394. Mnium triquetrum; Linn. Sp. Pl. 1578, excluding the synonyms.)—Stem subdivided. Branches simple, erect. Leaves spreading in three rows, ovato-lanceolate, sharp-pointed, finely serrated. Capsule slender pear-shaped, oblique and incurved. Lid conical.—This fine moss, distinguished from all others by the length of its *fruit-stalks*, which extends to three or four inches, is found in bogs in Sweden, Switzerland, and, since the publication of Fl. Brit., in Ireland. Hedwig erroneously describes the *leaves* as entire, notwithstanding the elaborate detail of the two folio plates which he has devoted to this species.

2. M. *uliginosa*. Hedw. Crypt. v. 1. 1. t. 1, 2. (Bryum trichodes; Sm. Fl. Brit. 1350. Engl. Bot. t. 1517.)—Native of bogs in Germany and Scotland. Hedwig says it is common on alpine calcareous rocks in Austria.

3. M. *dealbata*. Hedw. Sp. Musc. 174. t. 41. f. 6—9. (Bryum dealbatum; Sm. Fl. Brit. 1350. Engl. Bot. t. 1571.)—Native of Sweden and Scotland; as well as of St. Faith's bogs, near Norwich. The *leaves* are of a singularly whitish green, finely reticulated.

These two last species are described by the late Mr. Wood, in our article BRYUM, n. 4 and 5. The first was omitted there, not being known at that time as a British plant.

MEETKA, in *Geography*, a country of Africa, W. of Bergoo.

MEFLESS, a town of Bohemia, in the circle of Konigingratz; 14 miles N.E. of Konigingratz.

MEGADOMESTICUS. See DOMESTIC.

MEGÆRA, in *Mythology*, one of the three furies. She is represented with serpents on her head, and two distinguished ones over her forehead, as her sisters have, and, like them, with torches. She is not mentioned so frequently by the Roman poets as the others are. Virgil gives us a descriptive picture of her, where he is speaking of the punishment of the Lapithæ; who were said to be always placed round a table very richly and plentifully set out, with a loose piece of rock hanging over their heads, as just ready to fall; and this fury attending close by, to watch and menace them, the moment they endeavoured to taste any one of the tempting things set before them. En. vi. ver. 607.

MEGAIZEL, in *Geography*, a town of Egypt; six miles N. of Rosetta.

MEGALA, a town of Tunis; 3 miles N.E. of Spaitla.

MEGALARTIA, Μεγαλαρτια, in *Antiquity*, a festival in honour of Ceres, being the same with Thesmophoria.

MEGALASCLEPIA, Μεγαλασκληπεια, a festival in honour of Æsculapius. See ASCLEPIA.

MAGALENSIA, or MEGALESIA, solemn feasts celebrated among the Romans on the twelfth of April, in honour of the great mother of the gods, that is, Cybele or Rhea: wherein were sports or combats held before the temple of that goddess.

They were called *megalensia*, from the Greek μεγαλη, *great*, Cybele being accounted the great goddess.

MEGALONISI, in *Geography*, a small island in the Mediterranean, near the coast of the Morea; two miles E. of Leucadia.

MEGALOPOLIS, in *Ancient Geography*, now *Leontari*, a large city, as its name imports, in the southern part of Arcadia, upon the river Helisson. Pausanias observes, that it was the most modern of the cities of Arcadia, if we except those which had been renewed by Roman colonies, after the victory of Octavius over Antony. It owed its foundation to the counsels and activity of Epaminondas, who in the year 365 B.C., being desirous of keeping the Lacedæmonians in that state of subjection to which they were reduced, induced the Arcadians to establish this city, and to settle in it a numerous colony, collected from different cities, so that it might serve as a fortress and a bulwark against Sparta. To favour them in this enterprize, and to protect them in their labours, he sent them a guard of a thousand chosen men, under the command of Pammenes. The city being thus fortified and defended, the Arcadians confided in its strength and security; and on the other hand their enemies were the more desirous of attacking it. To this object they directed their whole force; but the Megalopolitans for a long time vigorously resisted them. At length, however, *viz.* in the year 224 or 225 B.C. it fell, partly by surprize, and partly by a violation of treaties, under the power of Cleomenes, king of Sparta. The greater number of the inhabitants retired to Messenia, and emboldened by the counsels and example of Philopœmen, they refused the offer made them by Cleomenes, of remaining in their own city, on condition of concurring in the Achæan league. Philopœmen, upon their return to Arcadia, encouraged them to rebuild their city, and to adorn it with temples and magnificent edifices, which restored its former splendour. It is needless to enumerate its temples and statues, and other ornaments. The most considerable monument which the southern part of Megalopolis presented, was the theatre, a building so grand and magnificent, that it even exceeded in extent and beauty all those of Greece. We learn from Polybius that, next to Athens, Megalopolis was the grandest and most splendid city of Greece.

MEGAMETER. See MICROMETER.

MEGARA, in *Ancient Geography*, the capital of the territory of the Megarians, which has been commonly comprised in Attica, bounded eastward by mountains, and extends westward as far as a district of the isthmus of Corinth. Megara, which had previously been called Nisa, derived its name either from Megarius, the surname of Minos, a Bœotian chief, who succeeded the king of Nisa, or from Megara, the name given to ancient temples erected in honour of Ceres, or from Megara, a supposed wife of Hercules. Under the reign of Codrus, the Peloponnesians having declared

clared war againſt the Athenians, and miſcarried in their enterprize, returned and took poſſeſſion of Megara, which they peopled with Corinthians. Beſides two citadels, this city had ſeveral magnificent ſtructures and ornaments; one was an aqueduct, diſtinguiſhed by the grandeur and beauty of its columns, conſtructed by Theagenes, tyrant of Megara; another was a ſtatue of Diana, the protectreſs; to which we may add, the ſtatues of the twelve great gods, attributed to Praxiteles; a group conſecrated to Jupiter Olympius, in which was a ſtatue of this deity, with the face of gold and ivory, and the reſt of the body of burnt earth; and upon the path that led to one of the citadels of Megara, called Caria, were a temple of Bacchus Nyctalus, another of Venus Spiſtrophia, a chapel dedicated to the Night, whence iſſued her oracles; a temple of Jupiter; two ſtatues, one of Æſculapius, and one of Hygeia, executed by Briexis, and a temple of Ceres, called the Megaron; north of the citadel, near the temple of Jupiter the Olympian, was the tomb of Alcmenes, and that of Hyllus, ſon of Hercules; a temple of Apollo and Diana, the tomb of Hippolyta, queen of the Amazons, and the tomb of Therea. Beſides theſe edifices, there were in the ſecond citadel, called the citadel of Alcathous, a tomb of Megareus, and a temple of Minerva, with her ſtatue, the body of which was gilt, and the face, feet, and hands were of ivory, &c. &c. See Pauſanias in Attica, c. 39—44.

Megara was alſo the name of a town on the eaſtern coaſt of Sicily, on the gulf of Megara, otherwiſe called Xiphonius, N. of Syracuſe. This city, which is ſaid to have been built here by the Greeks of Megara, the city of Achaia, (ſee the preceding article,) gave name to the mountain, called "Hybla Megara." This colony, 100 years after its eſtabliſhment, founded Salinus, which was deſtroyed by Marcellus when he beſieged Syracuſe. The ruins of Megara are now ſcarcely diſcernible.

Megara, a town of Illyria.—Alſo, a town of Pontus.—Alſo, a town of Aſia, in Syria, dependent upon Apamæa.—And alſo, a town of Greece, in the Peloponneſus.

Megara, in *Geography*, a town of European Turkey, in the province of Livadia, on the coaſt of the gulf of Engia, once the capital of a republic, now very much reduced; 26 miles W. of Athens.

MEGARBE, a town of Nubia; 9 miles W.S.W. of Maſuah.

MEGARIS, or the Megaride, in *Ancient Geography*, a country of Attica. See Megara *ſupra*.

Megaris, a town of Italy, in Campania, placed by Pliny between Naples and Pauſilipo.

MEGATHERIUM, in *Natural Hiſtory*, a genus of the claſs Mammalia, order Bruta. This is generally known by the name of *mammoth*. It has a near reſemblance to the elephant, but its having never been found alive, nor with its organs in a perfect ſtate after death, its generic character cannot be accurately aſcertained. By ſome accounts from St. Peterſburg, it is ſuppoſed that the animal ſtill exiſts in a living ſtate, though it has hitherto eſcaped the reſearches of modern naturaliſts. Its reſidence appears to have been confined to a line in the northern hemiſphere, extending from Siberia to the banks of the Ohio, and the common name of mammoth was firſt given to the ſkeleton when dug from the earth by a Siberian peaſant. The following is the beſt account we have of this animal: it was received from St. Peterſburg, and relates to a ſpecimen found, though not alive, yet in a complete and almoſt perfect ſtate of preſervation. A Tungooſe chief, in the ſummer of 1799, when the fiſhing in the river Lena was over, repaired, according to annual cuſtom, to the ſea-ſide. Leaving his family in their huts, he coaſted along the ſhore in queſt of the tuſks of the mammoth, when he accidentally perceived, in the midſt of a rock of ice, a large ſhapeleſs block, not at all reſembling the logs of drift wood commonly found there. He climbed the rock, and examined it all round, but could not aſcertain what it was. The next year he returned, and found the carcaſe of a *trichecus roſmarus*, and obſerved that the maſs which he had ſeen before was freer from ice, but that there were two ſimilar pieces by the ſide of it. Theſe proved to be the feet of the mammoth. In 1801, the ſide of the animal and one of its tuſks appearing very diſtinctly, he acquainted his wife and ſome of his friends with what he had found. An alarm was inſtantly ſpread: the aged people affirmed that a ſimilar monſter had been ſeen once before, and that the whole family of the perſon who diſcovered it ſoon became extinct. At firſt the chief, terrified at the report, abandoned his prize, fell ſick, and was brought nearly to the grave; but on his recovery, he was more reſolute, and was determined not to relinquiſh the expectation of the profit he might make of the tuſks. It was not, however, till the fifth year, that the ice had melted ſufficiently to diſengage the mammoth, when it fell over on its ſide on a bank of ſand. The Tungooſe was quite ſatisfied to take away the tuſks, which he bartered for goods to the value of 50 rubles, or rather more than 11*l.* Being ſatisfied with the prize, the carcaſe was left to be devoured by the bears, wolves, and foxes. Previouſly to this he had made a rude drawing of it, which repreſented it as having pointed ears, ſmall eyes, horſe's hoofs, and a briſtly mane extending along the whole back. In 1806, Mr. Michael Adams, of Peterſburg, being at Yakoutſk, heard of the circumſtance, and proceeded to the ſpot, in order to inveſtigate every thing relating to it. Before his arrival, the ſkeleton was ſtripped of its fleſh, but was itſelf entire, with the exception of one fore-foot. The vertebræ, one of the ſhoulder-blades, the pelvis, and the remaining three extremities, were held firmly together by the ligaments of the joints, and by ſtrips of ſkin and fleſh. It received ſome damage in the removal to Peterſburg, a diſtance of almoſt 7000 miles. The ears, however, were preſerved, and the pupil of the left eye was perfectly diſtinguiſhable. From other parts it proved to be a male, with a long mane, but had neither tail nor trunk. From the ſtructure of the os coccygis, Mr. Adams did not entertain a doubt that it had a ſhort thick tail, and he thinks it muſt have had a proboſcis. The ſkin was of a deepiſh grey colour, and covered with reddiſh hair and black briſtles. The head weighed 460lb.; the two horns weigh 400lb.: the entire animal was 10½ feet high, and full ſixteen feet long. Mr. Adams has ſeen the tuſks, and ſays they are ſo curved as to form three-fourths of a circle. They are curved in the direction oppoſite to thoſe of the elephant, bending towards the body of the animal. In 1801, Mr. William Peale, proprietor of the muſæum at Philadelphia, ſucceeded in obtaining a ſkeleton ſo nearly complete, that, by a few additions only, he rendered it, as it were, perfect. This ſkeleton was brought to London, and exhibited eight or nine years ago.

The generic name of *Megatherium* was firſt given to it by M. Cuvier, who has accurately examined the ſkeleton; and to the generic name he added the trivial one of *Americanum*. In Dr. Shaw's Zoology it is deſcribed as a ſpecies of the Manis genus, and is denominated Manis megatherium. According to Cuvier, the ſkeleton which he ſaw at Madrid was twelve feet long, and about ſix in height. The ſpine is compoſed of ſeven vertical, ſixteen dorſal, and four lumbar vertebræ. It has ſixteen ribs; the ſacrum is ſhort, the oſſa ilia very broad. The thigh-bones are exceſſively thick, and the leg-bones ſtill more ſo in proportion. The entire ſole of the

the foot bore on the ground in the act of walking. The shoulder-blade is much broader than long: the fore-limbs are longer than the hind. The head is the greatest singularity of the skeleton. The occiput is elongated and flattened, but is convex above the eyes. The two jaws form a considerable projection, but without cutting teeth, all grinders, with a flat crown, and grooved across.

This quadruped, in its character, differs from all known animals: and each of its bones, considered apart, also differs from the corresponding bones of all known animals. This results from a comparison of the skeleton with that of other animals, for none of the animals which approach it in bulk, have either pointed claws, or a similarly formed head, shoulder-blades, clavicle, pelvis, or limbs. "As to its place in the system of quadrupeds," says the French naturalist, "it is perfectly marked by the sole inspection of the ordinary indicatory characters, that is, the claws and teeth. These shew that it must be classed in the family of unguiculated quadrupeds, destitute of cutting teeth, and in fact it has striking relations with those animals in all parts of its body. This family is composed of the dasypus, bradypus, manis, myrmecophagus, and Cape ant-eater, or oryćteropus. The thickness of the branches of the lower jaw, surpassing even that of the elephant, seems to prove that this vast animal was not content with leaves, but, like the elephant and rhinoceros, broke on the ground the branches themselves; its close and flat-crowned teeth appearing very proper for that purpose." Cuvier thinks there are indications that this animal had a trunk, but that it must have been short, since the length of the head and neck together only equals that of the fore-legs. He places it between the bradypus and the dasypus genera, because to the shape of the head of the former it joins the teeth of the latter. It would be necessary to know particulars, of which a skeleton cannot inform us, in order to determine to which of these it approached the most. "This adds," says Cuvier, "to the numerous facts which apprize us that the animals of the ancient world were all different from those we now see on the earth, for it is scarcely probable that if this animal still existed, so remarkable a species would have hitherto escaped the researches of naturalists. It is also a new and very strong proof of the invincible laws of the subordination of characters, and the justness of the consequences deduced for the classification of organized bodies: and under both these views, it is one of the most valuable discoveries which have for a long time been made in natural history."

MEGE, in *Geography*, a town of Persia, in Farsistan; 10 miles S. of Ispahan.

MEGE'VE, a town of France, in the department of the Leman, and chief place of a canton, in the district of Bonneville. The place contains 3075, and the canton 9951 inhabitants, on a territory of 180 kiliometres, in seven communes.

MEGGIO, a town of Africa, in Fez; nine miles from the Mediterranean.

MEGHARISH Uzzur, or Acra, a town of Arabia, in the province of Hedsjas; 85 miles E.S.E. of Madian.

MEGHEM, or Megen, a town of Brabant, on the Meuse; 12 miles S. of Nimeguen.

MEGNITZESC, a town of Sclavonia; 18 miles W.S.W. of Verovitza.

MEGRA, a town of Russia, in the government of Archangel, on the E. coast of the White sea; 72 miles N. of Archangel.

MEGUNTICK, a lake of Canada, on the borders of Maine. N. lat. 45° 44'. W. long. 70° 25'.

MEHALLE' el Kebiré, a town of Egypt, capital of Garbia, the second province of the Delta, and the residence of a bey. As there is no town more considerable in the Delta, it is called Kebira the Great. It has manufactories of linen and some sal ammoniac works. A great deal of business is done there. The rivers which surround it serve for the conveyance of its merchandize through Egypt. Its environs are covered with villages, flocks, and the various productions of a fertile soil; 47 miles N. of Cairo. N. lat. 30° 50'. E. long. 31° 24'.

MEHALLEBEG, a town of Persia, in the province of Irak; 25 miles S.E. of Rai.

MEHALLET il Emir, a town of Egypt, on the Nile; six miles S.E. of Rosetta. N. lat. 30° 50'. E. long. 30° 24'.

Mehallet *il Loben*, a town of Egypt; 16 miles S. of Faoué.

Mehallet *Malek*, a town of Egypt; five miles S. of Faoué.

Mehallet *il Meshak*, a town of Egypt; five miles N.N.E. of Tineh.

MEHAMA, one of the smaller Friendly islands, in the Pacific ocean; four miles E. of Neeneeva.

ME'HE'GAN, William Alexander, in *Biography*, was born at la Salle, in the Cevennes, in the year 1721, of a family originally from Ireland, which had followed the fortunes of James II. He was prevented from adopting the profession of arms, in which his family had been distinguished, by ill health, and cultivated the belles lettres, attaching himself particularly to the study of eloquence. When Frederic V. king of Denmark founded, in the year 1751, a professorship of the French language, M. de Mèhègan composed a discourse which was pronounced at the opening of the lectures in Copenhagen. In the following year he published a work entitled "L'Origine des Guebres; ou la Réligion naturelle mise en Action," which was looked upon as breathing the spirit of modern philosophy. This was followed at distant intervals by "Considerations sur les Révolutions des Arts;" "Pièces fugitives;" "Mémoires de la Marquise de Terville;" "Lettres d'Aspasie," and in 1759 "L'Origine, le Progrès, et la Dècadence de l'Idolatrie." He died in 1766, and after that event, was published, as a posthumous work of M. Mèhègan, "Tableau de l'Histoire moderne," in three vols. 12mo. This is highly esteemed on account of the warmth and eloquence of the style, and the generally impartial and philosophical spirit by which it is animated. The history commences with the year 476, and concludes with the peace of Westphalia in 1648. "It is," says his biographer, "full of picture and portrait, upon which he sometimes throws too strong a glare of colouring; he has, however, succeeded in making his work much more interesting than abridgments usually are, and at the same time has judiciously selected the points of instruction." There is an English translation of it. In 1767 was published another posthumous work of this author, entitled "L'Histoire considerée vis-à-vis la Réligion, les Beaux-Arts, et l'Etat," in three volumes 12mo. Gen. Biog.

MEHEM, in *Geography*, a town of Hindoostan, in the subah of Delhi; 27 miles W.S.W. of Rodak.

MEHERRIN, a town of America, in North Carolina; 25 miles E. of Halifax.—Also, a river of Virginia, which runs into the Chouan, 20 miles N.W. of Hartford, in N. Carolina.

MEHINDEY, a river of Hindoostan, which runs into the gulf of Caubay, about 40 miles S. of Amedabad.

MEHITPOUR, a town of Hindoostan, in Lahore; 45 miles S.E. of Sultanpour.

MEHRIBAN, a town of Curdistan; 22 miles S.E. of Sherezur.

MEHUN, a town of France, in the department of the Cher, and chief place of a canton, in the district of Bourges, situated on the Eure; seven miles N.W. of Bourges. The place contains 1267, and the canton 7064 inhabitants, on a territory of 287⅓ kiliometres, in 12 communes. Charles VII. had a palace in this town, where he resided, and starved himself to death for fear of being poisoned by his son Louis XI. N. lat. 47° 9′. E. long. 2° 18′.

Mehun, a small island in the straits of Babelmandeb. N. lat. 12° 20′.

MEHUNTPOUR, a town of Hindoostan, in the circar of Chanderee; 16 miles N.W. of Chanderee.

MEI, Girolamo, in *Biography*, a Florentine nobleman, mathematician, philosopher, and theoretical musician, who flourished in the latter end of the sixteenth century. Battista Doni, in his "Trattato secondo sopra gl'Instrumenti di Tasti," or keyed instruments, says, that in the beginning of his musical studies, his partiality for the music of the ancients was greatly increased by the perusal of the dialogue of Galilei, in which Mei had the greater part (dove il Mei ebbe la meggior parte), and still more by a treatise written by this learned personage (Mei) "De Modis Musicæ," a MS. presented to the Vatican library by Monsig. Guarengo. Op. Om. t. i. p. 324. Doni has supported this assertion by no proof; but in the Vatican library, among the queen of Sweden's MSS. there is a volume of inedited tracts and letters, written by Girolamo Mei, upon the music of the ancients, in which are discoverable, not only opinions similar to those of Galilei, but frequently the words in which they are expressed in his dialogue; particularly in a letter from Mei, dated Rome, 1572, in answer to two that he had received from Galilei, in which he seems to have been consulted concerning the usual difficulties which those have to encounter who undertake to discuss the music of the ancients. We procured a copy of this letter entire, and considerable extracts from the other writings of Mei, which indeed contain the whole substance of Galilei's dialogue, except what concerns the controversy with Zarlino relative to the musical scales and proportions of the ancients.

Mei *Misere*. See Miserere.

MEIA Sarekin, in *Geography*, a town of Asiatic Turkey, in the government of Diarbekir; 30 miles E.N.E. of Diarbekir. N. lat. 38° 5′. E. long. 39° 55′.

MEIANE, a town of Persia, in the province of Comis; 18 miles S.S.E. of Bistan.

MEIANO, a town of Italy, in the department of the Mela; 12 miles S.S.W. of Brescia.

MEIAS-Farekin, a town of Asiatic Turkey, in the province of Diarbekir; 25 miles N.E. of Diarbekir.

MEIBOMIA, in *Botany*, a genus of Heister's, named after Brandanus Meibom, professor of medicine at Helmstadt, who died in 1740, aged 62, but who is not recorded as having written any botanical work. The plant on which Heister founded his genus is *Hedysarum canadense* of Linnæus. We do not find that he has given any other character, than enumerating it among papilionaceous genera with ternate leaves; see Heist. syst. 9.

There was another professor Meibom at Helmstadt, who wrote upon beer, *de cerevisiis potibusque et ebriaminibus extra vinum aliis commentarius*, and died in 1655, aged 65. Dryandr. Bibl. Banks.

MEIBOMIAN Glands, in *Anatomy*, very small round bodies, arranged in parallel vertical lines on the inner surface of the tarsi of the eyelids, and secreting an unctuous substance, which is poured from their ducts on the ciliary edges of the palpebræ, and prevents their agglutination. See Eye.

MEIBOMIUS, John Henry, in *Biography*, a learned physician, was born at Helmstadt, in August 1590. He spent a considerable time on his travels in Italy, for the purposes of improvement in science and literature; and, having given his attention to medicine, in which he made great progress, he went ultimately to Basle, in 1619, where he was honoured with the degree of doctor of physic. On his return to his native place, his character obtained for him, in 1620, the appointment of professor of medicine from the faculty of that university; and he continued in the office about six years, when he removed to Lubeck, where he had been chosen physician to the city, and to its bishop. Here he passed the rest of his life, which terminated in May 1655, in his sixty-fifth year. In the latter period of his life, he employed himself chiefly in the investigation of medical history, and left a manuscript to his son, entitled "De Vitis Medicorum usque ad seculum xv;" but this work was never printed. The following are the whole of his published works, the two last of which appeared after his death. 1. "Hippocratis Orkos, sive Commentarius in Hippocratis jusjurandum," Lugd. Bat. 1643, 4to. 2. "De Flagrorum usu in re venerea," ibid. 1643, which was reprinted at London, Copenhagen, and Francfort. 3. "Epistola de Cynophoria, seu, Canis portatione ignominiosâ," Helmstadt, 1645. 4. "De Mithridatio et Theriaca Discursus," Lubec. 1652, 1659. 5. "Mæcenas, sive, de C. D. Mæcenatis vitâ, moribus, et gestis, Liber singularis," Lug. Bat. 1653. 6. "De Cerevisiis, Potibusque et Ebriaminibus extra Vinum aliis, Commentarius," Helmstadt, 1668, published together with the treatise of Adrian Turnebus, "De Vino;" and 7. "Aurelii Cassiodori Formula Comitis Archiatrorum," ibid. 1668; which is a commentary on the 19th epistle of the 6th book of Cassiodorus. Eloy Dict. Hist.

Meibomius, Henry, son of the preceding, was born at Lubeck, in June 1638. After having gone through various courses of study at Helmstadt, and in different Dutch universities, he travelled into Italy and France, and took his doctor's degree at Angers, in 1663. He then continued his travels into England, whence he returned to Germany. His father's name was still held in estimation at Helmstadt, and his own talents and acquirements gained him considerable respect, so that he was soon enrolled among the professors of that university; in which he held successively the chairs of medicine, poetry, and history; the last of which he retained at the time of his death, in March 1700, when he had reached his sixty-second year. Occupied as he ever was in the practice of his profession, and in his academical labours, he nevertheless found leisure to write several works, and also to superintend the publication of the writings of others. His first dissertation, "De Incubatione in Fanis Deorum, Medicinæ causâ, olim factâ," was published at Helmstadt, in 1659. It contained a history of the priest-medicine of ancient times, and of the various ceremonies, offerings, and sacrifices, instituted in different Pagan temples, in conducting this practice. He edited a treatise of Arnold de Boot, which had been published in London, in 1649, entitled "Observationes Medicæ de Affectibus omissis;" with a preface, and many valuable notes, ibid. 1664. He also published "De Vasis Palpebrarum novis, Epistola ad Joëlem Langelottum," ibid. 1666. "De Ossium contusione Disputatio," ibid. 1668; and several other small dissertations, which evinced his great knowledge of the animal economy, and its disorders. He seems to have contemplated a history of medicine, and printed, "De Medicorum Historiâ scribendâ, Epistola ad G. H. Velschium," ibid. 1669; but the difficulties

culties which he met with in investigating the medicine of the Arabians arrested his progress, and deterred him from publishing the work left him by his father. He published, however, the following: "Parentatio I. Danielis Schmidt," Dantisci, 1687. "Ad Saxonicæ Inferioris Historiam Introductio," Helmstadt, 1687. "Scriptores Rerum Germanicarum," ibid. 1688, in two vols. folio; and he edited Valentin. Hen. Vogler's "Introductio universalis in notitiam cujuscumque generis bonorum scriptorum," ibid. 1700, with additions.

Some other individuals of the family of MEIBOMIUS were professors at Helmstadt; especially *Henry*, the grandfather of the preceding Henry, who published several works; *Mark*, whose studies were entirely confined to history and the belles-lettres; and *Brandus*, who taught medicine, and published several academical dissertations, about 1730. Eloy Dict. Hist. de Med.

MEIBOMIUS, MARCUS, a writer of great erudition, particularly in the music of the ancient Greeks, was descended from a very learned family at Helmstadt, who successively practised physic in that city, with great reputation.

Marcus Meibomius was born about 1611, and in 1652 he published from the Elzevir press, in two volumes 4to. dedicated to Christina, queen of Sweden, the following work: "Antiquæ Musicæ auctores septem Græce et Latine, Marcus Meibomius restituit ac Notis explicavit. Amstel. apud Lud. Elzivirium, clↄ. lx. lii." The first volume contains:

I. Aristoxeni Harmonicorum Elementorum, libri iii.
II. Euclidis Introductio Harmonica.
III. Nichomachi Geraseni, Pythagorici, Harmonius Manuele.
IV. Alypii Introductio Musica.
V. Gaudentii, Philosophi Introductio Harmonica.
VI. Bacchii Senioris Introductio Artis Musicæ.

The second volume.

Aristidis Quintiliani de Musica, libri iii.
Martiani Capellæ de Musica, liber ix.

Meibomius, after this learned and elegant publication, was invited to the court of the queen of Sweden, which invitation he accepted.

Having, by his enthusiastic account of the music of the ancients, impressed this princess with similar ideas, the younger Bourdelot, a physician, and his rival (as a classical scholar) in the queen's favour, instigated her majesty to desire him to sing an ancient Grecian air, while Naudet, an old Frenchman, danced *à la Grec* to the sound of his voice. But the performance, instead of exciting admiration, produced loud bursts of laughter from all present; which so enraged Meibomius, that seeing the buffoon Bourdelot in the gallery among the scoffers, and having no doubt but that it was he who, with a malicious design, had persuaded her majesty to desire this performance, immediately flew thither, and exercised the pugilist's art on his face so violently, without being restrained by the presence of the queen, that he thought it necessary to quit the Swedish dominions before he could be called to an account for his rashness; and immediately went to Copenhagen, where, being well received, he fixed his residence there, and became a professor at Sora, a Danish college for the instruction of the young nobility; here too he was honoured with the title of aulic counsellor, and soon after was called to Elsineur, and advanced to the dignity of Architesorié, or president of the board of maritime taxes or customs; but neglecting the duty of his office, he was dismissed, and upon that disgrace quitted Denmark.

Soon after he settled at Amsterdam, and became professor of history in the college of that city; but refusing to give instructions to the son of a burgomaster, alleging that he was not accustomed to instruct boys in the elements of knowledge, but to finish students arrived at maturity in their studies; he was dismissed from that station.

After quitting Amsterdam, he visited France and England; then returning to Holland, he led a studious and private life at Amsterdam till 1710 or 1711, when he died at near 90 years of age.

Besides the seven Greek writers on ancient music, Meibomius published an edition of the Greek mythologists; a treatise de Fabrica Triremium; a new edition of Vitruvius, with a commentary on the *Echeia*, or harmonic vases, described book 5; correcting, for a new edition, the Hebrew bible. This daring work appeared at Amsterdam, 1698, in folio, under the title "Davidis Psalmi, et totidem sacræ scripturæ veteris Testamenti capita—restituta, &c."

The most solid and celebrated of his critical works is his edition of the seven Greek writers on ancient music, in which all subsequent writers on the subject of ancient music place implicit faith. It is from the indefatigable and learned labours of Meibomius, in his commentaries on the Greek writers in music, particularly Alypius, that we are able to fancy we can decipher the musical characters used by the ancient Greeks in their notation; which, before his time, had been so altered, corrupted, disfigured, and confounded, by the ignorance or negligence of the transcribers of ancient MSS., that they were rendered wholly unintelligible.

MEICHE, in *Geography*, a town of France, in the department of the Doubs, and chief place of a canton, in the district of St. Hippolyte. The place contains 690, and the canton 7864 inhabitants, on a territory of $222\frac{1}{2}$ kiliometres, in 31 communes.

MEIDAN, a town of Persian Armenia; 100 miles N.E. of Erivan.

MEIDANS, in the *Eastern Nations*, are a sort of country-seats, where the greater people have often summer-houses, to which they retire on the three days of the week in which they do not attend the pasha's divan, and where they divert themselves with seeing their slaves ride, shoot, and throw the dart, while they are regaling with their pipe and coffee.

MEIDOBRIGA, in *Ancient Geography*, a town of Hispania, in Lusitania, S.W. of Nuba Cæsarea. It was formerly a powerful city; and its inhabitants were called Plumbarii, on account of the mines of lead which were found in its vicinity. Some traces of it have been discovered in a place called Armenha. South of this town was a chain of mountains, denominated "Mons Herminius."

MEIDON, or MEIDUN, in *Geography*, a town of Egypt, at some distance from the left bank of the Nile, near which is the most southerly of the pyramids; it is thought to occupy the scite of the ancient Nilopolis; 32 miles S. of Cairo.

MEJEDDAH, a town of Algiers, on the Shellif; five miles N.E. of Seedy-Abid.

MEJERDAH, or MAI-SEAR-DA, a sea-port town of Algiers, in the province of Tremecen, consisting of meanly-constructed cottages. From this place a great quantity of corn is exported to Europe; 42 miles W. of Tremecen. N. lat. 35° 8'. W. long. 1° 35'.

MEJERDAH, a river of Africa, formed by the union of the Sujerass and the Serrat, on the borders of Algiers; after traversing the country from W. to E. it runs into the Mediterranean at Porto Farina. It pursues a winding course through a country, which it contributes to fertilize, and in this respect, as well as by its encroachments on the sea, it resembles

resembles the Nile. This river was anciently called "Bagrada," or "Brada." See Bagrada.

MEILAN, a town of European Turkey, in Natolia; 18 miles W.N.W. of Kiangari.

MEILHAN, a town of France, in the department of the Lot and Garonne, and chief place of a canton, in the district of Marmande; six miles W.N.W. of Marmande. The place contains 2414, and the canton 9552 inhabitants, on a territory of 170 kiliometres, in 10 communes.

MEILHUYS, a town of Norway, in the government of Drontheim; 14 miles S.W. of Drontheim.

MEIMARG, a town of Grand Bucharia; 36 miles S.E. of *Bokhara*; which see.

MEIMEND, a town of Persia, in Segestan; 40 miles W. of Candahar. N. lat. 33° 5'. E. long. 65° 45'.

MEINAM, signifying the "Mother of Waters," a large river of Siam. According to Loubere, this river, when it enters the dominions of Siam, is so small that it can only convey small boats, scarcely sufficient for carrying above four or five persons. It is afterwards very much augmented, at the town of Lancocevan, by another considerable river from the north, of the same name, or rather by the reunion of a branch of the same river. Loubere's account of the smallness of the stream has been doubted, and it has been suggested, that it was only obstructed in its course by rapids or cataracts. When we advert to the regular inundations, similar to those of the Nile and Ganges, which are rivers of long course, and other circumstances, we may infer that the Meinam is of a more distant and higher origin than the mountains of Yunnan in the west of China; and that the Thibetian Alps furnish its source in that of the Nou Kian of the Lamas, supposed to be the Thaluan or river of Martaban, which has no Delta, nor any marks of so distant an origin, but is represented by Loubere and d'Anville as a short and insignificant stream. The Meinam is celebrated among the oriental rivers. Kæmpfer says, that it is very deep and rapid, always full, and larger than the Elbe. He adds, that the inhabitants suppose its source to be in the mountains, which give rise to the Ganges, and that it branches through Cambodia and Pegu; an account somewhat confirmed by the discovery of the river Anau, which connects the Meinam with the rivers of Cambodia. The inundations are in September, after the snows have melted in the northern mountains, and the rainy season has commenced. In December the waters decline, and by degrees sink to their former level. The same intelligent traveller informs us, that the water in the earth swells before the river rises; that the wells are nitrous, but the water of the Meinam, though muddy, is pleasant and salutary; that the inundations are chiefly discernible towards the centre of the kingdom, not near the sea; that the rice is reaped in boats, and the straw left in the water; that a festival is celebrated in December, when the wind begins to blow from the north, and the inundation abates. The banks of the Meinam are generally low and marshy, but thickly peopled from Yuthia to Bankok, below which are wild desarts like the Sunderbunde of the Ganges. Monkies, fire-flies, and moskitoes swarm on the fertile shores. Pinkerton.

MEINART, a town of Germany, in the county of Hohenlohe; 7 miles S.E. of Ohringen.

MEINAU, an island in the N.W. part of the lake of Constance, with a commandery of the Teutonic order; about three miles in circumference. In 1805 it was added to Baden, once so celebrated for its wine; 14 miles N. of Constance.

MEINOR. See Mainour.

MEINUNGEN, in *Geography*, a town of Germany, in the county of Henneberg, belonging to the prince of Saxe-Weimar, situated amidst mountains, on the river Werra; 21 miles N. of Schweinfurt. N. lat. 50° 37'. E. long. 10° 40'.

MEIONITE; *Hyacinthe blanche de Somma*, Romé de l'Isle; *Hyacinthine*, Delameth.

The colour of this mineral is a greyish-white.

It occurs seldom massive; generally in prismatic crystals, the primitive form of which is a rectangular prism with square bases. The principal modifications are

The rectangular four-sided prism, acuminated by four planes placed on the lateral edges.

The preceding with lateral edges truncated (*dioctaèdre*, Haüy, fig. 76.) The truncating planes are often seen on two opposite edges only.

The same, but with lateral edges bevilled, and the bevilment again truncated; the edges formed by the lateral ... acuminating planes likewise replaced by a plane, (*soustractif*, Haüy, fig. 77.)

Often one of the acuminating planes increases at the expence of the others which sometimes entirely disappear.

The crystals are small, seldom middle-sized, closely grouped together. They are splendent, with a vitreous lustre, especially when viewed in the direction of the longitudinal fracture.

Longitudinal fracture foliated, the folia parallel with the four sides of the prism; cross fracture conchoidal: the former is indicated by fissures observable in the interior.

It is semi-transparent passing into transparent.

It is hard, scratching glass.

Before the blowpipe it effervesces, and easily melts into a spongy white glass.

We are still without an analysis of this substance.

Meïonite is found at Capo di Bove, near Rome, in basalt with melilite, augite, leucite; and on Monte Somma, among the volcanic ejections of Vesuvius, with calcareous spar or granular limestone.

This mineral substance was first discovered by Romé de l'Isle, who considered it as a variety of Vesuvian; Haüy afterwards found it to be a distinct species, to which he gave the name it now bears, and which has been also adopted by Werner, who at first considered it as a variety of feldspar.

From mesotype-zeolite, with which it might be confounded at first view, the meïonite differs in not forming a jelly with nitric acid.

MEIOSIS, in *Rhetoric*, is a figure, which is a species of the hyperbole.

MEIRONNES, in *Geography*, a town of France, in the department of the Lower Alps, and chief place of a canton, in the district of Barcelonnette. The place contains 554, and the canton 3252 inhabitants, on a territory of 335 kiliometres, in three communes.

MEISENHEIM, a town of France, in the department of the Sarre, and chief place of a canton, in the district of Birkenfeld. The place contains 1730, and the canton 7512 inhabitants, in 21 communes.

MEISNER, Balthasar, in *Biography*, an eminent German Lutheran divine, was born in Saxony in the year 1587. At the age of fifteen he was sent to pursue his academical studies at the university of Wittemberg, where he took his degree of M.A., and acquired much reputation by his diligence and talents. He studied also at the universities of Strasburg, Tubingen, and Giessen; but in 1611 he returned to Wittemberg, and was appointed professor of moral philosophy, and in 1614 he was elected to the theological chair, which he filled with great success during the remainder

 of

of his life. He died in 1626, leaving behind him works that bear witness to his learning and zeal, of which we may notice "Commentarius in Hoseam:" "Meditationes Sacræ in Evangelia:" "Anthropologia Sacra," in two vols. quarto, and "Philosophia Sobria, hoc est, consideratio Questionum Philosophicarum," in three vols. quarto.

MEISSANG, in *Geography*, a town of Africa, in Kaarta; 52 miles E. of Kemmoo.

MEISSAU, a town of Austria; 34 miles N.W. of Vienna.

MEISSEN, *Margraviate of*, a principality of Saxony, founded in the 10th century, and united in 1422 to the electorate of Saxony. Its boundaries have been various at different periods.

MEISSEN, a city of Saxony, capital of the margraviate above-mentioned, situated on the Elbe, at its confluence with the Meisse, whence its name. Out of several jurisdictions that formerly belonged to this town arose the four prefecturates of Meissen, to which pertain several villages. In the centre of the old citadel, the other parts of which are in a ruined state, is the part called "Albretschsburg," in which is carried on the celebrated manufacture of the excellent Misnian porcelain. At this place is also a manufacture of cloth. The first foundation of this town was begun by king Henry I. about the year 930; 14 miles N.W. of Dresden. N. lat. 51° 19′. E. long. 13° 27′.

MEKAM ALI, a town of the Arabian Irak, on the Euphrates, opposite to Bassora.

MEKAM *ul Kidr*, a town of the Arabian Irak, on the Euphrates; 26 miles S.S.E. of Hellah.

MEKARA, a name of the Hindoo goddess *Parvati*, which see.

MEKEHOAN, in *Geography*, a town of Arabia, in the province of Oman, on the Persian gulf; 45 miles W.S.W. of Julfa.

MEKELBURG, a town of Prussia, in the province of Bartenland; 12 miles S.S.E. of Bartenstein.

MEKES, a town of Curdistan; 30 miles S.S.E. of Betlis.

MEKKIAS, signifying measure, a name given to the Nilometer, situated on an island in the front of old Cairo, about 500 yards in breadth. It is there, in front, that upon the graduations of a pillar the rise of the river is measured, and from the observations made upon it, public cryers go about the streets of Cairo, proclaiming the successive heights of the water, in which are centered all hopes of fertility and abundance. This Nilometer is said to have been built by the Arabs. The island on which it stands is called "Roudda," or gardens, because it is laid out in gardens, and inhabited only by gardeners. See NILOMETER.

MEKLAF AL ASFAT, a town of Arabia, in Yemen; 75 miles N. of Hasec.

MEKZARA, a country of Africa, on the S. side of the Niger, between Cashna and Melli.

MEL, GAUDIO, FIAMINGO, in *Biography*, a Flemish musician, by whom the Italians have been generally understood to mean Claude Goudimel, a native of Franche Compté, and a Hugonot, who was one of the first composers of music to the French translation of the psalms by Clement Marot and Theodore Beza; and who was murdered at Lyons in 1572, on the fatal day of the massacre of Paris.

There are certain difficulties in this account, of which we shall speak further elsewhere. See PALESTRINA.

MEL, in *Geography*, a town of Italy, in the Trevisan; 12 miles N.W. of Ceneda.—Also, a small island in the Atlantic, near the coast of Africa. N. lat. 13° 15′.

MEL. See HONEY.

MEL *Cedrinum*, in the *Materia Medica of the Ancients*, a term used to express a sort of liquid manna, used rather as a pleasant sweet in foods than as a medicine, and which seems to have been the same with the *mel roscidum* of Galen, and with the liquid manna of mount Sinai; that mountain having been the place where it was annually collected in large quantities even in Galen's time; and the account Bellonius gives of the manner of collecting it in his time, agreeing very well with what Galen has left about it. It is, however, an error in Bellonius, to suppose this to be the *terenjabin* of the Arabians, that being evidently a solid, not a liquid substance, and being from all accounts the same with what is now called *manna Persicum*, or Persian manna.

The mel cedrinum is a term used only by Hippocrates for this substance, and seems so odd, that many are apt to believe there is an error of the text, and that the author never meant any such thing. Foesius is of opinion, that these ought to be read as two distinct names, with a comma between them, and that the author only meant by them two substances very well known in his time, which were common honey, and the liquid substance called *cedrinum*, or *cedria*.

MEL *Roscidum*, a name given to a kind of liquid manna collected in their time, as it is at present, in considerable quantities, on mount Sinai. The monks who collect it call it *terenjabin*, after the name of a kind of manna, common among the Arabians. But this is an error, the terenjabin of those authors not being a liquid manna, but the small round kind, collected from the *alhagi maurorum*, and now called *manna Persicum*. It does not appear that the *mel roscidum*, or any other species of manna, was used in medicine by the ancients; this was esteemed a curiosity, rather than a thing of any use, by Galen; and other authors say, it was sweeter than honey itself, with no farther account; whence it seems rather to have been used as a delicacy than as a medicine. See TERENJABIN, and MANNA *Persicum*.

MELA, POMPONIUS, in *Biography*, an ancient geographical writer, was a native of Spain, and flourished A.D. 45. His great work, entitled "De Situ Orbis," divided into three books, is written with elegance, great perspicuity, and brevity. The best editions are those of Gronovius 1722, and Reinhold in 1761. Vossius gave an edition of it with copious notes. In the last edition by Gronovius are added five books "De Geographia," written by some later writer.

MELA, in *Geography*, a department of Italy, deriving its name from a river which rises on the confines of the Trenton, and after crossing the Bressan, runs into the Oglio, near Ustiano. The department is composed of part of the Bressan, and has a population of about 190,689 inhabitants, who elect 15 deputies.

MELA. See MEELAH.

MELA, a river of the Morea, which runs into the sea; 8 miles S.W. of Patras.

MELA, a surgeon's instrument, called also speculum, and by the vulgar a probe.

Its use is to probe ulcers, or draw a stone out of the penis; its form is various, according to the use it is intended for.

MELADA, in *Geography*, a small island in the Adriatic, a little to the N. of Isola Grossa. N. lat. 44° 35′. E. long 15° 56′.

MELÆNA, in *Medicine*, μελαινα νοσος in the language of Hippocrates (see his book περι νουσων, sect. 5. book ii. edit. Foës.) a disease characterized by a discharge of black matter by stool.

This affection sometimes occurs together with *hæmatemesis*, or vomiting of blood, and sometimes without that symptom. The ancients considered that the black matter thrown off by by the bowels, was that modification of bilious matter which they denominated *black bile:* but recent observation has ascertained that it consists principally of blood, in a grumous or semi-coagulated state, which is poured out slowly from the vessels of the inner coat of the intestines. It is observed generally to be connected with obstruction or congestion of some of the abdominal viscera, as of the liver, spleen, or mesentery. Great debility, and frequent fainting accompany the disease; the pulse is often quickened, though but moderately; and other symptoms of fever are seldom urgent. There is commonly severe pain in the stomach and abdomen, with loss of appetite, nausea or vomiting, head-ache, and other signs of derangement of the digestive organs.

Gentle purgatives and clysters have been recommended for this complaint from the time of Hippocrates downwards: and they are as beneficial in this affection, as in the hæmatemesis, to which it bears much affinity. (See HÆMATEMESIS.) Dr. Home employed the diluted sulphuric acid, in addition to laxatives, and, as he believed, with considerable advantage. Emetics he justly deems useless, if not injurious, and shunned the use of opium, as tending to shut up the matter that nature was carrying off. Opiates, however, combined with gentle cathartics, tend rather to aid the operation of the latter, by removing the spasmodic constrictions which take place in the bowels, and thus also afford material relief to the pains. See Home, Clinical Experiments, sect. 7.—Also Hoffman, Med. Rat. Syst. tom. iv. part. ii. sect. 1. cap. 3. Morgagni de Sed. et Causis Morbor. epist. xxx. art. 17. Sauvages, class ix. gen. 11. Portal, Mem. sur plusieurs Maladies, tom. ii. p. 129.

MELAGGE, in *Geography*, a river which rises in Algiers, formed by the union of several streams; which, in its course, takes the name of "Sarratt," and runs into the Mejerda, on the borders of Tunis.

MELAIPOUR, a town of Hindoostan, in the circar of Schaurunpour; 20 miles E.N.E. of Schaurunpour.

MELALEUCA, in *Botany*, from μελας, *black*, and λευκος, *white*, a very fine exotic genus of trees and shrubs, so named by Linnæus, because the principal, and indeed original, species was called *Leucadendron*, and *Arbor alba;* words synonimous with its appellation in the Malay tongue, *Caju-puti*, or White Tree. We know not why the idea of black was associated with white in the above name. Linn. Mant. 14. Sm. Tr. of Linn. Soc. v. 3. 273. Schreb. 332, excluding the synonyms. Willd. Sp. Pl. v. 3. 1428. Mart. Mill. Dict. v. 3. Juss. 323. Lamarck Illustr. t. 641. Gærtn. t. 35.—Class and order, *Polyadelphia Icosandria.* Nat. Ord. *Hesperideæ*, Linn. *Myrti*, Juss.

Gen. Ch. *Cal.* Perianth superior, of one leaf, turbinate, in five deep, roundish, often coloured, equal segments. *Cor.* Petals five, roundish, inserted into the rim of the calyx, between its segments. *Stam.* Filaments very numerous, in five sets, inserted into the calyx, either opposite to, or alternate with, the petals, various in length and structure; anthers roundish, incumbent. *Pist.* Germen inferior, nearly globular; style thread-shaped, declining, shorter than the stamens; stigma obtuse. *Peric.* Capsule globose, coated, of three cells and three valves, the partitions from the centre of each valve. *Seeds* numerous, minute, angular.

Eff. Ch. Calyx superior, in five deep segments. Petals five. Stamens numerous, very long, in five parcels. Style one. Capsule of three cells.

A fine genus of aromatic trees and shrubs, with lateral inflorescence, and simple entire leaves, all, except the first species, the produce of New Holland. This genus was confounded by the younger Linnæus, the two Forsters, Schreber, and many other botanists, whom Jussieu seemed disposed to follow, with three other genera; see FABRICIA, LEPTOSPERMUM, and METROSIDEROS. From the two first it is clearly distinguished, as their characters will shew; from the last it differs merely in having the stamens assembled in five sets, not simply icosandrous; the habits of these two genera, and every part of their fructification, except the stamens, being alike. How very different the form of the filaments is in different species of *Melaleuca*, will appear by their descriptions; some being united to a great extent, others but slightly; some in a pinnate, others in a palmate manner; all which being considered, their union at all seems to afford but an artificial character. This however is a sufficiently clear, and, both genera being numerous, a very commodious distinction.

Eleven species of *Melaleuca* are described, by the writer of this article, in the third volume of the Linnæan Society's Transactions, and one in the sixth. These are all adopted by Willdenow. We shall here make some addition to the number, and Mr. Brown, in the second volume of his Prodromus, will probably increase it much more. The whole are distributed into two sections.

* *Leaves alternate.*

1. M. *Leucadendron.* Greater Cajeput Tree. Linn. Mant. 105. Suppl. 342, α. Sm. Tr. of Linn. Soc. v. 3. 274. (Myrtus Leucadendra; Linn. Sp. Pl. 676. Arbor alba; Rumph. Amboin. v. 2. 72. t. 16.)—Leaves alternate, lanceolate, pointed, obliquely falcate, five-ribbed. Footstalks, young branches, and germen, smooth.—Native of some parts of the East Indies, especially the Molucca islands, Ceram and Amboyna, growing in hilly places, flowering from January to March, and ripening fruit from August to November; but according to Rumphius, it is rarely propagated by seed. This is described by that accurate writer, as a large *tree*, as thick as a man's body, or much thicker, with many irregular widely spreading *branches*, but not of a lofty growth. *Leaves* scattered, on short smooth *footstalks*, lanceolate, entire, smooth, tapering at each end, but most at the extremity, curved laterally into a sickle shape, from five to eight inches long, scarcely an inch broad in the widest part, furnished with five principal ribs, connected by intermediate interbranching veins. *Stipulas* none. *Flowers* white, in long, loose, somewhat whorled spikes, whose smooth common stalk terminates in a leaf-bud, and becomes a branch. The bundles of *stamens* are $\frac{3}{4}$ths of an inch long, and each divided nearly to the base. *Germen* scarcely so large as a hemp-seed, globose, smooth, quite sessile, the *capsules* remaining long firmly fixed to the branch, surmounted by leaves, after the seeds have fallen out, as is common to the whole genus. Rumphius speaks much of the resinous and aromatic properties of this tree, its whitish or grey aspect, and its agreeable shade. The wood is hard and heavy, but easily splits and soon decays, being neither beautiful nor useful. The outer bark is of a spongy nature, and much used for caulking vessels, as it swells in the water; but is nevertheless liable to shrink again, and give way. It is called *baru*, a name given to all substances used for that purpose. An oil is obtained by firing the tree, which soon becomes thick and is used for candles. Rumphius says nothing of any fine essential oil being procured by distillation from this tree; see the next species.

2. M. *minor.* Lesser Cajeput Tree. Arbor alba minor; Rumph.

Rumph. Amboin. v. 2. 76. t. 17.)—Leaves ſcattered, elliptic-lanceolate, bluntiſh, ſtraight, five-ribbed. Young branches and germens downy.—Native of Amboyna, but leſs frequent than the foregoing, with which it has been confounded by every body but Rumphius. We now venture, for the firſt time, to diſtinguiſh them. This is ſmaller in all its parts, and rather a ſhrub than a tree. The young *leaves* are extremely ſilky; adult ones nearly ſmooth, about two (ſcarcely three) inches long, and one broad, exactly elliptical, and not oblique or falcated. *Footſtalks* broad and very ſhort, ſomewhat hairy. Young *branches*, where the *flowers* are ſeated, denſely clothed with white ſilky prominent down, as is likewiſe the *germen*. The *calyx* is but ſlightly downy. *Fruit* ſmooth, depreſſed and truncated.

The late Mr. Chriſtopher Smith, from whom we have received ſpecimens of both theſe plants, aſſured us of this being what yields the oil of Cajeput, and Rumphius gives the ſame account. (See CAJEPUT.) The bark is woody and brittle throughout, not externally corky like the former. The ſtructure of their parts of fructification is the ſame in both, eſpecially the form of the *ſtamens*. Rumphius's plates are by no means calculated to give a juſt idea of the foliage of either, eſpecially of the preſent, but his deſcriptions are excellent.

3. M. *viridiflora*. Green-flowered ribbed Melaleuca. Gærtn. v. 1. 173. t. 35. Sm. Tr. of L. Soc. v. 3. 275. (M. Leucadendron; Forſt. Prod. 38. Linn. Suppl. 342, β. Metroſideros quinquenervia; Cav. Ic. v. 4. 19. t. 333.)—Leaves alternate, elliptic-lanceolate, ſtraight, bluntiſh, coriaceous, five-ribbed. Footſtalks and young branches downy. Germen nearly ſmooth.—Native of New Caledonia and New South Wales. The younger Linnæus confounded it with both the preceding. From the firſt it is abundantly diſtinct. With the ſecond it more agrees in the ſhape of its *leaves*, but differs in their thick rigid texture, and much longer more downy *footſtalks* The *flowers* are twice as large, green, not white, with a ſmooth or very ſlightly hairy *germen*. The form of the *ſtamens* is the ſame. The young *leaves* of the preſent ſpecies are finely downy, but ſcarcely ſilky.

4. M. *ſuaveolens*. Sweet-ſcented Melaleuca. Gærtn. v. 1. 173. t. 35.—Leaves alternate, elliptical, ſingle-ribbed. Flower-ſtalks axillary, forked, downy, twice as long as the footſtalks. Filaments ſhorter than the petals, ſomewhat pinnate. Native of the warmer part of New Holland, near Endeavour river. A plate of this, communicated by ſir Joſeph Banks to Linnæus, is in our poſſeſſion. It appears to be a handſome *tree*, with elliptical ſmooth entire *leaves*, tapering at each end, ſingle-ribbed, five or ſix inches long and two broad. *Footſtalks* an inch long. *Flower-ſtalks* nearly twice that length, downy, axillary, ſometimes in pairs, forked, each bearing ſeven handſome white *flowers*, whoſe *ſtamens* are much ſhorter than the *petals*, and pinnated in their lower part. The *germen* and *calyx* are downy.

5. M. *laurina*. Laurel-leaved Melaleuca. Sm. Tr. of Linn. Soc. v. 3. 275.—Leaves alternate, obovato-lanceolate, ſingle-ribbed. Flower-ſtalks axillary, forked, downy, about as long as the footſtalks. Filaments rather ſhorter than the petals, ſomewhat pinnate.—Native of New South Wales; communicated by ſir Joſeph Banks. It is very nearly related to the laſt, but not at all aromatic, which that ſhould ſeem by its name to be, and the *leaves* of the preſent are broadeſt towards the top, very narrow and taper at their baſe. The *footſtalks* are bordered, and ſo connected with the leaf, it is hard to fix the limits of each. *Flower-ſtalks* axillary, not an inch long, forked, ſilky, bearing five or ſeven *flowers*, half the ſize of the *ſuaveolens*. *Stamens* hairy, rather ſhorter than the *petals*. *Germen* and *calyx* downy.

6. M. *ſtypheloides*. Sharp Twiſted-leaved Melaleuca. Sm. Tr. of Linn. Soc. v. 3. 275.—Leaves alternate, ovate, twiſted, many-ribbed, with a ſpinous point. Calyx-teeth ſharp-pointed, ribbed.—Native of Port Jackſon, New South Wales. This has the habit of a *Styphelia*, and is ſcarcely at all aromatic. The numerous *leaves* are ſeſſile, ſcattered, not an inch long, ovate, twiſted, rigid, pungent, entire, ſmooth, rather glaucous, ſtriated with innumerable nerves. Young *branches* very hairy, bearing in their lower part ſhort crowded circles of ſeſſile white *flowers*. *Germen* and *calyx* downy; the teeth of the latter erect, rigid, ſpinous, ribbed. *Stamens* palmate, much longer than the *petals*. M. Ventenat ſays, there were many fine plants of this ſpecies, in his time, at Malmaiſon, but none had then bloſſomed.

7. M. *ſquarroſa*. Various-leaved Melaleuca. Sm. Tr. of Linn. Soc. v. 6. 300. Donn. Cant. ed. 4. 186. (M. myrtifolia; Vent. Malmaiſ. t. 47.)—Leaves ſcattered or oppoſite, ovate, pointleſs, five or ſeven-ribbed. Calyx-teeth pointleſs, ſmooth.—Native of the eaſt and weſt coaſts of New Holland. We firſt ſaw it in the Cambridge garden in 1799. The *leaves* ſpread in three or four rows, according as they are ſcattered or oppoſite, they have about ſeven remote ribs, and are blunt without any ſpine. *Flowers* white, encircling the hairy branches in long denſe maſſes. *Germen* and *calyx* ſmooth, the latter blunt, without thorns or ribs. *Stamens* much longer than the *petals*, collected into five bundles, but not completely, many of the filaments being diſtinct, as in the genus *Citrus*; ſo that the limits between *Melaleuca* and *Metroſideros* here become almoſt evaneſcent. The *ſtigma* too in this ſpecies is quite ſimple, not ſo tumid or capitate as in moſt other *Melaleucæ*.—Perhaps *M. decuſſata* of Mr. Donn's *Hort. Cant.* ed. 5. 186, is but a variety of this.

8. M. *dioſmifolia*. Green-flowered Reflexed Melaleuca. Andr. Repoſ. t. 476.—Leaves ſcattered, reflexed, elliptic-oblong, obtuſe, ſingle-ribbed. Calyx-teeth rounded, ſmooth.—Native of King George's Sound, on the weſt coaſt of New Holland, where it was found by Mr. Menzies. We gathered it in flower, in June 1807, in the conſervatory of Claude Scott, eſq. at Sundridge park, Kent. A tall ſhrub, with many ſpreading *branches*, clothed with numerous, ſcattered, crowded, ſtalked, reflexed *leaves*, about half an inch long, nearly elliptical, dark green; ſmooth and even above; dotted and ſingle-ribbed beneath. The *flowers* are green in every part, rather large, thickly crowded for an inch or two along the middle part of each branch, their long *ſtamens*, which are united by their baſe into five bundles, projecting horizontally all round. The *anthers*, or at leaſt their *pollen*, is yellow. *Stigma* obtuſe. *Capſules* large, thickly coated, crowded into irregularly angular figures.

9. M. *microphylla*. Small-leaved Melaleuca.—Leaves ſcattered, imbricated, cylindrical, obtuſe, ſomewhat ſpreading. Flowers crowded at the upper part of the branches. This hitherto nondeſcript ſpecies was gathered near King George's Sound, on the weſt coaſt of New Holland, by Mr. A. Menzies, who favoured us with a ſpecimen. The *ſtem* is ſhrubby, much branched in a determinate manner; the *branches* ſmooth, whitiſh, leafy throughout. *Leaves* very numerous, crowded, a little ſpreading, about a quarter of an inch long, cylindrical or obſcurely quadrangular, very blunt,

blunt, unarmed, ſmooth, pale green, with a ſtrong aromatic reſinous flavour; each ſupported by a ſhort, ſlender, ſmooth *footſtalk*, jointed at its baſe. *Flowers* white, crowded into an oval ſpike at the ſummits of a few of the branches, which are not extended beyond them, but ſtill the infloreſcence is lateral. *Stamens* in five ſets, thoſe of each ſet united, a good way up, into a flat linear baſe or common filament, which reaches beyond the *petals*. *Germen* and *calyx* ſmooth. *Capſule* turbinate. This is moſt akin to the next.

10. M. *ericifolia*. Heath-leaved Melaleuca. Sm. Tr. of Linn. Soc. v. 3. 276. Exot. Bot. v. 1. 65. t. 34.—Leaves ſcattered or oppoſite, linear, acute, nerveleſs, pointleſs, a little recurved. Flowers crowded at the upper part of the branches.—Native of Port Jackſon, New South Wales. This and the laſt are the ſmalleſt we have ſeen of the genus. Both have the habit of *Ericæ*. The preſent is very ſmooth in all its parts, and has the taſte and ſmell of Coriander ſeeds. The *branches* are prettily ſtriped with green and white. *Leaves* from half an inch to an inch in length, flattiſh, linear, very narrow, acute, but without any ſpinous point, deſtitute of rib or veins, a little convex beneath. *Flowers* yellowiſh-white, crowded into oval or oblong ſpikes at the top of almoſt every branch, which is commonly a little prolonged, and leafy, above them. *Germen* and *calyx* ſmooth. *Stamens* ſtrongly united in five ſets, but their common claws do not extend beyond the petals. The *flower-buds* are reddiſh.

11. M. *nodoſa*. Needle-leaved Melaleuca. Sm. Tr. of Linn. Soc. v. 3. 276. Exot. Bot. v. 1. 67. t. 35. Vent. Malmaiſ. t. 112? Metroſideros nodoſa; Gærtn. v. 1. 172. t. 34. Cavan. Ic. v. 4. 19. t. 334.)—Leaves ſcattered, linear, ſtraight, tipped with ſpinous points. Flowers crowded near the tops of the little ſide branches. Filaments palmate.—From the ſame country as the laſt. It has long been known in the gardens. The ſtouter taller habit; ſtraight pungent *leaves* above an inch long; and the much ſhorter, almoſt globular, maſſes of yellow *flowers*, each of which is borne on a ſhort lateral branch, diſtinguiſh this ſpecies from the laſt. The flowering branches have leafy terminations. The bundles of *ſtamens* are palmate, their united part ſhorter than the petals.

12. M. *armillaris*. Slender-leaved Melaleuca. Sm. Tr. of Linn. Soc. v. 3. 277. (M. ericæfolia; Andr. Repoſ. t. 175. Vent. Malmaiſ. t. 76. Metroſideros armillaris; Gærtn. v. 1. 171. t. 34.)—Leaves ſcattered, linear, ſomewhat recurved. Flowers crowded at the lower part of the branches. Filaments very long, linear; many-cleft and radiating at the ſummit.—Native of New South Wales. It has long been in the gardens. We have ſeen it trained againſt a wall to the height of ſeveral feet, in the open air, covered with flowers in May, and requiring only the ſhelter of a mat or glaſs frame in winter. It differs from *M. nodoſa* in its leſs rigid, and ſomewhat recurved, *leaves*, ſcarcely ſpinous at the tip; much longer ſeries of *flowers*, which are white; and particularly in the long linear baſe of each cluſter of *ſtamens*, which is extended to twice the length of the petals, and then branches off at once into numerous radiating filaments of no conſiderable length. We have always found the *flowers* ſituated about the lower part of each branch; Ventenat repreſents them near the end. So, on the contrary, his plate of *M. nodoſa* has the flowers on the lower parts of very long leafy branches, very different from what we have obſerved. It ſeems therefore that the relative ſituations of the fructification vary in theſe plants, though the comparative number of flowers in each is conſtant.

13. M. *geniſtifolia*. Broom-leaved Melaleuca. Sm. Tr. of Linn. Soc. v. 3. 277. Exot. Bot. v. 1. 107. t. 55.—Leaves ſcattered, lanceolate, ſharp-pointed, three-ribbed, cloſely dotted. Flowers looſely ſcattered. Filaments pinnate in their upper part. Style hairy.—Native of New South Wales, where the firſt ſettlers called it the White Tea-tree. It is ſaid to grow "in a good ſoil, moſtly near the water-ſide," being covered with white bloſſoms in November. We have met with it in no garden. In its native ſoil the *ſtem* attains the height of twenty or twenty-five feet. The *branches* and *leaves* are ſmooth; the latter lanceolate, ſcarcely three quarters of an inch long, acute, flat, marked with three ribs, and numerous reſinous dots at the back. Their flavour is pleaſantly aromatic, not ſtrong. *Flowers* ſcattered, in alternate pairs, towards the tops of the ſmall terminal branches, which are ſlightly downy in that part. The claws of the united *ſtamens* are about as long as the petals before they divide; they then become pinnate, and towards the top are more cloſely branched. *Germen* and *calyx* ſmooth. *Style* hairy.

** *Leaves oppoſite.*

14. M. *linarifolia*. Toad-flax-leaved Melaleuca. Sm. Tr. of Linn. Soc. v. 3. 278. Exot. Bot. v. 1. 109. t. 56. (Metroſideros hyſſopifolia; Cavan. Ic. v. 4. 20. t. 336. f. 1.)—Leaves oppoſite, linear-lanceolate, three-ribbed, cloſely dotted beneath. Flowers looſely ſcattered. Filaments pinnate all the way up. Style ſmooth.—Native of the country about Port Jackſon, New South Wales. We have ſeen it flowering at Mr. Scott's of Sundridge park. In its native ſoil this ſpecies forms a large *tree*, whoſe outer bark is eaſily ſtripped off, in large light thick ſpongy flaky portions, which ſerve the rude natives as a warm wrapper for their new-born infants. The European ſettlers found it anſwer the purpoſe of tinder. The *branches* are ſmooth. *Leaves* oppoſite, nearly ſeſſile, an inch and a half, or two inches long, narrow, linear-lanceolate, acute but not pungent, marked with three ſlight ribs above, much dotted on both ſides; the mid-rib keeled beneath. *Flowers* numerous, looſely diſpoſed, cream-coloured, with a tinge of red in the *petals*. *Stamens* very long, each bundle regularly pinnate, almoſt from the very baſe to the end. *Style* ſhort, ſmooth, as well as the *germen* and *calyx*. Every part is highly aromatic, with a flavour reſembling pepper-mint.

15. M. *abietina*. Fir-leaved Melaleuca.—Leaves oppoſite, elliptic-oblong, concave, blunt, ribleſs. Flowers few, at the ends of the branches. Filaments long, linear, many-cleft at the ſummit. Communicated by Mr. Menzies, who gathered it at King George's Sound, on the weſt coaſt of New Holland. This ſeems to be a ſtout *ſhrub*, or *tree*, with numerous, ſtrong, leafy, ſmooth *branches*. *Leaves* about half an inch long, crowded, oppoſite, in pairs croſſing each other, on ſhort broad *footſtalks*; they are concave above, with a very blunt point; convex beneath, deſtitute of ribs, veins, or dots. *Flowers* reddiſh, few together, in ſhort, ovate, apparently terminal ſpikes, beſet with many imbricated, reddiſh, ribbed and keeled *bracteas*. It ſeems doubtful whether the branches be ever continued, in a leafy form, beyond the inſertion of the flowers, which if they be not, would overſet a character in the habit of this genus on which we have always depended. Our ſpecimen however is inſufficient to decide this queſtion. The bundles of *filaments* are linear and ſimple to a conſiderable extent (but not to the extremities of the *petals*, which are longer than uſual); then they ſuddenly branch off into numerous diviſions, each bearing its *anther*, as in the other ſpecies. *Style* ſmooth, longer than in the laſt, but much ſhorter than the ſtamens. *Germen* and *calyx* ſmooth.

16. M.

16. M. *thymifolia.* Thyme-leaved Melaleuca. Sm. Tr. of Linn. Soc. v. 3. 278. Exot. Bot. v. 1. 69. t. 36. (M. coronata; Andr. Repof. t. 278. M. gnidiæfolia; Vent. Malmaif. t. 4. Metrofideros calycina; Cavan. Ic. v. 4. 20. t. 336. f. 2.)—Leaves oppofite, elliptic-lanceolate, acute, riblefs. Flowers few together, on fhort lateral branches. Filaments oppofite to the petals, branched more than half way down.—Native of New South Wales. It was firft raifed in England, if we miftake not, by Mr. Fairbairn at Chelfea garden, and is not very uncommon in green-houfes. This fpecies is a little, flender, fmooth, bufhy *fhrub,* about two feet high, with numerous fmall, fmooth, oppofite thyme-like *leaves,* full of refinous dots beneath, and highly aromatic. *Flowers* rofe-coloured, abundant, though but few together, on fhort lateral *branches,* not always furmounted by leaves. The *germen* and *calyx* are fmooth. *Filaments* oppofite to the petals, which is remarkable, and as far as we can examine our dried fpecimens of others, peculiar to this and the next fpecies. They are twice the length of the petals, and confift of one broad flat compound filament, fending off from its margin and inner furface abundance of fimple filaments with *anthers,* almoft to its very bafe. *Style* fmooth, rather fhorter than the ftamens.

17. M. *hypericifolia.* St. John's-wort-leaved Melaleuca. Sm. Tr. of Linn. Soc. v. 3. 279. Vent. Jard. de Cels, 10. t. 10. Andr. Repof. t. 200.—Leaves oppofite, fpreading, elliptic-oblong, fingle-ribbed. Flowers numerous, on fhort lateral branches. Filaments oppofite to the petals, very long, linear, radiating at the fummit.—Found in fwamps at New South Wales. This is now not unfrequent in the green-houfes and confervatories of England, where it makes an elegant appearance, being, in our opinion, the moft beautiful of the genus. The *ftem* is fhrubby, fix feet high, with lax fpreading branches. *Leaves* numerous, horizontal, oppofite, croffing each other in pairs, elliptical, fmooth, about an inch long, with much of the habit of an *Hypericum. Flowers* on fhort, lateral, fcattered branches, many together, in denfe cylindrical maffes. *Calyx* and *germen* fmooth, green, very glandular and refinous. *Petals* green or reddifh, with refinous dots at the back. *Filaments* oppofite to them, the common bafe of each clufter three or four times the length of the petal, and of the fame colour, linear and narrow, terminating in a very large radiating tuft of long, capillary, crimfon, filk-like threads, each bearing a fmall red *anther,* with yellow pollen. Thefe crimfon threads, combining all round into a clofe mafs, almoft concealing the reft of the flower, conftitute the chief beauty of the whole. It was miftaken for a *Bankfia* by one of the firft convicts who went to New South Wales, and who fent a very characteriftic drawing to England of this plant, among fome of lefs accuracy.

18. M. *neriifolia.* Oleander-leaved Melaleuca. Sims in Curt. Mag. v. 26. t. 1058. (M. falicifolia; Andr. Repof. t. 485.)—Leaves oppofite, lanceolate, fingle-ribbed. Flower-ftalks axillary, forked, nearly fmooth. Stamens fhorter than the corolla, fcarcely cohering.—Native of New Holland, we know not precifely from what part of that extenfive country. It is faid to have been firft raifed from feed by Mr. Barr of Iflington. This is very different from all the reft of the prefent fection, having yellow *flowers,* on axillary forked ftalks, being next akin in habit to *M. fuaveolens* and *laurina* of the former divifion; but its *leaves* are oppofite. Their figure is lanceolate, about two inches long, and the under fide is pale. The *ftamens* are defcribed by Dr. Sims as collected into five bundles, fhorter than the petals, but hardly cohering; Mr. Andrews delineates thefe bundles as oppofite to the petals, with the filaments feparate almoft to the very bafe. Whether Mr. Brown, from whom in his Prodromus v. 2, and Ait. Hort. Kew, we may expect additions to this genus, has made any generic divifion of it, we are not informed; but Dr. Sims hints at the propriety of fuch a meafure.

Mention of more fpecies than we have defined will be found in Mr. Donn's Hort. Cant. but fome of thofe are certainly not different. His *neriifolia* and *falicifolia* are, we prefume, our laft fpecies, under the names of Sims and Andrews. His *coronata,* and probably *fimbriata,* are our *thymifolia,* which he has likewife. His *diofmæfolia* and *armillaris* we judge to be one and the fame, as perhaps is his *ericifolia.* This intelligent botanift and cultivator is neceffarily liable to be mifled, by the communications of his friends, who fend the fame thing under different names; nor are the plants always in a condition for determination till it is too late for his purpofe. S.

Melaleuca, in the *Materia Medica.* The *Melaleuca minor* is that fpecies, which yields the *Cajeput* oil, and not the *M. leucadendron,* as mentioned under that article. See the preceding article.

The Cajeput oil, called alfo "Oleum Wittnebianum," from Wittneben, who gave an account of the procefs for obtaining it, though unknown in Britain, is now admitted into the Materia Medica of all the principal foreign pharmacopeias. It is imported into Europe from the Eaft Indies, and is diftilled chiefly in the ifland of Banda. From its exorbitant price it is frequently adulterated; and is therefore feldom found perfectly pure in Europe. Cajeput oil appears to be a powerful medicine, and is much efteemed in Germany, as well as in India, as a general remedy in chronic and painful complaints. It is ufed for the fame purpofes for which we employ the officinal ethers, to which it feems to have a confiderable affinity; the Cajeput, however, is more potent and pungent; taken into the ftomach, in the dofe of five or fix drops, it heats and ftimulates the whole fyftem, proving at the fame time a very certain diaphoretic, by which, probably, the good effects it is faid to have in dropfies and intermittent fevers are to be explained. For its efficacy in various fpafmodic and convulfive affections, it is highly efteemed; and numerous inftances of its fuccefsful employment are publifhed by different authors, cited by Murray. It has been alfo ufed both internally and externally with much advantage in feveral other obftinate diforders, as palfy, hypochondriacal and hyfterical affections, deafnefs, defective vifion, tooth-ache, gout, rheumatifm, menftrual obftructions, herpetic eruptions, &c.; of which Thunberg gives a particular relation. The dofe is from two to fix and even twelve drops. Woodville Med. Bot. See Cajeput *oil.*

MELALIEH, in *Geography,* a town of Egypt; 10 miles N. of Abugirgé.

MELAMPODIUM, in *Botany,* is a Linnæan genus whofe derivation may eafily be traced from μελας, *black,* and πους, *a foot.* According to the defcription of it in his *Hortus Cliffortianus,* it fhould feem that Linnæus had in view the fimilitude of the feed of the female florets to the foot of a goat. —In the *Critica Botanica* however it is faid to be named in honour of the Greek phyfician Melampus.—Linn. Gen. 445. Schreb. 583. Willd. Sp. Pl. v. 3. 2338. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 1. v. 3. 269. Juff. 188. Lamarck Illuftr. t. 713. Gærtn. t. 169.—Clafs and order, *Syngenefia Polygamia Neceffaria.* Nat. Ord. *Compofitæ Oppofitifoliæ,* Linn. *Corymbiferæ,* Juff.

Gen. Ch. *Common calyx* flat, much fpreading, of five, oblong-ovate leaves, the length of the florets. *Cor.* compound, radiated; the apparently perfect florets conftituting the

M E L.

the disk; female ones about five, making the radius: that of the florets of the disk of one petal, funnel-shaped, five-toothed, erect; of the radius ligulate, ovate, entire or three-toothed. *Stam.* in the disk, Filaments five, very small; anthers cylindrical, tubular. *Pist* in the same florets, Germen very small, abortive; style bristle-shaped, the length of the corolla; stigma obsolete: in the female ones, Germen nearly ovate, compressed, rough at the sides, flat and membranous at the top; style very short. *Peric.* none, except the unchanged calyx. *Seeds* in the disk none; in the radius solitary to each floret, obovate, compressed, quadrangular, prickly at the sides, crowned with a heart-shaped, partial calyx, involute and converging at the margin. *Recept.* chaffy, conical; scales lanceolate, coloured, the length of the florets.

Eff. Ch. Receptacle chaffy, conical. Seed-down of one leaf, converging. Common calyx of five leaves.

1. M. *americanum*. Linn. Sp. Pl. 1303. (Caltha americana, &c., Banks. Reliq. Houst. 9. t. 21.)—Stem erect. Leaves linear-lanceolate, pinnatifid.—Found by Houston, near Vera Cruz, in a craggy, sandy soil, where it flowered and ripened fruit in March.—*Stems* herbaceous, numerous, round, villose, procumbent. *Leaves* opposite, an inch and half long, usually with two lateral segments, sometimes entire; hairy on both sides, but more particularly at the back. *Flowers* solitary, yellow, upon axillary stalks. *Seeds* forming a crown, and supplying the place of the florets of the radius.

The specific character of this plant given in the *Species Plantarum* of Linnæus differs so much from Houston's figure, as well as from the description in *Hortus Cliffortianus*, which seems made from the same specimen, that we have presumed to alter it.—Possibly when he wrote the second edition of the *Species Plantarum*, not having any specimen before him, he did not sufficiently attend to what he had previously recorded.

2. M. *humile*. Swartz. Prod. 114. Ait. Hort. Kew. ed. 1. v. 3. 269.—Stem erect. Leaves toothed, somewhat lyrate, sessile.—A native of Jamaica and St. Domingo, flowering from June to October.—Nothing is known of this species but from the authors above quoted, and not being able to refer either to a specimen or a figure of it, we must of course be content with copying their specific character.

3. M. *australe*. Linn. Sp. Pl. 1303. Willd. n. 3. (M. australe, feminibus quinque oblongis hispidis, calyce pentaphyllo, caule decumbente; Lœfl. It. 268.)—Stem decumbent. Leaves oval, serrated.—Found at Cumana in South America by Lœfling, who describes the *Root* as perennial. *Stems* a span long, somewhat downy, with opposite decumbent *branches* ascending towards their extremities. *Leaves* opposite, on footstalks, oval or obtusely ovate. *Flowers* terminal, yellow, on short footstalks. *Seeds* furrowed, and covered with hooked hairs.

These three species are all that are known of the genus *Melampodium*. Of the two last we are not acquainted with any figure. Professor Martyn observes, that they are all tender plants requiring much shade and warmth. The seeds should be sown in the spring in a hot-bed, and the plants removed in due time into pots filled with light sandy earth.

Melampodium, in the *Materia Medica*. See Hellebore and Helleborus.

MELAMPUS, in *Biography*, was enumerated among the early civilizers of Greece, who thought it necessary to travel into Egypt to qualify themselves for the high employments at which they aspired in their own country. Orpheus proceeded thence a legislator and philosopher; and Melampus, who had different views, commenced, at his return, physician and diviner, arts which in Egypt were professed together. Apollodorus says, that he was the first who cured diseases by medicinal potions. Physic had its miraculous powers during the infancy of the art, as well as music; and life and health being esteemed more precious and solid blessings than the transient pleasures of the ear, bore a much higher price: for though bards were often distinguished by royalty, and their talents recompensed by gifts and honours, yet we do not find in ancient records that any one of them ever experienced such munificence as Melampus. It is related by Pausanias, that having cured the daughters of Prætus, king of Argos, of an atrabilarious disorder, with hellebore, he was rewarded with one of his royal patients for wife, and a third part of her father's kingdom in dowry.

MELAMPYRUM, in *Botany*, is the Μελαμπυρον of Theophrastus, derived from μελας, *black*, and πυρος, *wheat*; its seeds greatly resembling the grain of wheat, but of a darker colour. In some however, indeed in all the Linnæan species, they are so like wheat in form, size and colour, as to be scarcely discernible from it.—Cow-wheat.—Linn. Gen. 305. Schreb. 401. Willd. Sp. Pl. v. 3. 197. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 651. Ait. Hort Kew. ed. 1. v. 2. 328. Tournef. t. 78. Juss. 101. Lamarck Dict. v. 4. 19. Illustr. t. 518. Gærtn. t. 53.—Class and order, *Didynamia Angiospermia*. Nat. Ord. *Personatæ*, Linn. *Pediculares*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, tubular, permanent, cloven half way down into four, slender segments. *Cor.* of one petal, ringent; tube oblong, recurved; limb compressed: upper lip helmet-shaped, compressed, emarginate, the lateral little margins reflexed; lower lip flat, erect, the length of the upper, obtuse, cloven half way down into three, equal segments, marked with two prominences in the middle. *Stam.* Filaments four, awl-shaped, curved, concealed under the upper lip, two of them shorter; anthers oblong. *Pist.* Germen superior, acuminate; style simple, in place and length like the stamens; stigma obtuse. *Peric.* Capsule oblong, oblique, pointed, compressed, its upper margin convex, the lower straight, of two cells and two valves, opening at the upper suture; partition contrary. *Seeds* in pairs (solitary according to Gærtner), ovate, gibbous, enlarged at the base.

Eff. Ch. Calyx tubular, four-cleft. Upper lip of the corolla compressed, folded back at the margin. Capsule of two cells, oblique, bursting at one edge. Seeds two, gibbous.

1. M. *cristatum*. Crested Cow-wheat. Linn. Sp. Pl. 842. Engl. Bot. t. 41.—Spikes quadrangular. Bracteas heart-shaped, imbricated, compact, toothed.—An English plant, though by no means a common one. It has been found both in Cambridgeshire and in Norfolk, on the borders of woods, and in corn-fields, flowering in July. The specimen figured in English Botany was sent from Madingley wood, near Cambridge.—*Root* annual. *Stem* rough, much branched. *Leaves* opposite, linear, entire. *Spikes of flowers* terminal, imbricated, very ornamental, being of a yellow, purple and tawny colour.—Linnæus however observes that there is a variety which has white flowers.

2. M. *arvense*. Purple Cow-wheat. Linn. Sp. Pl. 842. Engl. Bot. t. 53.—Spikes conical, loose. Bracteas fringed with narrow taper teeth.—This like the last may be considered as a rare native plant, though occurring occasionally in various parts of England, in gravelly fields, and flowering in July and August.—*Root* annual. *Stem* about two feet high,

high, erect, much branched, rough. *Leaves* lanceolate, pointed, entire. *Spikes of flowers* terminal, of a yellow and purple colour, extremely ornamental, indeed so much so that Dr. Smith observes "we are scarcely worthy to possess it, for its charms, however striking, have never procured it admission into a flower-garden, though it may easily be raised from fresh seed on a dry gravelly soil."

3. M. *barbatum.* Bearded Cow-wheat. Willd. n. 3. Wadstein and Keitabel Pl. Rar. Hung.—Spikes conical, loose. Bracteas toothed and bristle-shaped, not coloured. Calyx-teeth bearded. Corolla gaping.—A native of fields in the south of Hungary.—This new species is adopted on the authority of Willdenow, who says that it is very closely allied to the last, but differs in the following particulars. *Bracteas* green, not coloured. *Calyx-teeth* furnished with long, transparent, membranous hairs at the margin. Upper lip of the corolla more hairy. *Flowers* by no means variegated, but altogether of a yellow colour.

4. M. *nemorosum.* Many-coloured Cow-wheat. Linn. Sp. Pl. 843. Fl. Suec. 214. Fl. Dan. t. 305.—Flowers leaning one way, lateral. Bracteas toothed, heart-shaped, lanceolate, the upper ones coloured, sterile. Calyx woolly.—A native of woods in the north of Europe, and especially of some provinces of Sweden. Dr. Smith also found it in Savoy.—It flowers in July and August.—*Root* annual, small. *Stem* somewhat more than a foot in height, upright, branched. *Leaves* entire, ovate, pointed, occasionally rather arrow-shaped, toothed at the base. *Bracteas* violet-coloured, laciniated at the base, those at the top barren. *Flowers* of a beautiful yellow and purple colour.—The splendour of this species has attracted the notice of various botanists. Linnæus mentions it in his *Flora Suecica* with great delight, which has drawn forth the following observation from Dr. Smith in his Tour on the Continent, ed. 2. v. 3. 149. Speaking of *M. nemorosum* he says, "The red and yellow flowers, amid sky-blue and purple bracteæ, form the richest combination possible, which, but in the hands of nature, would be tawdry. Well might Linnæus esteem this plant worthy to decorate the palace of Flora herself."

5. M. *pratense.* Common yellow Cow-wheat. Linn. Sp. Pl. 843. Engl. Bot. t. 113.—Flowers lateral, leaning one way. Leaves in distant pairs. Corolla closed.—Common in woods and thickets throughout England, flowering through the summer.—*Root* annual, branched, spreading, smooth. *Stem* slender, branched. *Leaves* lanceolate, smooth, occasionally toothed at the base. *Bracteas* pinnatifid, often purplish. *Flowers* solitary, all leaning one way, yellow, their upper lip fringed with dense hairs, the lower one straight; anthers cohering together at their tips.—We find the following observation in English Botany. "Linnæus says, the best and yellowest butter is made where this plant abounds. All authors have copied him, and we do not scruple to do the same, in hopes that somebody will in time be induced to make experiments on the subject in England, where this plant is far from uncommon, flowering all summer long."—This property of M. *pratense* is mentioned in the Lapland Tour of Linnæus v. 1. 110, as well as in the *Flora Lapponica* n. 240, where he confounds it with the following as one species.

6. M. *sylvaticum.* Wood Cow-wheat. Linn. Sp. Pl. 843. Engl. Bot. t. 804.—Flowers lateral, leaning one way. Leaves in distant pairs. Corolla open, with its lip bent downwards.—Found occasionally in mountainous woods or pine forests, flowering in July.—The habit of this species is extremely similar to that of the last, but it is upon the whole considerably smaller.—*Root* annual. *Stem* roughish. *Leaves* a little broader, less black from drying, all of them generally entire. *Flowers* twice as small, of a yellowish-orange colour, especially at the mouth. *Capsule* marked with a net-work of prominent veins.

7. M. *lineare.* Linear Cow-wheat. Willd. n 7. Lamarck Dict. v. 4. 23.—Leaves linear, entire. Flowers axillary. A native of Carolina, where it was discovered by Mr. Fraser.—All that we know of this is from the authors above quoted, who tell us that it is more diminutive than any other species of this genus, in habit greatly resembling *Euphrasia linifolia.*—*Root* annual. *Stem* about five inches high, round, erect, furnished with opposite, somewhat quadrangular, branches. *Leaves* opposite, sessile, an inch long, little more than a line broad, acute. *Flowers* in the bosoms of the upper leaves, about three lines in length. *Calyx* half the length of the *corolla,* which is gaping, with equal lips, the upper one obtuse, villose at the margin.

The several species of *Melampyrum,* though extremely elegant and ornamental when fresh, are at the same time remarkable for turning brown or black when dry, losing all traces of their living beauty, and making a shabby appearance in the Herbarium. "The seeds of this genus have a remarkable resemblance to grains of wheat; on which account (says Dr. Smith) we prefer the old English name to that of *Cow-grass,* given by Dr. Stokes."

MELAN PHARMACON, a word used by Hippocrates, and by some supposed to mean common writing ink. He orders this to be poured upon the cranium, in case of a fissure, in order to discover how far it has penetrated. Galen seems to refer to this, in some places, and mentions his having treated of it in his book of ulcers; but as no such medicine is found prescribed here, it is probably one of the lost compositions of the ancients. In the spurious edition of Hippocrates, his book treating on the diseases of women, there is a black medicine ordered to be made of the squamæ and flos æris.

MELANA, or MÆLENA, in *Ancient Geography,* a town of Arcadia, in the western part, on the river Alpheus, S.W. of Telphusia.

MELANAETOS, in *Ornithology.* See FALCO.

MELANAGOGUES, MELANAGOGA, from μελας, *black,* and αγω, *I draw,* such medicines as were believed to possess the particular power of evacuating *black bile,* one of the four humours of the ancient pathology.

MELANANTHERA, in *Botany,* was so called by Michaux, from μελας, *black,* and ανθηρα, *an anther,* because of the colour of the anthers, which is strongly contrasted with the white corolla. Michaux Boreali-Amer. v. 2. 106.—Class and order, *Syngenesia Polygamia-æqualis.* Nat. Ord. *Compositæ oppositifoliæ,* Linn. *Corymbiferæ,* Juss.

Gen. Ch. *Common calyx* imbricated, of several, not very numerous, oval, flattish, close-pressed, unarmed leaves, in two rows. *Cor.* compound, discoid; florets uniform, numerous, all perfect, though some of the central ones are usually abortive; all funnel-shaped, with a short tube, and a much longer and wider, tubular, five-cleft, regular limb, whose segments are lanceolate and cohering. *Stam.* Filaments five; anthers forming a cylinder, shorter than the corolla. *Pist.* Germen obovate, angular, abrupt; style thread-shaped, projecting a little beyond the anthers; stigmas two, oblong, revolute, slightly tapering. *Peric.* none, except the permanent calyx. *Seeds* turbinate, quadrangular, smooth, abrupt at the top, with a small annular border, and a crown of very few, (about five,) erect, rough, deciduous bristles. *Recep.* rather convex, with a firm, keeled, concave, ribbed scale to each floret, at length overtopping the seeds and much resembling the calyx-scales.

Eff. Ch. Receptacle convex, with obovate, keeled, rigid scales.

scales. Seeds square. Crown of a few rough bristles. Calyx of two rows of uniform, ovate, imbricated leaves.

Obs. This genus differs so much in habit from *Bidens*, with which Linnæus confounded it, that we cannot but think Michaux right in separating them. The ovate uniform calyx-leaves, and the scales of the receptacle, so closely resembling them, in the seeding state, that the whole head of seeds assumes one uniform scaly aspect, added to the number and nature of the bristles of the seed-crown, which are not in one or two pairs, but of an indeterminate number, all uniform, and rough with minute ascending points, not barbed with sharp reflexed spines; these characters are surely sufficient marks of distinction.

1. M. *hastata*. Michaux. v. 2. 107. (Bidens nivea β and γ; Linn. Sp. Pl. 1167. B. scabra, flore niveo, &c.; Dill. Elth. t. 46 and 47.)—Leaves three-lobed, somewhat hastate. Scales of the receptacle lanceolate, taper-pointed.—Native of Carolina. It was cultivated in the Eltham garden before the year 1732, and flowered late in autumn. The *root* is perennial. *Stems* herbaceous, two or three feet high, rough, somewhat branched, leafy. *Leaves* opposite, stalked, rough and harsh, serrated; sometimes slightly, sometimes very deeply, hastate. Dillenius figures both varieties. *Flowers* terminal, an inch broad, on long stalks. *Corollas* white. *Anthers* black. This probably is the *Bidens nivea* of Mr. Donn's Hort. Cant., which is there marked as a hardy perennial, flowering in June and July.

2. M. *deltoidea*. Michaux. v. 2. 107. (Bidens nivea α; Linn. Sp. Pl. 1167. Swartz. Obs. 296. Ait. Hort. Kew. ed. 1. v. 3. 154. Calea aspera; Jacq. Ic. Rar. t. 583.)—Leaves ovate or heart-shaped, all undivided. Scales of the receptacle bluntish.—Native of the West Indies. Swartz says it grows in grassy, cultivated, elevated situations, as well as near the sea, in the south part of Jamaica. The late Mr. Aiton gave us a specimen from Kew garden, in 1783, as a great rarity. This is, of course, more tender than the former, from which it differs in the ovate, somewhat deltoid or cordate, form of the *leaves*, one of which is exhibited by Dillenius in his t. 47. f. 3. The *flowers* too are rather smaller.

MELANCHOLY. See MENTAL *Derangement*.

MELANCRANIS, in *Botany*, from μελανα, *blackness*, and κρανον, *a head*, alluding to the dark purplish spots with which the scaly roundish head of the flowers is besprinkled, and which give it a black aspect. Vahl. Enum. v. 2. 239.—Class and order, *Triandria Monogynia*. Nat. Ord. *Calamariæ*, Linn. *Cyperoideæ*, Juss.

Gen. Ch. *Cal.* Scales of a *spike*, imbricated every way, ovate, pointed, each subtending an oblong, compressed, two-ranked, nearly seven-flowered *spikelet*, of the same length. Perianth inferior, of two valves, shorter and narrower than the corolla. *Cor.* of one lanceolate valve, closely dotted with purple. *Stam.* Filaments three, linear, the length of the scales, whitish dotted with purple; anthers linear. *Pist.* Germen oblong; style solitary, smooth, cloven; stigmas simple. *Seed* one, without any bristles at its base.

Eff. Ch. Scales chaffy, imbricated every way. Spikelets solitary at every scale, many-flowered, two-ranked. Calyx of two valves. Corolla of one valve. Style cloven.

1. M. *scariosa*. Vahl. n. 1. (Schoenus scariosus; Thunb. Prod. 16.)—Head oblong. Bracteas about three.—Native of the Cape of Good Hope. *Root* perennial. *Stems* in tufts, about a foot high, or rather less, thread-shaped, rigid, without joints, finely striated, angular at the top. *Leaves* shorter, bristle-shaped, channelled, dilated into a sheathing base. *Head of flowers* terminal, half an inch in length, oblong, composed of imbricated, ovate, broad, membranous, rather rigid, smooth, shining *scales*, each a little spreading at the point, and tapering into a sort of awn; the three lower ones barren, tipped with a bristle-like leaf or *bractea*, which in the lowermost is three inches long. *Spikelets* five-flowered.

2. M. *radiata*. Vahl n. 2.—Head nearly globose. Bracteas numerous.—From the same country. Perennial. Rather taller than the first. *Bracteas*, or barren scales, at the base of the head of flowers, from six to eight, one of them half an inch long, the rest gradually less, widely spreading, awl-shaped, rigid and somewhat pungent. *Head* the size of a cherry, composed of innumerable, ovate, crowded *spikelets*; their accompanying *scales* striated and dotted with purple.

MELANCTHON, PHILIP, in *Biography*, an illustrious reformer, and coadjutor of Luther, was born at Bretten, in the Palatinate upon the Rhine, on the 16th of February 1495. His family name, in the German language, literally meant "Black Earth," which was exchanged for Melancthon, a word in the Greek tongue having the same signification. He received the early part of his education at his native place, was afterwards placed under the care of a private tutor, and then proceeded to the college of Pfortsheim, where he obtained the friendship of the learned Reuchlin, from whom he received the Greek name already alluded to, by which he is generally known. In 1509 he removed to Heidelberg, where he made so rapid a progress in the classics and other branches of literature, that before he had completed his fourteenth year he was entrusted with the tuition of the sons of count Leonstein. He is accordingly celebrated by Baillet, in his "Historical Treatise of young Men who became famous by their Study or Writings." At the age of thirteen he wrote a comedy, which he dedicated to his friend and patron Reuchlin; and at that period he was employed to make the greatest part of the harangues and orations which were delivered in public, in the university of Heidelberg. In 1511 he was admitted to the degree of B.A.; but being refused his superior degree in the arts in the following year, he left the college, and entered himself at Tubingen. Here he pursued his studies with great diligence and success, and became himself a lecturer on the Latin classics. In 1513, before he had attained the age of seventeen, Melancthon was created doctor of philosophy. It was about this period that Erasmus paid him the following high compliment: "What hopes may we not entertain of Philip Melancthon, who, though as yet very young, and almost a boy, is equally to be admired for his knowledge in both languages? What quickness of invention!—what purity of diction!—what powers of memory!—what variety of reading!—what modesty and gracefulness of behaviour!" While at Tubingen, Melancthon diligently studied the sacred Scriptures, and always carried about with him a bible, which he had received as a present from Reuchlin. This treasure, it may be said, he bound to his heart: he was hardly ever seen without it; and, during divine service, he frequently referred to its contents: and on this account, those who were jealous of his rising fame endeavoured to excite prejudices against him, by insinuating that he spent his time at church in reading what did not belong to the solemnities of the service. In 1518 he was appointed by the elector of Saxony professor of the Greek language in the university of Wittemberg, and by his inaugural speech excited the highest applause and admiration. He now began to read lectures upon Homer, and the Greek text of the Epistle of St. Paul to Titus, which attracted vast crowds of auditors, and which contributed, in no small degree, to

 promote

promote the ſtudy of Greek literature. In the year 1519 he publiſhed his "Rhetoric;" and in the following year, a treatiſe on "Logic;" and four years after this, his work on "Grammar." From the time of his ſettling at Wittemberg, Melancthon contracted a cloſe intimacy with Luther; and in the year 1519 he accompanied him to Leipſic, to be a witneſs of his eccleſiaſtical combat with Eckius. He ſeems not to have been contented to be a mere bye-ſtander, but joined ſo much in the debate as to provoke the rage and bitterneſs of Eckius, who found himſelf completely overwhelmed with the arguments brought againſt the cauſe, which he undertook to juſtify and defend. Melancthon, from this moment, became an advocate in the cauſe of reform, and, by the ſervices which he afterwards rendered it, made his name immortal. In the year 1520 he delivered a courſe of lectures at Wittemberg on the Epiſtle to the Romans, with which Luther was ſo highly pleaſed, that he cauſed it to be printed, and prefixed a preface of his own, recommending it to the uſe of the churches. In the following year he undertook a defence of the doctrines of Luther, in oppoſition to the univerſity of Paris, which had paſſed a ſentence of condemnation upon them. The next buſineſs of importance in which he was engaged, was to draw up, conjointly with Luther, a ſyſtem of laws relating to church government, public worſhip, the ranks, offices, and revenues of the prieſthood, and other matters of a ſimilar nature, which John, elector of Saxony, promulgated in his dominions, and which was adopted by the other princes of the empire, who had renounced the papal ſupremacy and juriſdiction. After this, Melancthon was commiſſioned, with others, to viſit all the churches in the electoral dominions, for the purpoſe of ſeeing theſe laws carried into execution.

In the year 1529, Melancthon accompanied the elector John to the diet at Spire, in which the princes and members of the reformed communion acquired the denomination of Proteſtants, in conſequence of their proteſting againſt a decree, which declared unlawful every change that ſhould be introduced into the eſtabliſhed religion, before the determination of a general council was known. In the year 1530 a diet of the empire was appointed to be held at Augſburg, with a view to put an end to the diſſentions occaſioned by religious diſputes, under the eye of the emperor, in order that he might be able to form a clear idea of the real opinions of the reformers, and of the true cauſes of their oppoſition to the Roman pontiff. The Proteſtant princes employed Melancthon to compoſe a creed, which was preſented to the emperor, and which reflects honour on the addreſs, moderation, and eloquence of Melancthon. This creed, commonly known by the name of the "Confeſſion of Augſburg," was ſeverely animadverted upon by his opponents, which led him to draw up an able reply, notwithſtanding the imperial prohibition, under the title of "A Defence of the Confeſſion of Augſburg." Recourſe was now had to conferences, in which our reformer mightily diſtinguiſhed himſelf. It was in theſe that the ſpirit and character of Melancthon appeared in their true colours; and it was here that the votaries of Rome exhauſted their efforts to gain over to their party this pillar of the reformation, whoſe abilities and virtues added a luſtre to the cauſe in which he had embarked. His gentle ſpirit was apt to ſink into a kind of yielding ſoftneſs, under the influence of mild and generous treatment. Accordingly, while his adverſaries ſoothed him with fair words and flattering promiſes, he ſeemed ready to comply with their wiſhes; but when they ſo far forgot themſelves as to make uſe of threats, then Melancthon appeared in a very different point of light: then a ſpirit of intrepidity, ardour, and independence animated all his words and actions, and he looked down with contempt on the threats of power, the frowns of fortune, and the fear of death.

As every attempt at reconciliation had proved in vain, a ſevere decree was iſſued by order of the emperor, enjoining the princes, ſtates, and cities, that had thrown off the papal yoke, to return to their duty, and their allegiance to Rome, on pain of incurring the indignation of the emperor, the patron and protector of the church. This at firſt oppreſſed the gentle ſpirit of Melancthon, till he was encouraged and animated by the exhortations of Luther; and he ſoon had the ſatisfaction to ſee the Proteſtant intereſt ſtrengthened and extended, owing to the treaty concluded at Nuremberg, of the expediency of which the emperor was made fully ſenſible, by the league of Smalkalde, and other circumſtances. Melancthon's fame was now ſpread far and wide, and he was invited by Henry VIII. to ſettle in England, and, about the ſame time, by Francis I. to take up his abode in France, with the view of employing him to pacify, or at leaſt to moderate the diſputes which had ariſen there concerning religion, and to adviſe with the French divines about reſtoring the ancient diſcipline of the church. Melancthon felt inclined to accept the latter invitation; but the elector of Saxony would not by any means give his conſent, knowing that by ſuch a ſtep he would expoſe himſelf to the reſentment of the emperor, between whom and Francis affairs began to wear a hoſtile aſpect. In 1541 Melancthon was at the famous conferences at Ratiſbon; and in 1543 he went to Cologne, to aſſiſt the elector in introducing the reformed religion into his dioceſe; but the main deſign of his journey was fruſtrated, through the oppoſition of the canons and other divines of the ſee: neverthele ſs the elector of Cologne and the elector palatine embraced the Proteſtant faith. In 1548 he aſſiſted at ſeven conferences on the ſubject of the interim of Charles V., and publiſhed a cenſure on that interim, and all the writings preſented at theſe conferences. In 1551, pope Julius III. having conſented to the aſſembling a council at Trent, the Saxon Proteſtants employed the pen of Melancthon, and the people of Wittemberg that of Bredlius, to draw up confeſſions of their faith, to be laid before the council. Soon after, the Saxon divines, with our reformer at their head, received directions from Maurice, now elector of Saxony, to ſet out towards Trent, but were ſecretly inſtructed to ſtop at Nuremberg, as Maurice had no intention to ſubmit to the emperor's views, and the ſchemes which he had been long preparing, with the deepeſt policy, for maintaining the rights and liberties of the German empire, and the ſecurity of the Proteſtant faith, and which were on the eve of being carried into execution. While he was at Nuremberg, in 1552, Melancthon received intelligence of the complete ſucceſs which had crowned Maurice's well-projected undertaking, and compelled the emperor to conclude the famous pacification at Paſſau, commonly called "The Peace of Religion."

Upon this event he intended to have returned to Wittemberg, but as that city was then infected with a plague, the univerſity had been removed for a time to Torgau, where Melancthon diſcharged the duties of his profeſſorſhip, till the infectious diſorder was completely baniſhed. To theſe duties he devoted the remainder of his life, as well as in the compoſition of various works, and the carrying on of controverſies with his Proteſtant and Catholic opponents. His laſt conference was with the doctors of the Romiſh communion at Worms. The firſt point diſcuſſed was concerning the rule of judgment in the church, which the Catholics maintained to be perpetual conſent or cuſtom;

2 but

but the Protestants, in conformity with their own principles, held it to be the prophetic and apostolical writings. In the next place the Catholics demanded a decree of condemnation against the followers of Zuingle, and others, when the deputies of Jena perceiving the disposition of the majority to agree to this demand, broke off the conference, by seceding from the meeting; and thus the object of the Papists to promote a division among the Protestants was effectually gained. From Worms, Melancthon went to Heidelberg, at the request of Otho Henry, elector palatine, for the purpose of giving his advice in forming the constitutions of an academical institution established in that city. In 1559 he made an attempt to bring over the Greek churches to embrace the doctrine and discipline of the Lutheran church, and to live in religious communion with the Protestants; in which his laudable endeavours were ineffectual. He died in the following year at Wittemberg, in the sixty-fourth year of his age, and was interred near the remains of Luther. "Nature," says one of this great man's biographers, "had given Melancthon a peaceable temper, which was but ill suited to the time he lived in. His moderation served only to be his cross. He was like a lamb in the midst of wolves. Nobody liked his mildness: it looked as if he were lukewarm." He was a person of the middle stature, with lively eyes and well-proportioned limbs, but his constitution was delicate and his health weak, yet by the exercise of the most rigid temperance, he was enabled to pursue his studies with an intenseness of application that is almost incredible. The habits of such a man cannot fail of interesting those who reflect on what he did for the world: it was his practice to go to bed immediately after an early supper, and to rise at midnight to his labours. On retiring to rest he endeavoured to dismiss as much as possible from his mind every thing that could tend to disturb his repose, and for this purpose he always postponed reading such letters as were brought to him in the evening till next day. He was civil and obliging to all; entirely free from envy, detraction, jealousy, and dissimulation; and possessed an unrivalled degree of candour and frankness. His principal relaxation from severe studies was the conversation of his friends during his meals. He was humble and extremely disinterested, constantly refusing the valuable presents which were offered him by many great princes, and contenting himself with the small profits of his professorship; yet he managed his narrow income with such admirable economy, that he was able to indulge his benevolent and charitable disposition to an astonishing degree. According to the testimony of Mosheim, few worthies can be compared with him, if we consider the extent of his knowledge, the fertility and elegance of his studies, the facility and quickness of his comprehension, or the uninterrupted industry that attended his learned and theological labours. He rendered philosophy and the liberal arts the same eminent service that Luther had done to religion, by purging them from the dross with which they had been corrupted, and by recommending them in a powerful and persuasive manner to the study of the Germans. He had the rare talent of discerning truth in all its connections and combinations, of comprehending at once the most abstract notions, and expressing them with the utmost ease and perspicuity. His love of peace, which was partly owing to the sweetness of his natural temper, made him desire with ardour, that a reformation might be effected without producing a schism in the church. The spirit of charity led him sometimes to make concessions that were neither consistent with prudence, nor advantageous to the cause in which he was engaged. But when the hour of real danger approached, when things wore a formidable aspect, and the cause of religion was in imminent peril, then this mild and even timorous man, in an instant, as it were, was converted into a hero, looked danger in the face with unshaken constancy, and opposed his adversaries with invincible fortitude. Had his fortitude been more uniform and steady, his desire of reconciling all interests, and pleasing all parties less excessive, he must deservedly have been considered as one of the greatest among men.

In philosophy he followed chiefly the principles of Aristotle, and had frequently recourse to the doctrines of the Platonists and Stoics, but always in due subordination to revelation, and only so far as they were likely to answer some valuable purposes. "I would have no one," says he, "trifle in philosophising, lest he should lose sight of common sense; rather let him be careful, both in the study of physics and morals, to select the best things from the best sources. He may not, therefore, improperly be considered as an *eclectic*."

Melancthon was much assisted in the execution of his plans by the labours of many learned Protestant professors of the Germanic schools from Italy and Great Britain, who brought with them an attachment to the Peripatetic system, and wherever they were appointed public preceptors, made that system the basis of their philosophical instructions. From Wittemberg, Tubingen, and Leipsic, conducted after the plan which had been introduced by Melancthon, many learned men arose, who, becoming themselves preceptors, adopted the same plan of instruction, which, from Melancthon's Christian name, was denominated "The Philippic Method," and thus disseminated the Peripatetic doctrine, till at length it was almost every where taught in the German Protestant schools, under the sanction of civil and ecclesiastical authority. The number of the works which Melancthon published, considering how much he was engaged as a public man, is truly astonishing. The titles of a great many of them are given in the General Biography. They are theological, moral, and philosophical; some, however, relate to what is usually denominated the Belles Lettres, and others are illustrative of various classical authors. The most complete edition was published by the author's son-in-law, Jasper Peucer, in the year 1601, in 4 vols. fol.

This celebrated and mild reformer, the friend of Martin Luther, and author of the confession of Augsburg, &c. wrote upon music. He composed his own epitaph, and died in 1560.

"Iste brevis tumulus miseri tenit ossa Philippi,
Quis, qualis fuerit nescio, talis erat."

MELANES, or MELAS, in *Ancient Geography*, a gulf that lay between the Chersonese of Thrace to the S.E., and a part of the continent to the N.W. It is now called the "gulf of Megarissa."

MELANI MONTES, a chain of mountains, placed by Ptolemy in Arabia Petræa, supposed by Jerome to be those that are called in scripture Sinai and Oreb.

MELANI, ALESSANDRO, in *Biography*, the composer of an opera, which was extremely applauded at Bologna, Florence, and in many other theatres of Italy, in 1697, called "Il Carcicrier di se Hesso."

MELANIPPIDES, a Greek poet and musician, who flourished about the sixtieth olympiad, and whose poetry and music rendered him famous. He had a grandson of the same name, who was likewise a great musician; though Plutarch, in a croaking fit, accuses him of having been one of the first corrupters of the ancient music, by the innovations which he introduced. See TIMOTHEUS.

MELANITE. See GARNET.

MELANIUM, in *Botany*, from μελας, *black* or *dark*, μελανιον being a name for the purple violet. It is applied by Browne, in his History of Jamaica, p. 215, to a small weak Jamaica plant, with a peculiarly disagreeable and pungent smell, which Linnæus referred to LYTHRUM, (see that article,) by the name of *L. Melanium*. Sp. Pl. 641. Swartz. Obs. 193. The author last mentioned says the flowers are purple; and this accounts for the name, for the application of which Browne, as usual, gives no reason.

MELANOGÆTULI, or NIGRITÆ, or *Black Gætulians*, in *Ancient Geography*, a people of Africa, placed by Ptolemy between the mountains Sagapola and Usargala, in a district S.E. of Gætulia Propria, to which it is contiguous, and N. of the river Niger. (See GÆTULIA.) The Melanogætuli were a people without doubt different from the Gætulians, and so considered by Ptolemy, though Cellarius insinuates that they were a tribe of that people. Their complexion not only evinces this fact, but likewise shews, that their progenitors were different from those of the Gætulians. The modern district of Wad-reag, in the province of Constantina, containing a collection of twenty-five villages ranged in a N.E. and S.W. direction, corresponds with a part of the country of the Melanogætuli, according to Dr. Shaw. Our learned traveller likewise supposes, that the country of the Beni-Mezzab, situated 35 leagues to the S. of the mountains of the Ammer, supposed to be part of the Mons Phraræsus of Ptolemy, the large village of Engousah, 30 leagues to the S.W. by W. of Tuggart, the capital of Wad-reag, and the populous city of Wurglah, with their dependencies, even to the banks of the Niger, were included in Melanogætulia. As Ptolemy places the Melanogætuli next to the Pharusii in a southern direction, fixing his Nigritian Ethiopians in a tract lying to the north of the Niger; and as Mela, Pliny, and Strabo give the Nigritæ exactly the same situation with regard to the Pharusii and the Niger, but are quite silent as to the Melanogætuli; it is very probable, that the Melanogætuli and Nigritæ were the same people. If this supposition be admitted, it will appear very credible, that their territories extended to the Niger, and that they had some remarkable places in those parts; since, according to Ptolemy, many towns stood not far from that river, of which the principal were Passide, Saluce, Negira, Thige, Cuphe, Thammdicana, and Vellegia. The most celebrated rivers of this part were the Gir and Niger. If any credit be given to Leo and the African historians, Sabtecha, the son of Cush, first peopled the Sahara, between the mountains of Atlas and Nigritia, and therefore probably Nigritia itself, or at least part of it. From the same author it appears, that the various Nigritian dialects bear an affinity to the Chaldee, Arabic, and Egyptian tongues; and consequently to the Ethiopic, which does not differ widely from them. The Carthaginians had undoubtedly some knowledge of the Nigritæ, since it appears probable from Frontinus, that one part of their army consisted of Nigritian troops. This circumstance will enable us to account for several antique coins with a Negro's or Nigritian's head upon them. The Nigritæ used chariots in their wars, and were armed after the manner of the western Ethiopians with bows and arrows, as we learn from Strabo. According to the same author, the Pharusii, and therefore, probably, the Nigritæ, travelled in caravans through the deserts to Cirta, and kept open a communication with the Maurusii. On these occasions they carried bottles filled with water, tied to their horses' bellies, lest they should perish from thirst in the vast deserts through which they were obliged to traverse. Hence it is undeniably clear, that these Pharusian and Nigritian merchants lived at a great distance from Cirta, and those places of Mauritania to which they resorted; and also that the Negroes or Blacks held an early correspondence with the ancient Mauritanians, Numidians, and Carthaginians. Anc. Un. Hist. vol. xvi. 8vo.

MELANOSCHOENUS, in *Botany*, from μελας, μελανος, *black*, and σχοινος, *a rush*, Mich. Gen. 46. t. 31, is *Schoenus mucronatus* of Linnæus. See SCHOENUS.

MELANO-SYRI, in *Ancient Geography*, a name given to those who inhabited Syria, between the Euphrates and the Mediterranean sea, by way of contradistinction to the *Leuco-Syri*, who lived in Cappadocia, towards the Euxine sea. The former are black Syrians, and the latter white, as their respective appellations import.

MELANTHIUM, in *Botany*, so called by Clayton, from μελας, *black* or *dark*, and ανθος, *a flower*; but the first word is here taken in a wider sense than is usual, even in its application to flowers; for the plant of Clayton, *M. virginicum*, Linn. Sp. Pl. 483, has a dull yellowish, lurid, but not black, hue. This plant is probably a *Veratrum*; but several others, more remarkable for the darkness of their flowers, have been referred to the genus before us, which now rests upon them. It must not be supposed however that any of these is the μελανθιον of the ancient Greeks, for the description in Dioscorides, more particular and expressive than usual, evidently indicates the *Nigella sativa*, the name being applied by a metastasis to the flower, which is white, the seeds, for which the plant was known and cultivated, being intensely black. Sometimes indeed the plant was, for this last reason, called μελανοσπερμον. Our present business is with the Linnæan *Melanthium*, as far as we can define its limits. Linn. Gen. 179. Schreb. 240. Willd. Sp. Pl. v. 2. 266. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 326. Juss. 47. Lamarck Illustr. t. 269. Thunb. Prod. 67. (Wurmbea; Thunb. Nov. Gen. 18. t. 1. Schreb. 239. Willd. Sp. Pl. v. 2. 265. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. ed. 2. v. 2. 325. Lamarck Illustr. t. 270.)—Class and order, *Hexandria Trigynia*. Nat. Ord. *Coronariæ*, rather *Tripetaloideæ*, Linn. *Junci*, Juss.

Gen. Ch. *Cal.* none, unless the corolla be taken for such. *Cor.* of six petals, sometimes contracted, sometimes combined, at the base, inferior, ovato-lanceolate, acute, spreading, equal, permanent. *Stam.* Filaments six, thread-shaped, erect, the length of the corolla, more or less attached to it, permanent; anthers globose. *Pist.* Germen superior, nearly globular; styles three, spreading, thread-shaped, the length of the stamens, recurved at the extremity, permanent; stigmas simple. *Peric.* Capsule ovate, with three furrows, three cells, and three valves, crowned with the styles. *Seeds* numerous, roundish.

Ess. Ch. Calyx none. Petals six, equal, bearing the stamens. Styles permanent. Capsule of three cells, with many seeds.

Obs. The sound Linnæan rule, that "the genus should give the character, not the character the genus," induces us to follow Linnæus, and even Thunberg himself, the original establisher of *Wurmbea*, in reducing that genus to *Melanthium*, from which it differs merely in the combination of its petals at their base into an angular tube, a character which, by a comparison of all the species together, will appear of no essential consequence in this case. Mr. Salisbury's *Ornithoglossum*, received into Ait. Hort. Kew. ed. 2. v. 2. 327. (*Melanthium viride* of Linnæus and Thunberg), however alike to many of the species at first sight, does so materially differ, in having the stamens inserted into the receptacle, and, like the styles, deciduous, to say nothing of other characters, that we cannot well retain it here. (See

ORNITHO-

Ornithoglossum.) Neither are we at all certain that fome of the following may not require to be placed elfewhere. *M. letum*, Willd. Sp. Pl. n. 3, is now properly referred to *Helonias*, by Mr. Ker in Curt. Mag. t. 803.

1. M. *fibiricum*. Siberian Graffy Melanthium. Linn. Sp. Pl. 483. (Melanthium; Linn. Am. Acad. v. 2. 349. t. 4. f. 11. Ornithogalum; Gmel. Sib. v. 1. 45. t. 8.)—Flowers panicled. Petals combined at the bafe. Capfule pointed. Leaves linear.—Native of mountainous woods in Siberia, where it was gathered by Gmelin, flowering in July. We have never feen a living fpecimen. The *root* is bulbous, perennial, oblong, white. *Stem* flender but firm, erect, one or two feet high, nearly leaflefs, glaucous when young, terminating in a longifh, fomewhat compound, bracteated *panicle*, of greenifh-white fmall *flowers*, whofe petals are reflexed. *Capfule* half an inch long, erect, ovate, pointed, purplifh, fheathed at the bottom by the combined dilated bafes of the petals, and crowned with the recurved ftyles. It burfts in the furrows, from the top nearly to the bottom.

2. M. *capenfe*. Spotted-flowered Melanthium. Linn. Sp. Pl. 483. Thunb. Prod. 67.—Flowers racemofe. Petals dotted, contracted at their bafe. Leaves ovato-lanceolate, with a broad fheathing bafe—Native of the Cape of Good Hope. *Root* an ovate bulb. *Stem* two or three inches high, with a few broad, fpreading, pointed *leaves*, and a fhort terminal clufter of fpotted *flowers*, whofe ftamens cohere but flightly with the petals. We find no figure of this fpecies.

3. M. *junceum*. Rufh-like Melanthium. Jacq. Ic. Rar. t. 451. Curt. Mag. t. 558. Willd. Sp. Pl. n. 7. (M. triquetrum; Linn. Suppl. 213.)—Leaves linear-awlfhaped, the upper ones dilated and concave at the bafe. Spike zigzag. Petals contracted at the bottom.—Native of the Cape. It flowers in the green-houfe early in the fpring, like other bulbs from the fame country, and indeed refembles an *Ixia* in its fpike of purplifh *flowers*, the bafes of whofe petals are marked with a double violet fpot. The *leaves* are glaucous, rather fucculent, and the uppermoft are remarkable for their tumid or inflated figure, juft above their infertion.

4. M. *ciliatum*. Fringed Melanthium. Linn. Suppl. 213. Thunb. Prod. 67.—Leaves ovate, fpreading, finely fringed with cartilaginous teeth. Spike zigzag. Petals much contracted at the bottom.—Native of the Cape; we find no traces of it in the Englifh gardens. The habit is like an *Orchis*, the lower part of the ftem bearing two or three broad, ovate, fpreading *leaves*, with a fheathing bafe, their edges minutely fringed. *Spike* rather denfe, of many feffile *flowers*, fpreading every way, whofe petals are elliptic-oblong, with a confiderable claw, and appear to be white, minutely ftreaked or dotted with purple or red.

5. M. *fecundum*. Single-ranked Melanthium. Lamarck Dict. v. 4. 28. Illuftr. t. 269. f. 2. Willd. Sp. Pl. n. 8.—Leaves linear. Spike inclined one way. Petals contracted at the bottom, with a tooth at each fide.—Native of the Cape, where it was gathered by Sonnerat and by Bladh. The younger Linnæus confounded it with the laft in his herbarium, and apparently in his Supplement. The prefent however is abundantly diftinguifhed by its narrow erect *leaves*, and efpecially by a remarkable tooth at each fide of the *petals*, juft above their claw or contraction, well obferved by Defrouffeaux in Lamarck. It feems doubtful to us whether the unilateral direction of the *flowers* be not an effect of drying. They are white or blufh-coloured, dotted like the foregoing.

6. M. *indicum*. Indian Melanthium. Linn. Mant. 226.—Leaves linear. Flowers corymbofe. Petals linear-lanceolate, tapering at the bafe.—Sent by Koenig from Pondicherry.

This has much the habit of *Ornithogalum luteum*. The *leaves* are very narrow, erect, and rife above the *ftem*, which bears a fort of leafy or bracteated *corymbus* of a very few upright *flowers*. The narrow and fharp *petals* are of a dark purple, as well as the *ftamens* and *piftil*. We think, with Willdenow, that there is a connection between the filaments and petals, efpecially as there is but a fimple row of fix fcars at the bafe of the ripening germen, after the flower has fallen, which indicates that the ftamens have no feparate infertion there. The *ftyles* are permanent, even on the ripe capfule. Neverthelefs the whole afpect of the plant is fo nearly allied to that of *M. viride*, (Mr. Salifbury's *Ornithogloffum*,) as almoft to fhake our faith in that genus.

7. M. *flavum*. Yellow Melanthium. (M. uniflorum; Jacq. Ic. Rar. t. 450. Coll. v. 4. 100. Curt. Mag. t. 767. Ait. Hort. Kew ed. 2. v. 2. 327. Willd. n. 12. M. æthiopicum; Herb. Linn. Lamarck Dict. v. 4. 29. Tulipa Breyniana; Linn. Sp. Pl. 438. Willd. Sp. Pl. v. 2. 98. Thunb. Prod. 65.)—Leaves linear-lanceolate, fheathing. Flowers fomewhat fpiked. Petals elliptic-lanceolate, tapering at the bafe. Stamens united to the petals more than half way up. Germen and capfule columnar.—Native of the Cape, where it was gathered by Thunberg. It is impoffible to retain the name *uniflorum* for this fpecies, which, as Mr. Ker obferves, is altogether fallacious. We have therefore ventured to tranflate the Englifh appellation, given by him, and adopted by the learned authors of the Hortus Kewenfis. We would have called it *Breynianum* after Linnæus; but the fynonym of Breynius feems very evidently to belong to fomething elfe; we pretend not to fay what. In this difficulty, fenfe is furely preferable to the mere records of confufion and miftake. The *ftem* is from a fpan to a foot high. *Leaves* fpreading, keeled and fheathing at the bafe. *Flowers* from two to fix, in a clofe zigzag fpike; very rarely folitary only. The *petals* are yellow on the upper fide; brownifh crimfon beneath. In the dried fpecimen this laft-mentioned colour runs into minute oblong fpots, which induces a fufpicion that the dotted appearance in fome of the former fpecies, known to us in a dry condition only, may not exift in the frefh flowers. The bafe of each petal in that now under confideration tapers down into a long dark-red claw, to which each *filament*, of the fame colour, is firmly united for three-fourths of its own length. The *germen* is remarkably columnar, with three longitudinal furrows. *Styles* very fhort, thick, and recurved. *Anthers* oblong.

8. M. *eucomoides*. Dwarf Green Melanthium. Jacq. Ic. Rar. t. 450. Curt. Mag. t. 641.—Leaves ovate-oblong, fpreading, fheathing at the bafe. Stalk with few flowers, fhorter than the leaves. Bafe of the petals concave, with a tooth at each fide.—Native of the Cape; rarely feen in England. This is very unlike any of the former, being of a dwarf habit, with feveral broad, fheathing, long, fpreading *leaves*, recurved at their points. Among thefe ftands a fhort *ftalk*, bearing one, two, or three large green *flowers*, of a fingular and not beautiful appearance. The long bafes or claws of the *petals* are rolled in at their fides, and crowned with a pair of broad blunt teeth, analogous to thofe defcribed in our fifth fpecies. *Filaments* united to the claws. *Anthers* oblong, yellow, brown at the back. *Germen* oval, with three deep furrows. *Styles* awl-fhaped, flightly recurved at the top.

9. M. *pumilum*. Little Rigid Melanthium. Forft. Comm. Gött. v. 9. 30. t. 6. Willd. n. 14.—Leaves lanceolate, rigid,

rigid, channelled, ſharp-pointed, bearded at the baſe. Stalk with few flowers, ſhorter than the leaves.—Native of Terra del Fuego. By one of Forſter's ſpecimens in our poſſeſſion, this appears to be a mountain plant, of a dwarf-tufted habit; having numerous, crowded, ſpreading, radical *leaves*, an inch long, ovato-lanceolate, rigid, pungent and rough-edged; channelled above, keeled beneath; their ſheathing baſes denſely inveſted with long, white, ſhining, pellucid hairs. The *flowers* are ſaid to be white; in a dry ſtate they have a purpliſh tinge. They are about three or four, each ſupported on its own ſhort *ſtalk*. *Petals* not contracted at the baſe. *Styles*, according to Willdenow, (from whom we adopt the reference to Forſter,) none; the *ſtigmas* three, rarely ſix.

Willdenow juſtly obſerves that *M. luteum*, Thunb. Jap. 152, is probably diſtinct from *Veratrum luteum* of Linnæus. Having ſeen no ſpecimen, by which we might judge of its genus, we decline admitting it here.

MELANURUS, in *Ichthyology*. See SPARUS *Melanurus*.

MELAONES, a word uſed by certain authors for a black kind of worm found in meadows in the month of May, which, when bruiſed, emits an agreeable ſmell. Some alſo have called a ſmall ſpecies of beetle by the ſame name.

MELAPARA, in *Geography*, a town of Bengal; 10 miles E.N.E. of Dacca.

MELAS, in *Ancient Geography*, the name of ſeveral rivers; *e. g.* a river of the Peloponneſus, in Achaia:—a river of Bœotia, which had its ſource ſeven ſtadia from Orchomené, and diſcharged itſelf into the lake Cephiſus:—a river of Theſſaly, near Heraclea:—a river of Mygdonia:—a river of Thrace:—a river of Aſia, whoſe ſource was near the town of Cæſarea ad Argæum:—a river of Aſia, in Pamphylia:—a river of Aſia, in Armenia Minor.

MELAS, μελας, in *Medicine*, ſignifying literally *black*, is a term applied by the ancients to a diſeaſe of the ſkin, which appears to be a variety of the ſcaly lepra; differing principally in the colour of the eruption from the more common form, which is white, and which was called *Alphos*, or *Leuce*. (See theſe articles.) The *leuce*, however, as we have there ſhewn, in ſtrictneſs, ought not to be confounded with *alphos*, or put under the ſame genus with it and the *melas*; ſince all the ancients, even Celſus, who has ranked all three under the head of *vitiligo*, diſtinctly pointed out the eſſential difference of the *leuce*. See Celſus, lib. v. cap. 27. ſect. 19. See alſo LEPROSY.

MELASICTERUS, from μελας, *black*, and ικτερος, *icterus*, the *jaundice*, a term which has been applied by ſome writers to that ſevere and inveterate degree of jaundice, which has been alſo termed in Engliſh the *black jaundice*. (See JAUNDICE.) Sauvages, Noſol. Method. claſs ix. genus 12.

MELASMA, in *Botany*, ſo named by Bergius, from μελας, *black*, apparently becauſe the herb aſſumes that colour in drying. Thunberg, who likewiſe eſtabliſhed it as a genus, called it *Nigrina*, for the ſame reaſon. The younger Linnæus referred it to GERARDIA (ſee that article); to which Thunberg, in his Prodromus 106, accedes, and the plant ſtands there, as well as in Willd. Sp. Pl. v. 3. 222, under the name of *Gerardia Nigrina*. (Melaſma ſcabrum; Berg. Cap. 162. t. 3. f. 4.)—Herb rough. Leaves lanceolate; ſerrated in their lower part. Stem ſquare.—Native of the Cape of Good Hope. The *ſtem* is herbaceous, above a foot high, leafy, ſomewhat branched. *Leaves* oppoſite, narrow, about two inches long, rough on both ſides, with prominent points. *Flowers* axillary and terminal, on long ſtalks, drooping, large. Nothing is recorded concerning their colour. Every part of the dried plant is as black as ink.

MELASMA, (from μελας, *black*), in *Surgery*, a black and dark blue, or livid, diſcolouration of the ſkin, more commonly termed by ſurgeons an *ecchymoſis*; which ſee.

MELASPHÆRULA, in *Botany*, ſo denominated by Mr. Gawler, now Ker, who firſt eſtabliſhed the genus, from μελας, *black*, and σφαιρα, *a ball*, in alluſion to the little black and ſhining globular bulbs, ſaid to be produced at the ramifications of the ſtem, as in ſeveral lilies, the *Dentaria bulbifera*, *Saxifraga bulbifera*, and others. Theſe however have not been obſerved on the cultivated *Melaſphærula* in England or France, but Jacquin delineates them. Ker in Sims and Kon. Ann. of Bot. v. 1. 231. Curt. Mag. v. 17. 615. Ait. Hort. Kew. ed. 2. v. 1. 103. (Diaſia; Decand. in Bulletin des Sciences, n. 80. Brumaire an. 12.)—Claſs and order, *Triandria Monogynia*. Nat. Ord. *Enſatæ*, Linn. *Irides*, Juſſ.

Gen. Ch. *Cal.* Spatha inferior, ſhorter than the corolla, of two oblong, acute, permanent valves; the outermoſt broadeſt. *Cor.* of one petal, ſuperior; tube none; limb irregular, two-lipped, ſomewhat bell-ſhaped, divided to the bottom into ſix ovate, briſtle-pointed, ſpreading ſegments, the three lower ones moſt coloured, and rather the ſmalleſt. *Stam.* Filaments three, cloſe together, ſhorter than the corolla, and aſcending under the middle ſegment of its upper lip, recurved at the ſummit; anthers oblong, incumbent. *Piſt.* Germen inferior, three-lobed, depreſſed; ſtyle thread-ſhaped, of the length and ſituation of the ſtamens; ſtigmas three, ſpreading, ſimple, bluntiſh. *Peric.* Capſule three-lobed, depreſſed, thin, of three cells and three valves, opening at the upper ſide. *Seeds* few, globoſe, without wing or border.

Eſſ. Ch. Spatha of two valves. Corolla two-lipped, in ſix deep, nearly equal, briſtle-pointed ſegments; without any tube. Stigmas three, recurved. Capſule three-lobed. Seeds globoſe.

M. *graminea*. Graſs-leaved Melaſphærula. Curt. Mag. t. 615. (Diaſia iridifolia; Redout. Liliac. t. 54. Gladiolus gramineus; Linn. Suppl. 95, excluding the ſynonyms. Willd. Sp. Pl. v. 1. 221. Jacq. Ic. Rar. t. 236. Andr. Repoſ. t. 62.)—Gathered by Sparrmann and Thunberg at the Cape of Good Hope. Mr. Maſſon ſent it to Kew in 1787, where it bloſſoms in the green-houſe during moſt part of the year. The *root* is a ſmall, coated, roundiſh bulb. *Stem* near two feet high, ſlender and rigid like that of a graſs. The leaves alſo are of a graſſy habit, pale green, long and narrow. *Flowers* numerous, in a lax and ſlender panicle, ſcentleſs, ſmall, compared with many of the ſame tribe. *Spatha* green, with a filmy edge. *Corolla* of a pale greeniſh-yellow, each ſegment marked with a purpliſh-brown, central line, or rib, of which thoſe in the three lower ſegments are broadeſt and moſt conſpicuous, evincing the natural irregularity of the flower. The *ſeeds* are brown.

No other ſpecies is known. Redouté diſtinguiſhes this, after Decandolle, into two, according to the various length and uprightneſs of the foliage, but, as it ſeems to us, without ſufficient reaſon.

MELASSES. See MOLASSES.

MELASSO, a town of Aſiatic Turkey, in Natolia, anciently called "Mylaſa," or "Mylaſſa." It is ſituated on a fertile plain near a mountain, which furniſhes a great quantity of fine white marble. It had formerly a temple dedicated to Auguſtus Cæſar, with twenty-two columns, ſix of which were in front; and it was adorned with ſo many temples and public buildings, that a certain muſician, on entering the αγορα, or market-place, to make a proclamation, on, used the words ακουετε ναοι, hear ye temples, instead of ακουετε λαοι, hear ye people. Under the Romans it was a free city. It is now a large place, containing a great number of houses, though they are mean. The air is accounted bad, and scorpions abound; 80 miles S. of Smyrna. N. lat. 37° 10'. E. long. 27° 40'.

MELASTOMA, in *Botany*, a very extensive tropical genus of plants, most remarkable for the transcendent beauty and peculiarity of its foliage. The name was composed by John Burmann, of μελας, *black*, and στομα, *the mouth*; being synonimous with the Portuguese appellation of one of the Ceylon species, *Bocca preto*, or Black Mouth, which arose from the effect of the fruit upon the lips of those who eat it. Some of the West Indian species are known by the name of American Gooseberries.—Burm. Zeyl. 156. Linn. Gen. 217. Schreb. 293. Willd. Sp. Pl. v. 2. 581. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 3. 45. Juss. 329. Lamarck Dict. v. 4. 31. Illustr. t. 361. Gærtn. t. 126. Aubl. Guian. 402—437. Swartz. Ind. Occ. 764—822. (Acinodendron; Linn. Gen. ed. 1. 129. Tococa; Aubl. Guian. 437. Fothergilla; ibid. 440. Mayeta; ibid. 443.)—Class and order, *Decandria Monogynia*. Nat. Ord. *Calycanthemæ*, Linn. *Melastomæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, bell-shaped, four or five-cleft, swelling at the base, permanent. *Cor.* Petals four or five, roundish, inserted into the rim of the calyx. *Stam.* Filaments eight or ten, short, inserted into the calyx; anthers very long, terminal, somewhat curved, of one or two cells, opening by an oblique terminal pore, and often accompanied by a pair of small spreading scales at the base. *Pist.* Germen roundish, in the bottom of the calyx; style thread-shaped, declining; stigma blunt or capitate. *Peric.* Berry of two to five cells, roundish, coated with the body of the calyx, and crowned with its permanent annular rim. *Seeds* very numerous, imbedded in pulp.

Ess. Ch. Calyx four or five-cleft, bell-shaped. Petals as many as the segments of the calyx, inserted, with the stamens, into its rim. Anthers beaked, opening at the tip. Berry of five cells, invested with the calyx.

Only fifteen species of this genus are defined in the 14th edition of the *Systema Vegetabilium* of Linnæus, but the discoveries of Swartz, and of various correspondents of sir Joseph Banks, in the West Indies, and of Aublet in Guiana and Cayenne, have very greatly increased that number, so that Willdenow describes eighty-five, notwithstanding his having referred some species of the above authors to *Rhexia.* We are possessed of a few that do not appear in Willdenow's list. The whole are distributed into various sections, distinguished by the number of stamens, which differ in different species from ten to eight or twelve; and the petals and segments of the calyx also from five to four or six. Subordinate characters of each section depend on the number and connection of the longitudinal ribs of the leaves, which, throughout the whole genus, are very remarkable, and in some form, together with the transverse veins, the most elegant appearance imaginable. The leaves in all are opposite and simple, their two sides generally different in colour and pubescence, the under one being often downy, rusty, or silky. Stem shrubby. Flowers numerous, axillary, or more generally terminal; their petals rarely yellow, usually red, purple, or whitish; with, for the most part, yellow very handsome anthers. We shall select examples of each section, marking the species by Willdenow's numbers.

Sect. 1. *Stamens* twelve. Three species in Willdenow.

1. M. *calyptrata.* Vahl. Eclog. v. 1. 40. Lamarck Dict. v. 4. 51?—Leaves elliptic-lanceolate, tapering, three-ribbed, smooth, slightly and minutely toothed. Flowers panicled.—Native of the island of Montserrat.—"*Panicle* terminal, erect, four inches long; its branches spreading, the lowermost four together, the rest opposite, smooth, their ultimate divisions divaricated, three-flowered. *Flowers* stalked, covered with an acute conical lid, separating all round and deciduous. *Calyx* abrupt, the size of a coriander seed. *Petals* yellow." *Vahl.*—The late Dr. Dancer sent us from Jamaica a specimen which answers to the above characters, except that the *flowers* seem fewer and larger. The teeth of the *calyx* are firmly united into a thick coriaceous conical lid, like that of an *Eucalyptus,* (see that article), which sometimes splits at the top, but more generally falls off entire, by an irregular circular separation from the body of the calyx. Within this are the *petals.* The *fruit* is crowned with a very narrow annular rim, quite distinct from the calyx.

3. M. *patens.* Swartz. Ind. Occ. 791.—Leaves with five or seven ribs, heart-shaped, hairy, somewhat toothed. Cluster terminal, spreading, bristly. Stamens twelve.—Native of the more lofty mountains of Jamaica, flowering in summer. The inhabitants call it the American Gooseberry. The *fruit* is sweet, but wants spirit. The *flowers* have rarely only ten *stamens.* It is a *shrub* eight or ten feet high, clothed with prominent, bristly, brownish-red hairs, and the branches are dark purple. *Leaves* varying in length from three to six inches, broad; green and bristly above; pale and downy beneath: ribs five or seven, besides the slender marginal ones, connected by a profusion of reticulated veins. *Footstalks* two or three inches long, bristly. *Clusters* three-forked, very bristly, with a pair of small leaves at each subdivision. *Flowers* large, with linear, bristly, elongated calyx-teeth, and whitish or flesh-coloured petals.

Section 2. *Stamens ten; leaves with three separate ribs.* Eighteen species in Willdenow.

5. M. *rigida.* Swartz. Ind. Occ. 768.—Leaves three-ribbed, minutely toothed, rigid, ovate, somewhat heart-shaped; roughish beneath. Clusters terminal, panicled, rough with dense rusty down.—Native of the Blue mountains of Jamaica; communicated by Dr. Dancer. A *shrub* 10 or 12 feet high; its *branches* obtusely quadrangular, compressed, rough at the extremities with dense, short, dark, rusty, somewhat starry, pubescence. *Leaves* from three to six inches long, on long rusty stalks, ovate, or slightly heart-shaped, rigid but brittle, pointed; smooth above; roughish, but of the same green colour, beneath; with three distant ribs, besides the marginal ones, and many parallel transverse veins. *Panicle* long, many-flowered, repeatedly three-forked, rusty. *Flowers* small, with white petals, each *calyx* subtended by a pair of long, awl-shaped, rusty, deciduous *bracteas.*

7. M. *montana.* Swartz. Ind. Occ. 766.—Leaves three-ribbed, very slightly toothed, nearly smooth. Cluster terminal; its branches deeply three-cleft, spreading. Petals obtuse. Calyx abrupt, with a deciduous lid.—Communicated by Dr. Swartz from the lofty mountains in the southern part of Jamaica. The *leaves, stalks,* and *calyx* are, in the dried plant at least, of a light yellowish-green, and every part is nearly, if not quite, smooth. *Flowers* small, white, their calyx-teeth combining to form a lid, as in the first species. The upper surface of the *leaves* is minutely granulated. Their lateral ribs are united, for a short space, to the middle one, so that they strictly come under the denomination of triply-ribbed. The marginal ones are distinct from the very bottom.

10. M. *aspera.* Linn. Sp. Pl. 560. (M. foliis lanceolatis trinerviis scabris; Linn. Zeyl. 76. n. 172. M. scabra trinervia;

trinervia; Burm. Zeyl. 154. t. 72.)—Leaves ovato-lanceolate, three-ribbed, entire, rough with depreffed briftles. Flowers in leafy clufters.—Native of Ceylon. We have a fpecimen from fir G. Staunton which anfwers well to Hermann's figure and defcription. Thefe were mif-applied by Linnæus to his *octandra*, as is well remarked by Retzius in his *fafc.* 4. 25. In the Linnæan herbarium a fpecimen occurs marked *afpera*, which is not an original one, nor, in fact, different from *malabathrica* hereafter mentioned, except that the lateral ribs of the leaves are very fmall. *Katou Kadali*, Hort. Malab. v. 4. 91. t. 43, quoted for the prefent fpecies, has ftrongly five-ribbed leaves, and numerous corymbofe flowers, with an extremely hifpid calyx. We cannot think it belongs here, and ftill lefs the *Fragarius ruber* of Rumph. Amboin. v. 4. 135. t. 71, whofe flowers are defcribed as fmall and white. Thofe of *M. afpera* are acknowledged on all hands to be large and purple. The Eaft Indian *Melaftomæ* have not yet been carefully ftudied on the fpot, by any accurate botanift, and the fynonyms of this in particular have been much confufed.—See *M. cyanoides*, hereafter defcribed, a fpecies to be introduced between Willdenow's n. 56 and 57.

12. M. *ftrigofa*. Linn. Suppl. 236; excluding the fynonym.—Leaves ovate, three-ribbed, very briftly, entire. Flowers terminal, folitary. Calyx very briftly; its fegments broad and triangular.—Sent by Mutis from New Grenada. This is a much-branched *fhrub*, whofe numerous *leaves* are ovate, ftalked, about three-fourths of an inch long; paler, with three ribs very prominent, beneath. Every part is clothed with depreffed yellow briftles. *Flowers* large, terminal, folitary, purple, their petals fringed with briftles; and the *calyx* is peculiarly hifpid, with broad, fhort, triangular fegments. It is a very handfome and remarkable fpecies.

14. M. *velutina*. Willd. (M. holofericea; Herb. Linn Swartz. Obf. 176.)—Leaves three-ribbed, ovate, acute, entire, feffile, clothed on both fides with filky briftles. Clufter terminal, four-ranked; its branches cloven. Stem acutely quadrangular.—Native of Brafil, where it was gathered by father Panegai, and fent by Arduino to Linnæus; as well as by fir G. Staunton and fir J. Banks. We know no authority for its being found in Jamaica.—The *leaves* are from one to two inches long, feffile, remarkable for their denfe filky briftly clothing. They have three principal ribs, with occafionally two flighter ones near the margin, towards the bafe. *Flowers* large and handfome, purple, with a very filky calyx, and ten long ftamens.—This fpecies is totally diftinct from the original Linnæan *holofericea*, of which we fhall fpeak hereafter. See n. 53.

14—15. M. *cuprea*.—Leaves three-ribbed, elliptic-ovate, pointed, entire, on fhort ftalks; nearly fmooth above; clothed with denfe ftarry down beneath. Panicle terminal, thrice compound, with radiating branches.—Gathered in the Caraccas, by J. Mærter, M. D. The *branches*, *ftalks*, *germen*, and back of the *leaves*, are all denfely clothed with fine ftarry hairs, which, in a dried ftate at leaft, are of a rich copper-coloured brown. A portion of the fame is feen on the upper furface of each *leaf*, efpecially on the ribs. The fegments of the *calyx* are fmooth. *Flowers* very fmall and numerous, cluftered, and compofing a fpreading, very compound *panicle*, whofe branches fpread in a radiating manner, many from one point, the lower ones at each ramification being the fhorteft. *Petals* not expanded in our fpecimen.—This fhould be placed between the 14th and 15th fpecies of Willdenow. We can refer it to none that he enumerates.

14—15. M. *fquamulofa*.—Leaves three-ribbed, elliptical, obtufe, entire; fmooth above; hoary beneath. Panicles terminal, compact. Calyx angular, minutely fcaly.—Sent from New Grenada by Mutis to Linnæus. The *ftem* is woody. *Leaves* on fhort thick ftalks, rigid, elliptical, fcarcely two inches long, obtufe, entire, with three diftinct ribs, and numerous fine tranfverfe veins. The upper fide is green, quite fmooth and rather fhining; the under hoary, with very clofe, fomewhat fcaly, pubefcence. *Panicles* terminal, compound, compact, about three inches long, many-flowered. *Calyx* turbinate, with ten ribs, and five broad fhort teeth, covered all over with clofe-preffed fcurfy fcales. *Petals* five, fmall, round, apparently yellow. *Berry* fmall, furrowed, hoary. Sometimes the *flowers* appear to be fix-cleft.—This may ftand next to our *cuprea*, though it has no particular likenefs or affinity to that, or any other of this fecond fection, being moft allied to *liguftrina*, another new fpecies hereafter defcribed, from the fame country.

20. M. *trinervia*. Swartz. Ind. Occ. 774.—Leaves three-ribbed, fmoothifh, elliptical, acute at both ends; the lateral ribs near the margin. Spikes long, axillary, in pairs. Flowers oppofite or whorled.—Native of mountains in Jamaica. Introduced in 1793 into the ftoves at Kew, where it blooms in July. The *leaves* are a fpan long, ftalked, thin and pliant, of a broad, elliptical form, pointed at each end, pale beneath, with flightly downy veins. Thefe *leaves* are peculiar for having the fide ribs almoft marginal, and very remote from the midrib, with which however they are connected by numerous tranfverfe ribs, and reticulated veins. The inflorefcence is fo incorrectly defcribed, that had we not authentic fpecimens, we could not have been certain of our plant. The *flowers* are fmall, numerous, in long downy fpikes, two of which ftand together in the forks of the branches, and are perhaps originally terminal, as Dr. Swartz defcribes, but the branch is foon extended on each fide beyond them; neither are they *racemi*, for the *flowers* are perfectly feffile, in diftant pairs, or fometimes whorls.

21. M. *repens*. Willd. n. 21. Lamarck Illuftr. t. 361. f. 2.—"Leaves obovate, fmooth, three-ribbed, nearly entire. Flowers folitary, terminal. Stem creeping."—This, which is faid to come from China, does not appear to us different from the *octandra* of Linnæus, which varies in the number of parts in the flower, and will be hereafter defcribed. We are at leaft certain that the fynonyms of Ofbeck and Retzius, cited here by Willdenow, belong to the real *octandra*.

Section 3. *Stamens ten*; *leaves with three ribs combined at the bafe*.

23. M. *parviflora*. Aubl. Guian. 433. t. 171.—Leaves ovato-lanceolate, acute at each end, obfcurely toothed, triple-ribbed, fmooth. Panicle terminal, repeatedly three-forked.—Found by Aublet growing in moift fituations in Cayenne and Guiana, where the inhabitants call it *tincta*, after the Portuguefe, and ufe it in decoction to dye black. The *ftems* are upright, fhrubby, feven or eight feet high. *Leaves* a fpan long, pliant and quite fmooth, green on both fides, but paler beneath, on fmooth *footftalks*, fcarcely an inch in length. They have three principal ribs, which in Aublet's fpecimen unite into one a little above the bafe, at not more than half the diftance expreffed in his plate. There are befides, as ufual, a pair of much flighter marginal ribs, diftinct to the bottom of the leaf. A large, very compound, three-forked *panicle*, of fmall white *flowers*, terminates each branch; but it fometimes becomes lateral by the elongation of the branch beyond. The *berries* are fmooth, fcarcely fo big as a peppercorn, and of a blueifh colour. The plant bears flowers and fruit in April.

25. M. *arborefcens*. Aubl. Guian. 420. t. 163.—Leaves roundifh-

roundish-ovate, acute, entire, triple-ribbed, smooth. Corymbs lateral. Petals divided at the base.—Native of woods in Guiana. A *tree* 60 feet high, with very broad ovate smooth entire *leaves*, rather opaque and paler beneath, four or five inches long. Their three central ribs are united for half an inch above the base; two lateral ones spring from the bottom; and there is also a pair of very slight marginal ones, not expressed in the plate. The *flowers* are white, produced in lateral bracteated *corymbs*, from the sides of the branches, much below the foliage. The *petals* are described by Aublet with divided or double claws. *Berry* as big as a small medlar, yellow, sweetish, and eatable, known by the name of *mêle* among the colonists. It ripens in November.—Willdenow justly points out the near resemblance of this plant to the Linnæan *M. grossularioides*, a species we have not seen, any more than himself, but its *leaves* are said to be toothed and pointed.

27—28. M. *ligustrina*. Leaves triple-ribbed, ovate, obtuse, entire, quite smooth. Panicles terminal, compact. Calyx hemispherical, furrowed, smooth.—Sent from New Granada, by Mutis to Linnæus. The *stem* and *branches* are woody, and, like the whole plant, perfectly smooth. *Leaves* stalked, an inch long, broadish-ovate, obtuse, entire, with three strong ribs united for a short distance from the base; the transverse veins are very slender, and the marginal ribs scarcely discernible. The upper surface is dark green, and polished; under paler and opaque, with a yellowish tinge. *Flowers* in compound clusters or panicles like those of Privet. *Calyx* short and hemispherical, most deeply furrowed in the upper part, quite smooth, with short, broad, blunt teeth. *Petals* small, roundish, white or purplish. *Stamens* short, with broad blunt anthers. *Style* obtuse. *Stigma* concave. *Berry* small, yellowish. All the *flowers* seem five-cleft. This is most akin to our *M. squamulosa*, described in the second section, though abundantly distinct. Linnæus had determined the genus of both, but left them undescribed.

Section 4. *Stamens ten; leaves with five combined ribs.*

28. M. *agrestis*. Aubl. Guian. 425. t. 166.—Very hairy. Leaves ovate, long-pointed, crenate, fringed, quintuple-ribbed. Corymbs axillary and terminal, spreading.—Native of banks of rivers, and about old walls, in Cayenne. *Aublet.* The specific name therefore must allude to its roughness of habit, not to its place of growth. The dense rusty-red spreading hairs, which clothe the *branches*, *flower-stalks*, *footstalks*, ribs and margins of the *leaves*, give the plant a tawny hispid aspect. The *leaves* are truly ovate, pointed, very neatly and closely crenate, about three inches long; their ribs disposed exactly as in the *arborescens* last described, so that both species ought to stand in the same section, whichever that may be. Aublet's figure is by no means correct in this point, according to his own specimen, and has missed Willdenow.

29. M. *scandens*. Aubl. t. 172. is more correctly quintuple-ribbed, as that figure expresses; but yet not in so striking a manner as some following species.

30. M. *alata*. Aubl. Guian. 410. t. 158.—Leaves elliptic-oblong, acute at each end, entire, quintuple-ribbed; rough above; downy beneath. Stem winged.—Native of uncultivated ground in Guiana and Cayenne, flowering in September, and fruiting a month or two afterward. The *stems* are six or seven feet high, remarkable for their four membranous wings. *Leaves* sessile, seven or eight inches long and about half as wide, much elongated at each end; rough above; paler and clothed with soft tufted down beneath. They have two pair of ribs, branching at wide intervals from the central one, besides a slight, nearly marginal, nerve. *Panicle* terminal, large, with square, partly winged, stalks. *Flowers* in dense heads, small, whitish. *Berry* red, the size of a gooseberry, not very succulent. A decoction of the leaves is used to wash foul ulcers.

30—31. M. *nervosa*.—Leaves elliptic-oblong, acute at each end, slightly crenate, quintuple-ribbed; rather hairy on both sides. Spikes hairy, whorled.—Native of Jamaica. A specimen with the above name was given to the younger Linnæus from the Banksian herbarium. It was gathered by a man who deceived his employers, by pretending to have collected many of his plants at the isthmus of Darien; whereas it afterwards appeared he went no further than the West India islands. Hence some of his discoveries, being marked with a wrong place of growth, were not admitted by Dr. Swartz, (unless he had found them himself,) into his West Indian Flora. Such appears to be the case with the present *Melastoma*, which we cannot refer to any that is described. Its *leaves* agree much in size, form and ribs, with the *alata* last described; but they are crenate, and clothed with simple and longer hairs, especially the ribs. The *stem* is round, bristly, not winged. *Flowers* in sessile remote whorls, composing a long, terminal, hairy spike.

Section 5. *Stamens ten; leaves with at least five separate ribs.*

32. M. *hirta*. Linn. Sp. Pl. 559, excluding the synonyms of Plumier and Sloane. Swartz. Obs. 175. (M. n. 4; Browne Jam. 219. Arbuscula Jamaicensis quinquenervis minutissimè dentatis foliis et caule pubescentibus, flosculis ex sinu foliorum gemellis; Pluk. Almagest. 40. t. 264. f. 1.)—Leaves ovate, pointed, crenate, five-ribbed, hairy. Flowers axillary, somewhat corymbose, bristly as well as the branches.—Native of Brasil, as also of Jamaica. We have a specimen from Browne, nor can we account for the omission of this species in Swartz's Flora, as that author likewise mentions in his *Observationes* its growing on the woody hills of Jamaica, flowering in autumn and spring. The *stem* is shrubby, six feet high, the younger *branches* very hispid, as are the *footstalks*, *flower-stalks*, *calyx*, and both sides of the *leaves*, especially the under. All the pubescence is of a rusty hue. The *leaves* are broadly ovate, not at all lanceolate, with five distinct ribs, besides a pair scarcely discernible near the margin, towards the base. The *flowers* are white, few together, axillary and corymbose; sometimes said to be six-cleft.

34. M. *Acinodendron*. Linn. Sp. Pl. 558. Swartz. Obs. 174. (Christophoriana americana, malabathri foliis acuminatis, nervosis, dentatis; Pluk. Phyt. t. 159. f. 1.)—Leaves ovate, pointed, five-ribbed, finely toothed, slightly hairy. Panicle terminal, compound, three-forked, roughish. Flowers somewhat capitate.—Native of Surinam. *Baker. Herb. Banks.* Dr. Swartz remarks that this is an obscure species, the synonyms of which are much confounded. The Linnæan herbarium throws no light upon it, but we have received from sir J. Banks, under the name of *M. aurea*, which is very well suited to the colour of the dried leaves, a Surinam specimen, that indubitably accords with Plukenet's figure, which Linnæus commends; and as our specimen will not agree with any other described *Melastoma*, we refer it to the present, omitting all the synonyms as doubtful, except the above. The *branches* are smooth, slightly quadrangular upwards. *Leaves* about three inches long, on rather short hairy stalks, (the only character not expressed by Plukenet,) ovate, neatly toothed, with a short taper point, and five ribs connected by numerous transverse parallel veins. There is a very slight marginal rib near the base. A few golden hairs are sprinkled over the upper surface, and on the ribs of the lower. *Panicle* large and spreading, repeatedly three-forked, roughish with scattered stellated down. *Flowers*

uſually two or three together, ſeſſile, with a pair of *bracteas,* at the end of each ſtalk of the panicle. *Calyx* ſmooth, turbinate. *Petals* five, apparently white or yellowiſh, obovate.

35. M. *cymoſa.* Schrad. Sert. Hannov. 18. t. 8. Vent. Malmaiſ. t. 14. (M. corymboſa; Ait. Hort. Kew. ed. 2. v. 3. 46?)—Leaves ovate, ſomewhat heart-ſhaped, pointed, ſeven-ribbed, ſomewhat hairy, with minute briſtly ſerratures. Cyme terminal. Segments of the calyx triangular.—Native of South America according to Schrader; and, if we are right in the citation of Hort. Kew., of Sierra Leone alſo. It is not probable that ſo fine a plant, for many years paſt frequently ſeen flowering in the Engliſh ſtoves, ſhould not be included in that rich catalogue, and it anſwers moſt preciſely to the character there given under the name of *corymboſa,* except that the flowers are really cymoſe. We received a ſpecimen in 1803, from the botanic garden at Liverpool, with the appellation of *M. purpurea,* under which it ſtands in the catalogue of that garden, p. 250. The *ſtems* are erect, about two feet high, ſucculent, herbaceous, ſcarcely ſhrubby. *Leaves* two or three inches long, on longiſh ſtalks, tender, of a broad, ovate, pointed figure, very ſlightly cordate at the baſe, fringed with minute briſtly teeth directed forwards. The ribs are ſeven, beſides a minute marginal pair at the baſe. Both ſides are roughiſh with minute hairs; the under one paleſt, and moſt poliſhed. *Flowers* ſeveral, roſe-coloured, in a terminal, rather drooping, ſlightly downy cyme. There are five yellow abortive anthers; the five perfect ones are purpliſh.

37. M. *elegans,* beautiful as it appears in Aublet's t. 167, is in every reſpect ſo like *hirta,* ſee n. 32, except the deeper and double crenatures of the *leaves,* that we are perſuaded it is but a variety of that ſpecies. There is no difference in the *infloreſcence* or *flowers.*

40. M. *Maieta.* Lamarck Dict. v. 4. 34. (Maieta guianenſis; Aubl. Guian. 443. t. 176.)—Leaves elliptical, pointed, five-ribbed, minutely crenate, hairy, inflated at the baſe. Flowers axillary, ſolitary, ſeſſile.—Found by Aublet in Guiana, on the banks of a rivulet fifty miles from the ſea-coaſt, flowering and fruiting in November. It is a *ſhrub* two or three feet high, the branches and foliage rough with briſtly, prominent, ruſty hairs. *Leaves* oppoſite, but very unequal in ſize, elliptical with a taper point and five ribs, without any at the margin beſides. The larger *leaf* of each pair is from three to five inches long, and diſtinguiſhed by a bladder-like ſwelling, of two cells, at the baſe, moſt prominent at the upper ſide; the ſmaller *leaf* is from one and a half to two inches long, and is uſually deſtitute of any ſuch bladder. The *flowers* are white, axillary, and ſolitary, bracteated at their baſe. It is difficult to imagine what led Aublet to diſtinguiſh this, as a genus, from *Melaſtoma,* to which it has not the ſlighteſt pretenſions. The germen in the flower is indeed apparently ſuperior, and diſtinct from the body of the calyx; but ſuch is the caſe in many *Melaſtomæ,* though thoſe parts unite into a pulpy maſs as the fruit ripens.

41. M. *heterophylla.* Lamarck Dict. v. 4. 34; and

42. M. *phyſiphora.* (Tococa guianenſis; Aubl. 438. t. 174.) agree with the laſt in having a bladdery appendage to the baſe of the larger *leaves,* or, in the latter inſtance, to their *footſtalks.*

49. M. *groſſa.* Linn. Suppl. 236.—Leaves ſomewhat heart-ſhaped, five-ribbed, entire, very rough. Flowers terminal, corymboſe. Petals briſtly at the back.—Sent by Mutis from New Granada. This very magnificent ſpecies is diſtinguiſhed by its coriaceous and briſtly appearance. The *leaves* are ſcarcely two inches long, about one broad, with five ſtrong ribs, and numerous cloſe tranſverſe veins, clothed very denſely on both ſides, with innumerable, minute, rigid, curved briſtles; paler beneath. The *branches* and *ſtalks* are all equally hiſpid, and of a ruſty hue. *Flowers* very large, purple, about five or ſix in a terminal corymboſe head. Segments of the *calyx* long and lanceolate. *Petals* obovate, above an inch long, clothed at the back, like the *calyx,* with rigid upright briſtles.

50. M. *malabathrica.* Linn. Sp. Pl. 559. Curt. Mag. t. 529?) M. foliis lanceolato-ovatis ſcabris quinquenerviis; Linn. Zeyl. 76. n. 171. M. quinquenervia hirta major, capitulis ſericeis villoſis; Burm. Zeyl. 155. t. 73. Kadali; Rheede Malab. v. 4. 87. t. 42. Fragarius niger; Rumph. Amb. v. 4. 137. t. 72.)—Leaves elliptic-lanceolate, five-ribbed, entire, rough with depreſſed briſtles. Flowers terminal, corymboſe. Calyx clothed with fringed imbricated ſcales.—Native of the Eaſt Indies. It is ſaid to have been given to Kew garden by ſir G. Staunton in 1795. We quote the Botanical Magazine with doubt, becauſe the figure is unfortunately ſo contrived as not to ſhew the *calyx,* a moſt important part in this caſe; neither does the form of the *leaves,* or the ſituation of their lateral ribs, preciſely agree with our wild ſpecimens. Of the other ſynonyms we have no doubt. Burmann, whoſe remarks on this plant are very good, obſerves that the calyx is drawn ſmooth in Rheede's figure, though deſcribed rough. Rumphius moſt happily compares it to the calyx of *Centaurea Cyanus.* It is in fact clothed with fine ſharp-pointed fringed ſcales, ſuch as we have remarked in no other ſpecies. The *petals* are large and purple, ſmooth on both ſides, but fringed with briſtles. The young *branches, ſtalks,* and ribs of the *leaves,* are ſcaly in a degree like the *calyx.* Sometimes the lateral ribs are ſo ſmall and ſlender as to be ſcarcely diſcernible. A ſpecimen ſo circumſtanced is in the Linnæan herbarium marked *aſpera;* ſee n. 10.

50—51. M. *granuloſa.* Lamarck Dict. v. 4. 44.—Leaves ovato-lanceolate, five-ribbed, entire; rough above with cloſe-preſſed briſtles; downy beneath. Cluſter with corymboſe branches. Calyx ſilky. Stem winged.—Gathered by Commerſon in Braſil, and given by Thouin to the younger Linnæus. A magnificent ſpecies, with *leaves* five or ſix inches long, whoſe outermoſt ribs are united at the baſe to the next. Their upper ſurface is ſo granulated, as it were, with cloſe-preſſed briſtles, as to look like the ſurface of a ſtrawberry. The *ſtem* is briſtly, nearly in like manner, and has four membranous wings. *Flowers* purple, large, and handſome, in a compound forked cluſter. *Calyx* denſely covered with ſilky hairs. This *ſhrub* is about ten feet high.

53. M. *albicans.* Swartz. Ind. Occ. 786. (M. holoſericea; Linn. Sp. Pl. 559. Willd. n. 13. Arbor racemoſa braſiliana, foliis malabathri; Breyn. Cent. 1. 3. t. 2. 4.)—Leaves ovate, acute, five-ribbed, entire; poliſhed and naked above; ruſty-white with cottony down beneath. Cluſters terminal, cottony, with cymoſe branches. Flowers ſeſſile.—Native of Braſil and of Jamaica. A *ſhrub* ſix or eight feet high, with hoary *branches,* which are ſlightly angular. *Leaves* on ſhort, thick, hoary ſtalks, elliptic-ovate, acute, three or four inches long, very ſlightly heart-ſhaped at the baſe; perfectly ſmooth and highly poliſhed above, ſo as to look, when dried, like black Spaniſh leather, as Breynius very happily remarks; on the under ſide they are entirely clothed with denſe ſoft cottony down, white with a ruſty tinge, and have five ſtrong ribs, all united at a very ſmall diſtance above the baſe. The *cluſters* are compoſed of oppoſite forked or cymoſe branches. The *flowers* are ſeſſile, ſmall, with a cottony *calyx* and white *petals.*

About this species there has been great confusion. It is unquestionably the original *holosericea* of Linnæus, (admirably described and figured by Breynius,) but not that which he afterwards called so in his herbarium, and which Dr. Swartz described in his *Obs. Bot.*; see *velutina*, n 14. The name however of *holosericea* is not so applicable to the plant before us, as that given by Swartz, by which it is most generally known, and which for that reason we have retained, as the best means of avoiding mistake.

56—57. M. *cyanoides*. (Fragarius ruber; Rumph. Amb. v. 4. 135. t. 71. Katou-Kadali; Rheede Malab. v. 4 91. t. 43.)—Leaves ovate, acute, five-ribbed, entire; roughish on both sides with close-pressed bristles. Clusters terminal, forked. Calyx clothed with clustered bristles. Bracteas ovate, fringed.—Sent from Amboyna by the late Mr. Christopher Smith. We can refer it to none in Willdenow or Lamarck, but we quote without hesitation the above synonyms, which have been, surely erroneously, referred to the true *M. aspera*; see n. 10. The present is rather a small and weak *shrub*, with slender, grey, slightly bristly *branches*. *Leaves* bright green on both sides, paler beneath, ovate, rather pointed, three inches long, and above one broad, with five distinct ribs, of which the lateral ones are nearly as considerable as the rest. The upper surface is besprinkled with yellow close-pressed *bristles*; the under is chiefly bristly at the ribs and veins. *Footstalks* bristly, purplish, half an inch long. *Panicles* terminal, forked or corymbose, a little bristly, with a pair of ovate, concave, smooth though fringed *bracteas*, at each division. *Calyx* densely covered with clustered, sometimes palmate, whitish bristles, which are, as far as we have seen, peculiar to this species, and give the part in question a great resemblance to *Centaurea Cyanus*. The *petals* are said by Rumphius to be white; in the Hortus Malabaricus they seem implied to be purple. The *fruit* is compared by the former author to a strawberry, being redder on one side than the other. It is agreeably acid, with some astringency, and is given to children in Amboyna, to prevent what some learned corruptor of English may hereafter call lectimiction.

Section 6. *Stamens eight*; *leaves with three separate ribs*.

59. M. *microphylla*. Swartz. Ind. Occ. 813; is erroneously placed here. It has ovate, obtuse, hairy *leaves*, about an inch long, most evidently triple-ribbed. The *flowers* are small, with a very hispid *calyx*, and stand in the forks of the branches, one usually nearly sessile, with two or three others on capillary, hairy, simple stalks. The *fruit* looks like that of a *Croton*, but has four furrows; nor are the leaves dissimilar to some of that genus, yet we cannot refer our plant to *M. crotonifolia*, n. 35. of Lamarck. The present species is but ill compared by Swartz to his *hirsuta*, which we have from himself, and which is more related to *hirta*; see n. 32. It must always be remembered that these sections of the genus, which we have adopted from Willdenow, are entirely artificial, as well as somewhat inconstant.

61. M. *capillaris*. Swartz. Ind. Occ. 808.—Leaves lanceolate, pointed, three-ribbed, smooth, nearly entire. Stalks axillary, capillary, three-flowered. Native of hills in the south parts of Jamaica. A very fair example of this section. It is remarkable for its extremely minute, whitish, short-lived *flowers*, which stand, three together, on roughish, capillary, axillary stalks. The *calyx* has four minute upright teeth. The *berry* also is perhaps the smallest in the whole genus. The young *leaves* are somewhat downy beneath, but the full-grown ones are smooth, three inches long, narrow, taper-pointed, pale at the back, with three ribs, and strong, simple, transverse veins. We have a specimen from its discoverer.

64. M. *glandulosa*. Swartz. Ind. Occ. 799.—Leaves ovate, entire, with three ribs besides the marginal ones, hispid on both sides, with axillary tufts of bristles at the veins beneath. Panicles terminal, three-forked, very rough. Gathered by Masson and Swartz on the loftiest hills of Jamaica. This is akin to some of the roughest leaved species before described, but distinguished by pale tufts of bristles at the separation of each vein from the midrib beneath. The *leaves* are about three inches long, and more than one broad; the bristles of their upper side most rigid, yellow and hooked. *Panicle* spreading, many-flowered, excessively hispid. *Petals* four, with longish claws. *Stamens* eight. *Anthers* bordered at each side with a yellow membrane. *Style* long and prominent. We cannot but remark that this is properly a five-ribbed species, and ought to stand in a section hereafter mentioned.

67. M. *octandra*. Linn. Sp. Pl. 560. (M. foliis lanceolatis trinerviis glabris, margine hispidis; Linn. Zeyl. 76. n. 173, excluding the synonyms. M. repens; see n. 21.)—Leaves ovate, entire, three-ribbed, smooth, with a simple marginal row of close-pressed bristles. Flowers terminal, mostly solitary. Calyx bristly.—Native of Ceylon and China. The *stem* is rather woody, but prostrate, branched and creeping. *Leaves* about an inch long, of a broad ovate obtuse figure, three-ribbed, besides an occasional pair of obsolete marginal ribs; dark green above; very pale and yellowish beneath; smooth and naked on both sides, except a few hairs on the ribs beneath, and a very remarkable row of marginal close-pressed oblique bristles, on the upper side, resembling stitches of thread; these are sometimes partially wanting. *Flowers* terminal, mostly solitary, large, purple, very handsome. *Calyx* clothed with simple incurved bristles. *Petals* fringed, barbed at the summit with a bristly tuft.

Lamarck was led by the synonym of Burmann, erroneously quoted by Linnæus, to describe and figure this real *M. octandra* of the latter as a new species, by the name of *repens*. This name however we should wish to retain, as the *flowers* in our specimens are most frequently five-cleft and decandrous. We know not why the *leaves* have ever been described as in any degree lanceolate, they being truly ovate. Half the *stamens* appear to be always abortive.

69. M. *tetrandra*. Swartz. Ind. Occ. 795.—Leaves three-ribbed, oblong, pointed, entire, smooth, with a notch at the base. Cluster erect, terminal. Stamens four.—Native of the Blue mountains in the south of Jamaica, but very rare. Flowering in May. This is a middling-sized *tree*, whose young branches are square, and nearly smooth. *Leaves* three or four inches in length, and one in breadth, on long stalks, smooth, entire, pointed, rounded at the base, with a notch at the footstalk. They have one strong central rib, with a slight marginal pair only. The *flowers* we have not seen. Dr. Swartz describes them as small and white, in a terminal compound cluster, which is rough with rusty mealiness. They are four-cleft, with but four *stamens*. *Berry* minute, roundish.

71. M. *angustifolia*. Swartz. Ind. Occ. 796.—Leaves three-ribbed, linear-lanceolate, entire; hoary beneath. Branches wand-like. Clusters terminal, repeatedly three-forked, mealy and rusty.—Native of Jamaica and other West Indian islands. A slender *shrub*, distinguished by its elegant narrow *leaves*; of a bright yellowish-green, and smooth, above; hoary and slightly rusty, with beautifully regular transverse veins beneath. *Clusters* terminal, stalked, with

with many forked, ſpreading, cymoſe branches. *Calyx* mealy. *Petals* four, pale yellow. *Stamens* eight.

Section 7. *Stamens eight; leaves with three combined ribs.*

78. M. *ſcabroſa*. Linn. Sp. Pl. 558. Swartz. Obſ. 174. (M. n. 5; Browne Jam. 219. t. 24. f. 3.)—Leaves ovate, crenate, triple-ribbed, rough and hairy. Branches denſely ſhaggy. Flowers axillary, aggregate, octandrous.—Native of the cooler mountains of Jamaica. A *ſhrub* about a man's height, whoſe branches are denſely covered with ſhort ſhaggy hairs, like the ſtalks and ribs of the *leaves*, which laſt are broad-ovate, three inches long, very harſh and hiſpid on both ſides, furniſhed with three ribs combined at their baſe, and two diſtinct ones nearer the margin, which is irregularly crenate. Swartz deſcribes the *flowers* as very minute, pale red, ſeſſile and axillary. Of theſe Browne's ſpecimen in the Linnæan herbarium retains two or three, which however ſtand on ſtalks, about as long as the *calyx*. The ſegments of the latter are awl-ſhaped.

Section 8. *Stamens eight; leaves with five ribs.*

80. M. *umbroſa*. Swartz. Ind. Occ. 817.—Leaves roundiſh-ovate, pointed, finely toothed, hairy on both ſides. Cluſters axillary, compound, briſtly, ſpreading.—Found in ſeveral of the Weſt Indian iſlands. This ſpecies has very hiſpid *branches* and *ſtalks*, and is remarkable for its large, almoſt round, taper-pointed *leaves*, broader than the hand, which have five ribs, beſides the marginal ones, all running from the baſe to the extremity. The *cluſters* are axillary, and in pairs, ſcarcely longer than the footſtalks, twice compound, ſpreading widely. *Bracteas* ſpatulate, recurved, briſtly. *Flowers* white, very ſmall.

85. M. *coccinea*. Vahl. Eclog. v. 1. 48.—Leaves elliptic-ovate, pointed, five-ribbed, entire, ſmooth. Branches hiſpid at intervals.—Native of the iſland of Montſerrat. *Stem* arboreous. *Branches* bluntly quadrangular, hollow, knotty, clothed here and there with irregular interrupted tufts of horizontal pale hairs, like radicles. *Leaves* ſeveral inches in length and breadth, ſmooth, entire, with five ribs beſides the two marginal ones, the three in the centre ſlightly combined at their baſe. The *flowers* are ſaid to be ſcarlet, or occaſionally white, forming a terminal *thyrſus*, which we have ſeen but in an imperfect condition. S.

Melastoma, in *Gardening*, contains plants of the evergreen tree and ſhrubby exotic kinds, of which the ſpecies cultivated are, the American gooſeberry of Surinam (M. groſſularioides); and the ſattiny-leaved melaſtoma (M. holoſericea).

But there are other ſpecies which may be cultivated.

Method of Culture.—Theſe tender plants are beſt obtained by having the entire fruits put up in their native places in dry ſand as ſoon as ripened, and immediately forwarded, which as ſoon as they arrive ſhould be taken out, and the ſeeds ſown in pots of light earth, plunging them in a moderate hot-bed of tanners' bark: when the plants are up, and fit to remove, they ſhould be planted each in a ſmall pot of light earth, replunging them in the tan-bed of the ſtove.

Afterwards they require the management of other woody ſtove-plants.

And they may alſo be increaſed by laying the young branches in the ſpring, or by planting cuttings of the young ſhoots in the ſummer ſeaſon in pots, and plunging them in a hot-bed. They ſhould afterwards have the ſame culture as the other kinds.

MELASTOMÆ, in *Botany*, a very beautiful but not extenſive natural order in Juſſieu's ſyſtem, of which the genus from whence the name is derived makes the principal part. (See Melastoma.) This order is the 90th of Juſſieu, the eighth of his 14th claſs. The characters of that claſs are given under the article Ficoideæ. It has two cotyledons, many petals, and ſtamens inſerted into ſome part of the calyx.

The *Melaſtomæ* are thus diſtinguiſhed.

Calyx of one leaf, tubular, either ſuperior or inferior, ſimple or ſurrounded with ſcales. *Petals* ſeveral, of a definite number, inſerted into the top of the calyx, equal in number to its ſegments and alternate with them. *Stamens* inſerted into the ſame place, of a definite number, which is double that of the petals; the top of the filaments, beneath the anthers, moſtly furniſhed with two briſtles, or two auricles; anthers long, beaked at the ſummit, attached by their baſe to the top of the filaments, and, at firſt, drooping, in conſequence of the filaments being bent inwards; but as the latter afterwards become ſtraight, the anthers riſe upwards. *Germen* ſometimes ſuperior, enfolded by the calyx, ſometimes inferior; ſtyle ſolitary; ſtigma ſimple. *Fruit* either pulpy or capſular, inveſted, when ſuperior, with the calyx, which is contracted above; when inferior, attached to the ſame part, and ſwelling beneath it, of many cells, with numerous ſeeds in each cell. *Corculum* ſuſpected by Juſſieu to be unaccompanied with albumen. *Stem* rather arboreous, or ſhrubby, or rarely herbaceous. *Leaves* oppoſite, ſimple, with three or more longitudinal ribs. *Flowers* oppoſite, either axillary or terminal, their ſtalks either ſingle or many-flowered.

The firſt ſection is ſaid to have an inferior germen, and conſiſts of *Blakea* of Browne and Linnæus, to which it is doubtful whether the *Blakea* of Aublet be properly united as one genus; *Melaſtoma*, ſee that article; and *Triſtemma*, a genus of Juſſieu's, brought by Commerſon from the Mauritius.

Section the ſecond is characterized by a ſuperior germen, and conſiſts of *Topobea* of Aublet, with *Tibouchina*, *Mayeta* or *Maieta*, and *Tococa* of the ſame author, which two laſt are now referred to *Melaſtoma*, there being really no generic diſtinction. To theſe are added *Oſbeckia* and *Rhexia* of Linnæus, whoſe fruits are capſular.

The plants of this order are, on the one hand, akin to the *Myrti*, and on the other to the *Salicariæ*, but diſtinguiſhed from both by their very conſpicuous large and long-beaked anthers, with appendages at their baſe. By the definite number of their ſtamens they are moreover diſtinguiſhed from the *Myrti*, to which we may add the peculiarly ribbed leaves, and rigid depreſſed pubeſcence, of many ſpecies, and the want of an aromatic quality. To the *Salicariæ* they are more ſimilar in habit.

Number of parts is one of the moſt variable circumſtances belonging to this order, the ſtamens differing in different ſpecies, and even varying ſometimes in the ſame, from eight to ten, or from ten to twelve; and conſequently the petals and calyx-teeth from four to five or ſix; of which the genus *Melaſtoma* affords inſtances.

MELAVERD, in *Geography*, a town of Perſia, in the province of Irak; 45 miles N.E. of Iſpahan.

MELAUI, or Mellavoué, a ſmall and tolerably handſome town of Egypt, ſituated half a league from the W. bank of the Nile, and the reſidence of a "kiaſchef." The plain ſurrounding it is very fertile, particularly in corn, a great quantity of which is exported by way of Cairo, Suez, and the Red ſea to Mecca, and other parts of Arabia. The Chriſtians have no church, but repair to the convent on the other ſide; 120 miles S. of Cairo. N. lat. 28° 2′.

MELAZZO, or Milazzo, anciently *Mylæ*, a ſea-port town of Sicily, in the valley of Demona, ſituated in a bay on the N. coaſt of the iſland. It conſiſts of two parts, one of which ſtands on a promontory of the ſame name, and

and is fortified: the other, on a bay, with a good harbour, the entrance of which is defended by a castle; 18 miles W. of Messina. N. lat. 38° 16'. E. long. 15° 23'.

MELBON, one of the cluster of the "Seven Islands," in the English channel, near the coast of France. N. lat. 48° 54'. W. long. 3° 22'.

MELBY, a town of Norway, in the province of Aggerhuus, on the Glomme; 55 miles N.E. of Christiania.

MELCAPOUR, a town of Hindoostan, in the Candeish; 20 miles S. of Burhampour.

MELCHITES, or MELECHITES, in *Ecclesiastical History*, were those Christians in Syria, Egypt, and the Levant, who in the seventh century, though not Greeks, followed the doctrines and ceremonies of the Greek church. They were called *melechites*, i. e. *royalists*, from the Hebrew *melech*, *king*, by their adversaries, by way of reproach, on account of their implicit submission to the edict of the emperor Marcian, in favour of the council of Chalcedon. For the same reason the emperor Justinian had the epithet Chalcedonensis given him.

MELCHIZEDECH, in *Biography*, king of Salem, and priest of the most high God, is mentioned in the scriptures, but without any reference to his genealogy, or to his birth or death: and in this sense, it has been asserted, he was a figure of Jesus Christ, as is affirmed in the epistle to the Hebrews, "Who is a priest for ever, according to the order of Melchizedech," and not according to the order of Aaron, whose origin, life, and death are known. When Abraham returned from pursuing the confederate kings, who had defeated the kings of Sodom and Gomorrah, and had taken away Lot with them, Melchizedech came to meet Abraham, and presented to him bread and wine with his benediction. (Gen. xiv. 17, &c.) Abraham, being desirous to acknowledge in him the quality of priest of the Lord, offered him the tythes of all that he had taken from the enemy. After this time there is no mention made of Melchizedech, till the 110th psalm, where, in allusion to the Messiah, it is said, "Thou art a priest for ever after the order of Melchizedech." It having been asserted, that he was without father or mother, some of the early Christians assumed that he was a celestial being, superior to angels. These obtained the name of *Melchizedechians;* which see.

MELCHIZEDECHIANS, or MELCHISEDEKIANS, ancient sectaries, so called, because they raised Melchizedech above all creatures, and even above Jesus Christ.

The author of this sect was one Theodotus; whence the Melchizedechians become more commonly known by the name of Theodotians; all the difference between those and the strict Theodotians consisting in that particular article relating to Melchizedech; who, according to them, was the great and supreme virtue.

This sect was revived in Egypt towards the close of the third century by Hierax. (See HIERACITES.) Those also in later times, who have maintained that Melchizedech was the son of God in a human form, may be distinguished by this appellation. See Cunæus de Rep. Hæbræorum.

MELCK, or MÖLK, in *Geography*, a town of Austria, near the Danube. In its vicinity is a famous cloister of Benedictines, seated on a rock; its library is said to consist of some curious and valuable MSS.; 11 miles W. of St. Polten.

MELCOMBE-REGIS, a borough and market-town in the hundred of Uggescombe, Dorchester division of the county of Dorset, England, is situated eight miles from Dorchester, 127 miles from London, at the mouth of the river Wey, which separates it from Weymouth. The population of Melcombe in the year 1801, according to the return made to parliament, was 2350, occupying 471 houses. This borough has sent two representatives to parliament ever since the reign of Edward II. Melcombe and Weymouth are so frequently joined in ancient grants, that there is some difficulty in separating them; though each had distinct privileges; of which Melcombe, being the favoured borough, and part of the demesne of the crown a considerable time before Weymouth, had the greatest share, and is principally noticed in succeeding charters to the exclusion of its neighbour. Hence arose disputes between the rival boroughs respecting their privileges: and the contention had arrived to so great a height in the reign of Elizabeth, that the expediency of a union became apparent; and they were accordingly incorporated by an act passed in the 13th year of that queen (afterwards confirmed by James I.) and directed to be called "The united town and borough of Weymouth and Melcombe-Regis." The civil government, with other local circumstances relative to Melcombe, will be found under WEYMOUTH. Sir James Thornhill, the celebrated painter of the cupola of St. Paul's cathedral and the halls of Greenwich hospital and Blenheim, was born at Melcombe in the year 1675, and died at his seat at Thornhill, near this town in 1734. (See THORNHILL.) Beauties of England and Wales, vol. iv. Hutchin's History of Dorchester, 2 vols. folio.

MELCONDA, a town of Hindoostan, in Dowlatabad; 23 miles W. of Beder.

MELDAL, a town of Norway, in the province of Drontheim; 30 miles S.S.W. of Drontheim.

MELDFEE, in our *Old Writers*, a recompence due and given to him that made the discovery of any breach of penal laws, committed by another person, called the promoter's or informer's fee.

The word is Saxon, from *meldfeoh*.

MELDOLA, in *Geography*, a town of Italy, in the department of the Rubicon; seven miles S. of Forli.

MELDORP, a sea-port of Holstein, at the mouth of the river Myle; 50 miles N.W. of Hamburgh. N. lat. 54° 10'. E. long. 9° 4'.

MELDRUM, a town of Scotland, in the county of Aberdeen, being a burgh of barony, and holding a weekly market; 16 miles N.N.W. of Aberdeen.

MELEAGER, in *Biography*, a Greek poet, son of Eucrates, was a native of Gadara, in Syria, or of Atthis, a village in its territory, and is supposed to have flourished about a century before the Christian era. He spent his youth chiefly at Gadara, where he formed himself upon the style and manner of Menippus, an elder poet of that place. He afterwards resided at Tyre, and finally passed over to Cos by way of refuge from the wars which ravaged Syria, and died there at an advanced age. He was the first who made a collection of the short poems called by the Greeks epigrams. Of these he formed two sets, under the title of "Anthologia," the *first* of which was a lamentable proof of the licentiousness of the age and country; the *second*, consisting of miscellaneous pieces, has formed the basis of the later anthologias of Agathias and Planudes. Many of the poems are the work of Meleager, and possess much elegance: an edition of the poems was given by Brunck in 1709. Gen. Biog.

MELEAGRIS, in *Natural History*, a genus of birds of the order Gallinæ. Bill conic, incurvate; head covered with spongy caruncles; chin with a longitudinal membranaceous caruncle; tail broad, expansile; legs spurred. According to Buffon, there is but one known species, which he says is a large unwieldy bird, the anterior part of the head

head is ſtrangely covered and ornamented with a pendulous, ſoft, and fleſhy ſubſtance, as alſo are the ſides of the head and throat; the eyes are ſmall, but bright and piercing; the bill convex, ſhort and ſtrong; a long tuſt of coarſe black hairs on the breaſt, the wings moderately long, but not at all formed for ſupporting ſo large a bulk in long flights; the legs moderately long, and very robuſt. In Gmelin's edition of Linnæus, two ſpecies are mentioned, namely, the Gallipavo and Satyra, of which the following are the characteriſtics.

Species.

Gallipavo. Front and chin carunculate; breaſt of the male tufted. It inhabits America; is above three and a half feet long, is domeſticated every where, and varies much in its colours; in a wild ſtate, it lives in woods and feeds on nuts, acorns, and inſects; rooſts on the higheſt trees, is very iraſcible and impatient of any thing red; the cock ſtruts with an inflated breaſt, expanded tail, red face and relaxed frontal caruncle, and makes a ſingular inward noiſe, which, when it is uttered, ſhakes the whole body; eggs numerous, white, with reddiſh or yellow ſpots; it has eighteen tail-feathers. The female has no ſpur.

Satyra. Head with two horns; body red with eye-like ſpots. This is called the horned turkey. It inhabits India, and is leſs than the laſt ſpecies. The bill brown; noſtrils, front, and area of the eyes covered with black hair-like feathers; crown red; horn callous, blue, bent back; caruncle of the chin dilatable, blue, varied with rufous; legs whitiſh, ſpurred; it has 20 tail-feathers. The female has its head covered with feathers, without horns or gular caruncle; feathers of the head and upper part of the neck black-blue, long, decumbent; reſt of the body as in the male, red, with eye-like ſpots; ſpurs more obtuſe.

Meleagris, the Guinea-hen or Pintado, a ſpecies of *Numida*; which ſee.

Meleagris, in *Zoology*, a ſpecies of *Anguis*.

MELEDA, in *Geography*, an iſland in the Adriatic, ſeparated from the peninſula of Sabioncello by a narrow channel, belonging to the republic of Raguſa. It is about 30 miles long, and of an unequal breadth, and is interſected by many bays and inlets, which afford good harbours for fiſhermen. It produces vines, orange and lemon trees, but not ſufficient corn for the inhabitants, who amount to about 2000, occupying ſix or ſeven villages. N. lat. 43° 5'. E. long. 17° 44'.

MELELA, a town of Africa, in Barca; 76 miles S.W. of Tolometa.

MELEMBA, a town of Cacongo. S. lat. 5° 30'. E. long. 11° 55'.

MELENES, a ſmall iſland in the Engliſh channel, near the coaſt of France. N. lat. 48° 48'. W. long. 3° 31'.

MELENKI, a town of Ruſſia, in the government of Vladimir, on the Oka; 44 miles S.E. of Vladimir. N. lat. 60° 24'. E. long. 41° 24'.

MELES, Badger, in *Zoology*, a ſpecies of *Urſus*; which ſee.

MELETIANS, in *Eccleſiaſtical Hiſtory*, the name of a conſiderable party, who adhered to the cauſe of Meletius, biſhop of Lycopolis, in Upper Egypt, after he was depoſed about the year 306, by Peter, biſhop of Alexandria, under the charge of his having ſacrificed to the gods, and having been guilty of other heinous crimes; though Epiphanius makes his only failing to have been an exceſſive ſeverity againſt the lapſed. This diſpute, which was at firſt a perſonal difference between Meletius and Peter, became a religious controverſy; and the Meletian party ſubſiſted in the fifth century; but was condemned by the firſt council of Nice.

MELETIN, in *Geography*, a river of European Turkey, which runs into the Pruth, 12 miles N. of Jaſſi, in the province of Moldavia.

MELETZKOI, a town of Ruſſia, in the province of Tobolſk; 44 miles N. of Archinſk.

MELFI, a town of Naples, in Baſilicata, the ſee of a biſhop, containing ſeven churches and eight convents; five miles N.W. of Venoſa. N. lat. 41° 1'. E. long. 15° 39'.

MELFORD, Long, an extenſive village, ſituated near the river Stour, in the hundred of Babergh, and county of Suffolk, England. It is about one mile in length, whence the characteriſtic appellation *long*, and contains, according to the parliamentary returns of 1801, 450 houſes, and 2204 inhabitants, *viz.* 1034 males and 1173 females. Of theſe 1837 were returned as employed in different departments of trade. Few villages in England can boaſt of a more agreeable ſituation than this, the immediate vicinity being diſtinguiſhed by much beautiful and pictureſque ſcenery. The church, which ſtands on an elevated ſpot at the north end of the village, is a curious piece of architecture in the pointed ſtyle of the fifteenth century. Its length is 180 feet, excluſive of the ſchool-houſe at the weſtern extremity. The chancel, or eaſt end, is diſtinguiſhed for its maſonry, conſiſting of flint work, and ſquared ſtones; and beneath the parapet is an inſcription in old letters. In the north aiſle is an altar tomb for William Clopton, eſq., whoſe ſtatue, in armour, reſts on the top; he died in 1446. His ſon, John Clopton, who was ſheriff of the counties of Norfolk and Suffolk in the time of Henry VI., was interred under an altar tomb in the chancel. Near the communion table is a large and ſtately marble monument to the memory of ſir William Cordell, who was ſpeaker of the houſe of commons in the reign of queen Mary. This gentleman founded an hoſpital here, which is ſtill ſtanding, almoſt cloſe to the church. It is a reſpectable brick building, and is ſufficiently endowed for the ſupport of a warden, twelve poor men, and two women, who are required to be old and decayed houſekeepers of Melford. Several Roman urns have been dug up in this pariſh within theſe few years. At a ſhort diſtance eaſt of the church is Melford Hall, the ſeat of ſir H. Parker, bart. The houſe, a large brick building, appears to be of the age of queen Elizabeth. At the diſſolution of religious houſes, this eſtate was granted to ſir William Cordell. About half a mile north of the church is Kentwell Hall, formerly the ſeat of the Cloptons, but now the ſeat of Richard Moore, eſq. The houſe is large, and was formerly ſurrounded by a moat, three ſides of which are ſtill remaining; the fourth, or eaſt ſide, has been filled up. Beauties of England and Wales, vol. xiv. by F. Shoberl. Kirby's Suffolk Traveller.

MELGAR, a town of Spain, in Old Caſtile; 23 miles W.N.W. of Burgos.

MELGASSO, a town of Portugal, in the province of Entre Duero e Minho, ſituated on the Minho, and defended by a caſtle; 30 miles N. of Braga. N. lat. 42° 5'. W. long. 8°.

MELHANIA, in *Botany*, Forſk. Ægypt.-Arab. 64. Juſſ. 277; a genus of Forſkall's, named by him from Melhân the Arabic appellation of the hill upon which he gathered it, and which is rich in curious plants. He deſcribes this as a branched ſpreading *ſhrub*, two cubits high, with ſoft, ovato-lanceolate, ſerrated *leaves*, and yellow, axillary, ſtalked *flowers*. The *calyx* is double; the outer of three, inner of five, leaves. *Stamens* five, inſerted into a nectari-

ferous

ferous crown, with five intermediate linear bodies, exceeding them in length. *Style* one, with five stigmas. *Capsule* globose, of five cells and five valves. *Seeds* four in each cell, angular, dotted.

The only species in *M. velutina*, described above. Jussieu suspects it to be of the same genus as *Dombeya* and *Assonia* of Cavanilles, both united under the latter name by Schreber. Our plant is *Dombeya velutina*, Willd. Sp. Pl. v. 3. 726. (Pentapetes velutina; Vahl. Symb. v. 1. 49.) We have already objected to this *Dombeya* in describing the true one. See Dombeya.

MELHUA, or Melluah, in *Geography*, a town of Syria, in the desert; 20 miles S.E. of Aleppo.

MELIA, in *Botany*, a name adopted by Linnæus for this tree, apparently because its leaves resemble those of the *Ash*, which is doubtless the true Μελια of the ancient Greeks. Linn. Gen. 211. Schreb. 286. Willd. Sp. Pl. v. 2. 558. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 3. 39. Juss. 265. Lamarck Illustr. t. 352. Cavan. Diss. 363. (Azedarach; Tournef. t. 387.)—Class and order, *Decandria Monogynia*. Nat. Ord. *Trihilatæ*, Linn. *Meliæ*, Juss.

Gen. Ch. *Cal.* Perianth of one leaf, very small, five-toothed, erect, obtuse. *Cor.* Petals five, linear-lanceolate, spreading, long. Nectary cylindrical, of one leaf, the length of the corolla, with a ten-toothed mouth. *Stam.* Filaments ten, very small, situated within the apex of the nectary; anthers oblong, not protruding beyond it. *Pist.* Germen conical; style cylindrical, the length of the nectary; stigma capitate, with five, conniving valves. *Peric.* Drupa globose, soft. *Seed* a roundish, five-furrowed, five-celled nut.

Ess. Ch. Calyx five-toothed. Petals five. Nectary cylindrical, toothed at its mouth, bearing the anthers. Drupa a nut of five cells.

1. M. *Azedarach.* Common Bead-tree, or Pride of China.—Linn. Sp. Pl. 550. Sims in Bot. Mag. t. 1066. Sm. Ins. of Georgia, v. 2. t. 90.—Leaves bipinnate; leaflets smooth, about five. Native of Syria, and common in Spain. Cultivated, in 1656, by Mr. John Tradescant jun. It flowers from June to August. This beautiful *tree* grows to a large size in warm countries, and is much branched. *Leaflets* ovate, notched, pointed, green above, paler beneath. *Flowers* lateral, in long, loose panicles. Petals white, streaked with pink. *Fruit* oblong, the size of a cherry, of a pale yellow when ripe.—The pulp which surrounds the nut is poisonous, and "in the southern parts of Europe, the *nuts* are threaded for beads to assist the devotion of good Catholics, for which purpose they are peculiarly suited, having a natural perforation through the centre; hence the tree has been called *arbor sancta*, and by the Spaniards *arbol parayso.*" *Sims.*

2. M. *sempervirens.* Evergreen Bead-tree. Swartz. Prod. 67. Ind. Occ. v. 2. 737. (M. Azedarach β; Linn. Sp. Pl. 550. Azadirachta indica, &c.; Com. Hort. Amst. v. 1. 147. t. 76.)—Leaves bipinnate; leaflets somewhat rugose, generally about seven.—A native of the East and West Indies, in which latter country it is called Indian lilac. In separating this from the last species, we have the authority of Swartz, who says that the whole plant is considerably smaller, that the *leaflets* are of a brighter green, seldom more than seven, somewhat wrinkled, more deeply and unequally serrated and pointed. In addition to these marks of distinction its *foliage* is not deciduous. The author of the Botanical Magazine has not thought proper to disunite them, but we do not think his reasons conclusive.

3. M. *Azadirachta.* Ash-leaved Indian Bead-tree. Linn. Sp. Pl. 550. Cavan. Diss. t. 208. (Aria Bepou; Rheed. Hort. Mal. v. 4. t. 52.)—Leaves pinnate.—A native of the East Indies, flowering in June and July.—The stem of this tree is large and thick. The *wood* of a pale yellow; the *bark* of a dark purple, and very bitter. *Leaves* composed of five or six pairs of oblong, pointed leaflets, terminated by an odd one. These are opposite or alternate, on long footstalks, smelling disagreeably. *Flowers* small, white, lateral, in long, branching panicles. *Fruit* oval, the size of small olives, green, turning yellow, and purple when ripe; its pulp abounds with an acrid and bitter oil, some of which was sent by Dr. Roxburgh to the President of the Linnæan society in 1792, with the character of an excellent vermifuge.

4. M. *dubia.* Cavan. Diss. 364.—Leaves bipinnate; leaflets broadly lanceolate, acute, serrated, the terminal one larger. Sent by M. Sonnerat to Lamarck from the East Indies.—All that we know of this species is from Cavanilles, who says that he saw a single specimen of it in Lamarck's herbarium without any name, but that he easily discovered it belonged either to *Trichilia* or *Melia*, and that he referred it to the latter genus from its fruit. The *flowers* resemble those of *M. Azadirachta*.

5. M. *composita.* Willd. n. 5.—Leaves pinnate; lower leaflets ternate, on stalks. Calyx and corolla downy.—A native also of the East Indies.—At the end of Willdenow's description of this species, he says, that *M. dubia* of Cavanilles seems very nearly allied to it.—It occurs nowhere but in the above quoted author, upon whose sole authority we adopt it. The pubescence of the *calyx*, and outer side of the *petals*, seems to be the great mark of distinction. The *fruit* is unknown.

Melia, in *Gardening*, comprises plants of the deciduous and evergreen exotic tree kinds, of which the species cultivated are; the common bead-tree (M. azedarach); the evergreen bead-tree (M. sempervirens); and the Indian evergreen bead-tree (M. azadirachta.)

Method of Culture.—These different plants are all capable of being increased by seeds, which in the first sort are obtained from abroad, and should be sown in pots of light rich earth in the spring, plunging them in a hot-bed of tanners' bark or dung, under frame and glasses, giving frequent waterings, and fresh air, when the plants are come up, being fully exposed in a moderate shade, during the summer, and placed under a frame in the autumn, &c. to have the free air all winter in open weather, and be sheltered from frost.

But in the following March they should be planted in separate small pots, plunged in a bark-bed, &c. Though this last is not absolutely necessary, yet when practised, it greatly facilitates their rooting and early growth.

After they have been managed in this way for three or four years, and shifted occasionally into larger pots; some of the strongest and most woody plants may be planted out in the full ground under a warm wall, or in a dry sheltered part of the shrubbery. The proper season for this work is the first fortnight in April. And some plants should likewise be placed in pots, to have the management of green-house exotic plants, lest those in the open ground should be destroyed by the frost during the winter season.

The seeds in the second and third sorts, should be sown in pots, and plunged in the bark-bed, and managed nearly as the first sort; but, as being much more tender, must be always kept in pots, and plunged in the tan-bed in the stove during their early growth; afterwards, when they have acquired considerable size and strength, they may be placed in the open air for a month or two in the heat of summer, but the rest of the year be kept in the hot-house; managing them as other woody exotic stove plants.

It

It may be noticed that the laſt ſort is not common in the gardens.

In regard to the firſt ſort, it is proper for ſhrubberies and other parts in warm ſituations, as well as for the green-houſe, and the others for ſtove collections, in mixture with the more tender plants.

MELIA *Terra*, in *Natural Hiſtory*, a name given by ſome authors to the *melinum*, or white earth of the iſland of Melos, uſed among the ancients in painting; but in the works of Dioſcorides and Galen ſignifying a ſubſtance of a very different kind; the melinum of the painters having been a marle, and the melia terra of the phyſicians a tripela.

The terra melia of Dioſcorides, and the ancient phyſicians, is a dry looſe, and harſh earth, found in maſſes of different ſize, and lodged among the looſer ſtrata of other matter, never making a ſtratum of itſelf. It is very firm and hard, of a pale greyiſh-white or light aſh-colour, very heavy, of a looſe, open, and ſpungy texture, and of a rough uneven, and duſty ſurface. It adheres ſlightly to the tongue, and does not ſtain the hand, and leaves a duſt after the handling, which is ſo harſh as to make a grating noiſe, when the fingers are afterwards rubbed together. It makes no effervescence with acids. It is found in all the iſlands of the Archipelago, and was uſed by the ancients for the ſame purpoſes with the pumices.

MELIÆ, in *Botany*, one of Juſſieu's Natural Orders of plants, the 71ſt in his ſyſtem, or eleventh of his thirteenth claſs, derives its name from the moſt familiar genus among them; ſee MELIA. For the characters of the thirteenth claſs ſee GERANIA and GUTTIFERÆ. The following are the characters of *Meliæ*.

Calyx of one leaf, divided either down to the baſe, or only at the apex. *Petals* four or five, with broad claws, for the moſt part cohering at the bottom. *Stamens* of a definite number, either as many as the petals, or more generally double that number, their filaments united into a tube or cup, toothed at its ſummit, the teeth either bearing the anthers, or overtopping them when attached to their lower part, at the inſide. *Germen* ſingle; with a ſingle ſtyle; the ſtigma ſimple, or, more rarely, divided. *Fruit* either pulpy, or more generally capſular, of many cells, each containing one or two ſeeds, the valves equal in number to the cells, with partitions from the middle of each valve. The *ſtem* is ſhrubby or arboreſcent, with alternate branches. *Leaves* alternate, without ſtipulas, ſimple or compound.

The firſt ſection, with ſimple leaves, conſiſts of *Canella* of Browne, Swartz and Schreber (*Winterania* of Linnæus and Juſſieu), *Symphonia*, *Tinus*, *Geruma* of Forſkall (ſee that article), *Aitonia*, *Quiviſia* of Commerſon, and *Turræa*.

The ſecond, with compound leaves, compriſes *Ozophyllum* of Schreber (*Ticorea* of Aublet), *Sandoricum* of Rumphius, Schreber and Juſſieu, *Porteſia* of Juſſieu, *Trichilia*, *Elcaja* of Forſkall, *Guarea*, *Ekebergia*, *Melia* and *Leea*, which laſt is alſo *Aquilicia* of Linnæus. See LEEA.

A third ſection is ſubjoined by Juſſieu, of genera akin to *Meliæ*. Theſe are *Swietenia* and *Cedrela*. They differ widely from the proper genera of the order in their fruit, which is in both of them a woody capſule of five valves, ſplitting from the baſe, and containing numerous, imbricated, compreſſed, winged ſeeds.

The order in queſtion is by no means one of the moſt natural in its learned author's ſyſtem; at leaſt with reſpect to the affinities of ſome of the genera which he has referred to it.

MELIANTHUS, from μελι, *honey*, and ανθος, *a flower*, ſo named from the abundance of honey which flows from *M. major* in particular, for, as Linnæus remarks, if that ſpecies be ſhaken whilſt in flower, it diſtils a ſhower of nectar. Juſſieu tells us that *Melianthus* is allied to *Tropæolum* in the hood of the calyx, and ſituation of the petals and ſtamens; but that it is more like *Dictamnus* in habit, fruit, and albumen of the ſeed. He well remarks however that it is very diſtinct from either of thoſe genera, on which ſubject there cannot be the leaſt queſtion. We are told that the Linnæan botaniſts at Paris uſed ſarcaſtically to remark that *Melianthus* was not admitted into the public garden there, becauſe no plauſible place could be found for it in the ſyſtem of the Juſſieus.—Linn. Gen. 328. Schreb. 430. Willd. Sp. Pl. v. 3. 402. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 1. v. 2. 367. Tournef. t. 245. Juſſ. 297. Lamarck Illuſtr. t. 552.—Claſs and order, *Didynamia Angioſpermia*. Nat. Ord. *Corydales*, Linn. *Rutaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, large, coloured, cloven into five, unequal ſegments, the two upper ones oblong, erect, the loweſt one very ſhort, bag-ſhaped, ſwelling downwards, the intermediate two oppoſite, interior, lanceolate. *Cor.* Petals four, linear-lanceolate, reflexed at their tips, ſpreading in a parallel manner, turned outwards, forming a lower lip (as the calyx does an upper one) connected in the centre by their ſides. Nectary of one leaf, ſituated within the loweſt ſegment of the calyx, and adhering with it to the receptacle, very ſhort, compreſſed at the ſides, cut at the margin, and turned downwards at the back. *Stam.* Filaments four, awl-ſhaped, erect, the length of the calyx, the two lower ones a little ſhorter; anthers oblong, heart-ſhaped, four-celled in front. *Piſt.* Germen ſuperior, quadrangular, gibbous, four-toothed; ſtyle erect, awl-ſhaped, in length and poſition like the ſtamens, ſtigma cloven into four ſegments, of which the upper one is the largeſt. *Peric.* Capſule quadrangular, four-lobed, with acute, diſtant angles; the cells inflated, their partitions open in the centre to admit the receptacle of the ſeeds, the valves burſting between the angles. *Seeds* four, ſomewhat globoſe, adhering to the centre of the capſule.

Eſſ. Ch. Calyx of five leaves; the lower one gibbous. Petals four. Nectary beneath the loweſt petal. Capſule four-celled.

1. M. *major*. Greater Honey-flower. Linn. Sp. Pl. 892. (M. africanus; Herm. Lugd. t. 415.)—Stipulas ſolitary, adhering to the leaf-ſtalk.—Diſcovered by Hermann at the Cape in the year 1672. It flowers in greenhouſes from May to July.—*Root* perennial, woody, ſpreading. *Stems* numerous, four or five feet high, herbaceous towards the top. *Leaves* pinnate, embracing the ſtem, greyiſh, compoſed of about three or four pairs of ovate, deeply-toothed leaflets, three or four inches long, with an odd one; a leafy, jagged border or wing running along the mid-rib connects them at their baſe. *Flowers* in a longiſh ſpike; ſpringing from between the leaves towards the top of the ſtalks, of a brown or chocolate colour.

2. M. *minor*. Leſſer Honey-flower. Linn. Sp. Pl. 892. Curt. Mag. t. 301.—Stipulas in pairs, but ſeparate. Cluſters axillary, elongated. Bracteas linear, tapering.—Native of the Cape, and cultivated in 1708 by the ducheſs of Beaufort.—*Stems* four or five feet high, branched, ſoft, round, woody. *Leaves* about half as large as in the preceding, green on the upper ſide, whitiſh beneath. *Flowers* ſix or eight in a cluſter, very ornamental, variegated with green, yellow and red or pink.—Mr. Curtis obſerves that the foliage when bruiſed has an unpleaſant ſmell; that the ſecreted honey or nectar does not flow ſo copiouſly from this as from the laſt which is more common, but that it exhibits rather an unuſual phenomenon, being retained in the lower part of the bloſſom, and of a dark brown colour.

3. M.

3. M. *comosus*. Tufted Honey-flower. Willd. n. 3. (M. africanus minor fœtidus; Comm. Rar. t. 4.)—Stipulas distinct. Clusters below the leaves. Flowers alternate. Bracteas heart-shaped. Leaves hairy above.—A native also of the Cape. *Stem* upright, branched, four feet high, round. *Leaves* pinnate, consisting of about five pairs of linear, deeply toothed, soft leaflets with an odd one, hoary underneath. *Flowers* in pendent clusters, on short stalks, of a yellow colour.

Melianthus, in *Gardening*, comprehends plants of the perennial exotic kind, of which the species cultivated are, the great honey-flower (M. major); and the small honey-flower, (M. minor.)

Method of Culture.—These two species of plants may be increased by suckers from the roots and cuttings of the young stalks or branches. The first sort is, however, best raised by planting the suckers, or side-shoots, any time in the spring or summer seasons, choosing such as are furnished with root fibres, in pots, or the places where they are to remain, which, after they are planted and have taken root, require little further care, but to keep them clean from weeds. The cuttings may be planted during any of the summer months, due water and shade being given. When they have taken root they should be planted out where they are to remain, or in separate pots, to be managed as green-house plants.

But the second sort is raised with more difficulty, and chiefly from cuttings, which should be planted upon an old hot-bed, the heat of which is over, and covered close with bell or hand-glasses to exclude the air. When they have taken root they may be planted out in pots, and sheltered in the winter under a frame for a year or two, till they are become strong, after which they may be set out in a warm border, and be managed in the same manner as the first sort. And they succeed best in a dry soil and warm situation; but some plants should always be kept in pots and treated as greenhouse plants, lest those in the open ground be destroyed by severe frosts.

All of them afford ornament and variety in the borders and clumps, as well as among other plants in greenhouse collections

MELIBŒA, in *Ancient Geography*, a town of Greece, in the part of Thessaly called Magnesia, about the precise situation of which authors differ. Strabo places it in a gulf, on the eastern coast, between mount Ossa to the N. and mount Pelion, somewhat farther from the coast, lying from N.W. to S.E.

MELIBŒUS Mons, a mountain of Germany, which, according to Cæsar (Bell. Gall. l. vi. c. 1.) formed a separation between the Cherusci and Suevi. It was part of those mountains which covered the forest Bacenis.—Also, a mountain of Italy.

MELICA, in *Botany*, a name supposed by Ambrosinus to be corrupted, either from *Miliaca*, which might express the likeness of the grass so called, to *Milium*; or from *Meline*, the name of some sort of *Panicum*, which it also resembles in the aspect and distribution of the blossoms.—Linn. Gen. 34. Schreb. 48. Willd. Sp. Pl. v. 1. 381. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 91. Ait. Hort. Kew. ed. 2. v. 1. 152. Juss. 31. Lamarck Illustr. t. 44. Gærtn. t. 80.—Class and order, *Triandria Digynia*. Nat. Ord. *Gramina*.

Gen. Ch. *Cal.* A glume of two ovate, concave, nearly equal valves, containing two flowers. *Cor.* of two ovate awnless valves, one of which is concave, the other flat and smaller. A turbinate stalked body, consisting of two abortive florets, stands between the two perfect ones. Nectary of one fleshy horizontal leaf, surrounding the germen. *Stam.* Filaments three, capillary, thickened and united at their base, as long as the flower; anthers oblong, forked at each extremity. *Pist.* Germen superior, obovate, turbinate; styles two, bristle-shaped, spreading, naked at their base; stigmas oblong, feathery. *Peric.* none, except the corolla, which is not united to the seed. *Seed* one, ovate, with a longitudinal furrow at the upper side.

Obs. The stalked body between the florets is considered by Linnæus as affording an essential character. This consists of the abrupt rudiments of two other florets, placed in an alternate order, their glumes convolute and pellucid. To this Schrader adds that the stamens of the real florets are dilated and combined at their base, and that the *nectary* is of a single leaf.

Ess. Ch. Calyx of two valves, containing usually two florets, with the rudiment of more between them. Corolla of two valves, unconnected with the seed.

An elegant genus of grasses, of which Willdenow has thirteen species, three of them British. To these we add two gathered by Dr. Sibthorp in Greece, a third from America, and a fourth from the East Indies. The habit of the whole genus, well marked in some species, is not so uniform throughout the whole as could be wished. Neither is the number of perfect or of abortive florets constant in all.

1. M. *ciliata*. Fringed Melic-grass. Linn. Sp. Pl. 97. Sm. Fl. Græc. Sibth. v. 1. 54. t. 70. (Gramen montanum, avenæ semine; Clus. Hist. v. 2. 219.)—The outer petal of the lower floret fringed.—Native of dry stony ground in the south of Europe. With us it is sometimes kept in gardens for the sake of its long white plumpy spiked *panicles*. The *root* is perennial, tufted and knotty. *Stems* two or three feet high, erect, round, smooth, stiff, bearing several narrow rigid *leaves*. *Panicle* terminal, solitary, erect, close and cylindrical, from two to six inches long. *Calyx* containing only one perfect, and one abortive, floret. The *glumes* are membranous and whitish. *Stamens* long. *Fringe* of the corolla long, dense, and very remarkable.

2. M. *gigantea*. Gigantic Melic-grass. Thunb. Prod. 21. (Aira villosa; Linn. Suppl. 109.)—"Corolla hairy, awned. Panicle whorled. Stem erect."—Found by Thunberg at the Cape of Good Hope. The *root* is crowned with ovate-oblong hairy scales. *Stem* smooth. *Leaves* flat, tapering, with frequently shaggy sheaths. *Panicle* terminal, a foot long. *Florets* two, large, rusty; one of them smaller, and rather imperfect. *Corolla* hairy, with a short, straight, terminal awn.

3. M. *geniculata*. Bent-stalked Melic-grass. Thunb. Prod. 21.—"Corolla hairy. Panicle compact. Stem decumbent."—Native of the Cape.

4. M. *decumbens*. Decumbent Melic-grass. Thunb. Prod. 21.—"Corolla hairy. Flowers racemose, drooping. Stem decumbent."—From the same country. This must not be confounded with *M. decumbens* of Weber, which is *Festuca decumbens* of Linnæus, *Poa* of Fl. Brit. 107.

5. M. *racemosa*. Racemose Melic-grass. Thunb. Prod. 21.—"Corolla hairy. Clusters drooping. Stem erect."—From the Cape. We have seen no specimens of the last four species.

6. M. *minuta*. Slender Melic-grass. Linn. Mant. 32. Willd. n. 10. (M. pyramidalis; Desfont. Atlant. v. 1. 73. M. nutans; Cavan. Ic. v. 2. 58. t. 175. f. 2?)—Stem branched. Leaves setaceous. Petals beardless. Panicle simple, drooping.—Native of Italy, Spain, Greece and Cyprus.—This is an extremely slender smooth grass, scarcely a foot high. The *stems* are in our specimens, as Linnæus describes them, very much branched. Cavanilles says

says they are always simple. *Leaves* extremely narrow, perfectly setaceous when dry, from the inflexion of the edges; the long sheath crowned by a membranous *stipula*. *Panicle*, or rather *cluster*, simple, of a very few drooping flowers. The *calyx* contains two perfect florets, and the stalked rudiments of one or two others. All the *glumes* are obtuse and ribbed; the *corolla* minutely downy, but not fringed or bearded.

7. M. *saxatilis*. Rock Melic-grass. Sm. in Prod. Fl. Græc. Sibth. v. 1. 51. Fl. Græc. t. 71. (M. aspera; Desfont. Atlant. v. 1. 71? Gramen avenaceum saxatile, paniculâ sparsâ, locustis latioribus candicantibus et nitidis; Tourn. Inst. 524?)—Stem simple. Petals beardless. Panicle close, directed one way. Flowers drooping. Stipula elongated.—Frequent on rising ground in the islands of the Archipelago. It has the habit of the last, but is much larger in every part, and the *stems* are simple, *panicle* of a much greater number of *flowers*, with sharper glumes. The *panicle* agrees with that of the British *M. nutans*, hereafter mentioned, but the *foliage* is narrower, and the *stipula* more elongated than in that species. There is some reason to suspect the synonym of Cavanilles, which we have cited for the foregoing, may belong to this; but no stress can be laid on his delineations of the minuter parts.

8. M. *nutans*. Mountain Melic-grass. Linn. Sp. Pl. 98. Curt. Lond. fasc. 6. t. 4. Engl. Bot. t. 1059. Knapp. t. 42. Mart. Rust. t. 65. (M. montana; Huds. 37.)—Petals beardless. Panicle compact, leaning one way, nearly simple. Flowers drooping. Calyx two-flowered. Leaves flat.—Found in mountainous woods, chiefly in the north of Europe. With us it is confined to Westmoreland and the north-west part of Yorkshire, where it flowers in the early part of summer. The *root* is fibrous and perennial. *Stems* several, above a foot high, leafy, slender and naked above, with rough angles. *Leaves* lanceolate, flat, rough-edged, with a long rough sheath, and a very short jagged *stipula*. *Panicle* long, erect or slightly incurved, almost always simple, of many elegant purplish pendulous *flowers*, leaning one way. *Florets* two, with the unequal rudiments of two more. *Glumes* bluntish, with a white membranous termination. The *nectary* in this species answers to Schreber's description, but scarcely, we fear, in all.

9. M. *uniflora*. Wood Melic-grass. Retz. Obs. fasc. 1. 10. Curt. Lond. fasc. 5. t. 10. Engl. Bot. t. 1058. Knapp. t. 41. Mart. Rust. t. 64. (M. Lobelii; Villars Dauph. v. 1. 89. t. 3. M. nutans; Huds. 37.)—Petals beardless. Panicle branched, leaning one way. Flowers erect. Calyx single-flowered. Leaves flat.—Common in groves and bushy places in England and most parts of Europe, flowering in May and June, when its little red tumid flowers, trembling upon the divaricated wiry stalks of the panicle, make a very pretty appearance. The *root* is fibrous and perennial. *Stems* simple, a foot and half high, slender. *Leaves* flat and broadish, thin, bright green, rough at the back and edges, with a downy sheath and short variously-shaped *stipula*. *Panicle* of not many flowers; its lower branches two together. The single fertile *floret* is oval, tumid, with ribbed green glumes; the barren one likewise solitary, on a thick inflexed stalk.

10. M. *major*. Greater Melic-grass. Sm. Prod. Fl. Græc. Sibth. v. 1. 51. (M. n. 31; Gmel. Sib. v. 1. 99. t. 19. f. 1.)—Petals beardless. Panicle spreading; with branches in pairs. Flowers drooping. Stem simple. Leaves involute and pungent.—Native of Greece, France, and Siberia, in mountainous places. There is some reason to suspect this species to be what Dr. Sibthorp took for *M. nutans*, and put down as such in his lists of Greek plants, the latter not being found in his herbarium, nor this noticed by any other appellation. The plants however are very distinct. The *major* has a branched panicle, more like the *uniflora*, but the *calyx* contains from two to four florets, besides an abortive one, their *corolla* mostly bristly at the back. The *leaves* are flat when growing, but rolled in when dry, with a sharp rigid point. We believe this has been called *M. amethystina* by the abbè Pourret.

11. M. *ramosa*. Branched Cape Melic-grass. Thunb. Prod. 21.—“Petals smooth, beardless. Panicle compact. Stem branched.”—Gathered by Thunberg, at the Cape of Good Hope.

12. M. *capensis*. Spreading Cape Melic-grass. Thunb. Prod. 21.—“Petals smooth, beardless. Panicle widely spreading. Leaves nearly thread-shaped.”—From the same country. We have seen neither of these last, but their characters mark them as very distinct.

13. M. *papilionacea*. Fly Melic-grass. Linn. Mant. 31. Willd. n. 12. (M. brasiliana; Arduin. Spec. 2. 17. t. 6. f. 1, 2.)—Panicle close. Outer valve of the calyx very large, obovate, coloured. Outer petals with toothed ribs, somewhat hairy.—The seeds of this curious grass were sent from Brasil to Arduino, who raised them at Padua in 1756, and thinking it might form a new genus, as appears by his specimen, sent it to Linnæus, who justly referred it to *Melica*. Commerson gathered the same at Monte Video. The *stems* are eighteen inches high, simple, erect. *Leaves* broadish, somewhat involute in drying, their sheaths crowned by a long cloven *stipula*. *Panicle* branched, but compact. *Flowers* erect, remarkable for the large purple outer glume of their *calyx*, which embraces the whole of the spikelet, the inner glume being elevated on the stalk within, much narrower and more rigid, like the *corolla*, whose outer glumes have very strong, tuberculated, and somewhat hairy, ribs. The *florets* are two with one or two abortive ones.

14. M. *altissima*. Tall Melic-grass. Linn. Sp. Pl. 98. Host. Gram. Austr. v. 2. 8. t. 9. Ehrh. Calam. 71. (M. n. 30. Gmel. Sib. v. 1. 98. t. 20.)—Panicle close, many-flowered. Calyx-glumes obovate, nearly equal, rather shorter than the florets. Outer petals roughish, beardless. Leaves lanceolate, broad.—Native of Siberia. A tall and very handsome grass, with flat *leaves* half an inch in breadth, and a very long, upright, close, branched *panicle*, compound of innumerable crowded purple *flowers*, turned to one side. The above specific character distinguishes it from the last, which it much resembles at first sight.

15. M. *glabra*. Smooth American Melic-grass. Michaux Boreal-Amer. v. 1. 62. (M. altissima et mutica; Walt. Carol. 78? *Michaux*. Gramen avenaceum, locustis rarioribus muticis, virginianum majus; Moris. v. 3. 216. sect. 8. t. 7. f. 51.)—Panicle widely spreading, with branches in pairs. Flowers erect. Calyx-glumes elliptical, nearly equal, rather shorter than the florets. Petals smooth, beardless. Leaves linear.—Native of North America, from Virginia to Florida. *Michaux*. Linnæus referred the synonym of Morison to his *altissima*, having probably never seen the present species, which differs from that in its narrower *leaves*, spreading *panicle*, and smooth *flowers*. The *stem* is two or three feet high. Willdenow, who cites this as a variety of the last, still expresses his opinion of its being undoubtedly a different species.

16. M. *cærulea*. Purple Melic-grass. Linn. Mant. 2. 325. Ehrh. Calam. 91. Curt. Lond. fasc. 5. t. 11. Engl. Bot. t. 750. Knapp. t. 40. (Aira cærulea; Linn. Sp. Pl. 95. Huds. 33. Fl. Dán. t. 239.)—Panicle close, much branched. Flowers erect, cylindrical. Calyx-glumes much shorter than the florets. Petals acute, angular, smooth and beardless

beardlefs.—Native of various parts of Europe, generally on the moft barren fandy moors, or inundated heaths, flowering in Auguft. This is a very coarfe rigid ufelefs grafs, varying greatly in height and luxuriance according to the foil. Its habit is reed-like. *Leaves* taper-pointed and pungent, involute in drying, of a glaucous afpect, broad and fheathing at the bafe, with hairs in the place of a *ftipula*. *Panicle* erect, clofe, repeatedly branched, confifting of numerous, fmall, upright *flowers*, of a bluifh-purple hue, pale when growing in the fhade. *Calyx* of two unequal ovate, acute valves. *Florets* four, elongated, much exceeding the calyx, acute, angular rather than ribbed, fmooth and beardlefs, the two lower ones only complete and fertile. *Anthers* violet, almoft black. The habit of this is very diffimilar to all the foregoing, and its flowers in particular more refemble the next.

17. M. *diandra*. Broad-leaved Diandrous Melic-grafs. Roxb. MSS.—Panicle corymbofe, of numerous, flender, many-flowered branches. Flowers erect, ovate. Glumes all fharp-pointed, keeled, fmooth. Leaves ovato-lanceolate, reticulated.—Native of Calcutta. This has the habit of *Arundo Phragmites*. The *ftem* is clothed with feveral alternate, broad, lanceolate, acute *leaves*, fomewhat ovate at their bafe, with long, fringed, clofe *fheaths*. They have rough edges, and many ribs, connected by tranfverfe reticulations. The *panicle* is level-topped, compofed of numerous, flender, clofe, racemofe branches. *Flowers* purplifh, fhining, fmooth, rather fmaller, as well as more compreffed, than in the laft, all their glumes very fharp-pointed. By the name we prefume there are but two *ftamens*. The inner *petal* feems to be coarfely fringed, at leaft in the upper and imperfect floret.

M. *Falx*, Linn. Suppl. 109, is referred by Thunberg to *Cynofurus*, fee *C. Falcatus*, fp. 4. He is followed by Willdenow, and the habit as well as characters of this very curious grafs ftrongly juftify the meafure.

MELICA is alfo a word ufed by the ancients as the name of a food of a refrigerating and moiftening quality. It feems to have been a kind of *oxygala*; for Galen, when he directs perfons of a hot habit to ufe a refrigerating diet, among other aliments of that kind, directs the eating of melica, which, he fays, is prepared of milk. Conftantine, in his book of agriculture, mentions melica, and fays it was made by pouring milk into an earthen veffel, firft well impregnated with boiling hot vinegar, by means of which there was a feparation of the milk into whey and curd.

MELICE'RIA, or MELICÉRIOLA, in *Surgery*, a fmall encyfted tumour, the contents of which are of the confiftence of honey.

MELICE'RIS, (from μελι, *honey*, and κηρος, *wax*), an encyfted tumour, filled with matter, that has the appearance and confiftence of honey. See TUMOUR.

MELICHRUS, in *Botany*, from μελιχρος, *honey-coloured*, alluding, we prefume, to the colour of the flowers; efpecially as the mafculine gender is adopted in the fpecific names. Otherwife the latter would have been, as ufual, feminine, ποα, or *herba*, being underftood.—Brown. Prod. Nov. Holl. v. 1. 539.—Clafs and order, *Pentandria Monogynia*. Nat. Ord. *Epacrideæ*, Brown.

Gen. Ch. *Cal.* Perianth inferior, of many leaves, erect, permanent; the five innermoft longeft, equal, lanceolate, concave. *Cor.* of one petal, wheel-fhaped, or pitcher-fhaped, in five equal fegments, bearded half way, and with five clufters of glands near its bafe. Nectary a glandular, nearly entire, cup, furrounding the bafe of the germen. *Stam.* Filaments five, thread-fhaped, equal, inferted into the bafe of the corolla; anthers incumbent, oblong, burfting lengthwife, flightly projecting. *Pift.* Germen fuperior, roundifh; ftyle columnar; ftigma capitate. *Peric.* Drupa nearly dry, with a hard fhell. *Nut* of five cells. *Seeds* folitary?

Eff. Ch. Outer calyx of many leaves. Corolla five-cleft, wheel or pitcher-fhaped, bearded half way, with five clufters of glands near the bafe. Drupa dry, of five cells.

This genus confifts of two fpecies of fmall *fhrubs*, which are procumbent, or nearly fo, with lanceolate *leaves*. The *flowers* are axillary, folitary, erect.

1. M. *rotatus*. Br. (Vintenatia procumbens; Cavan. Ic. v. 4. 28. t. 349. f. 1.)—Corolla wheel-fhaped. Calyx hairy. Leaves nearly linear, hairy on both fides and at the edges.—Native of New South Wales, as well as of the tropical part of New Holland. The *ftem* is much branched, procumbent. *Branches* clothed with feveral rows of imbricated, linear-lanceolate, acute, entire *leaves*, about an inch long, fomewhat glaucous, clothed and fringed with foft hairs, and ftriated with numerous ribs. *Flowers* numerous, axillary, folitary, feffile. *Calyx* loofely covered with long, foft, white hairs. Segments of the *corolla* acute, broad at the bafe; Cavanilles reprefents them much too narrow; each is bearded with long hairs from beyond the middle to the point. There appears to be more of a tube than properly belongs to a wheel-fhaped *corolla*, but our fpecimens are not fufficient to determine that point.

2. M. *urceolatus*. Br.—Corolla pitcher-fhaped. Calyx fmooth. Leaves lanceolate, taper-pointed, minutely toothed. —Gathered near Port Jackfon by Mr. Ferdinand Bauer.

The other fpecies of *Vintenatia*, *humifufa*, Cavan. Ic. v. 4. 28. t. 348, is referred by Mr. Brown to a diftinct genus, *Aftroloma*, Prod. Nov. Holl. v. 1. 538, in which the tube of the *corolla* is inflated, and twice the length of the *calyx*; its limb fhort, fpreading, bearded. Thefe differences are by no means ftrikingly indicated in Cavanilles' figures, nor do they there appear to us fufficient to divide plants in other refpects fo nearly alike. We can indeed judge but imperfectly from dried fpecimens, or from fuch delineations. Neither can we account for the fpelling of the name, which was intended to commemorate the late M. Ventenat.

MELICOCCA, from μελι, *honey*, and κοκκος, *a berry*, fo named by Dr. Patrick Browne from the fweetnefs or mellownefs of its fruit.—The Genip Tree.—Browne Jam. 210. Jacq. Amer. 108. Linn. Gen. 188. Schreb. 254. Willd. Sp. Pl. v. 2. 330. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 350. Swartz Obf. 144. Juff. 248. Lamarck Illuftr. t. 306. Gærtn. t. 42.—Clafs and order, *Octandria Monogynia*. Nat. Ord. *Tribilatæ*, Linn. *Sapindi*, Juff.

Gen. Ch. *Cal.* Perianth inferior, of four, ovate, concave, obtufe, fpreading leaves. *Cor.* Petals four, oblong, equal, reflexed between the calyx-leaves. *Stam.* Filaments eight, awl-fhaped, erect, fhort; anthers oblong, erect. *Pift.* Germen fuperior, ovate, nearly the length of the corolla; ftyle very fhort; ftigma large, rather peltate, extended at each fide, oblique. *Peric.* Drupa covered with a tough fkin, roundifh, obtufely pointed. *Seed* a leathery, roundifh, fmooth nut.

Obf. In Gærtner's defcription of *Melicocca* the *Pericarp* is faid to be an ovate, pointed, leathery, thickifh *Berry*, of one cell. The *feeds* folitary (rarely two or three), ovate, furrowed on one fide, coated with a glutinous pulp.

Eff. Ch. Calyx deeply four-cleft. Petals four, reflexed between the calyx-leaves. Stigma fhield-like. Drupa with a tough coat.

1. M. *bijuga*. Genip Tree, or Honey-berry. Linn. Sp. Pl. 495. Jacq. Amer. t. 72. (Nux americana, foliis alatis bifidis; Comm. Hort. v. 1. 183. t. 94.)—A native of South America and cultivated in the Eaft Indies. Introduced into this

this country in 1778 by Dr. Thomas Clarke. We learn from Browne's History of Jamaica that this tree was brought to that island from Surinam. He calls it Genip tree from the Dutch *Knippen*. The Spaniards term it *Monos*. Jacquin mentions it as growing wild about Carthagena, and commonly cultivated at Curaçao. The *stem* of this tree rises to nearly twenty feet in height, and has numerous spreading branches. *Leaves* abruptly pinnate, on round, elongated, or rather compressed stalks, consisting of two pair of nearly sessile, ovate leaflets, acuminate at both ends, entire, nerved, smooth, bright green. *Flowers* in terminal, compound clusters of a yellow colour. *Fruit* about twice as large as a nutmeg, containing a sweet, acid, gelatinous substance like the yolk of an egg.

"Jacquin was informed at Curaçao that this genus was *diœcious*, but Swartz ascertained it to be *polygamous*, one tree bearing perfect flowers, another only male ones; the latter is most common and bears the finest flowers: they expand in April and the fruit ripens about Midsummer."

MELICOPE, a name constructed by Forster, from μελι, *honey*, and κοπη, *an incision*, the nectary being composed of a series of notched glands. Forst. Gen. t. 28. Schreb. 257. Willd. Sp. Pl. v. 2. 346. Mart. Mill. Dict. v. 3. Juss. 429. append. 453. Lamarck Dict. v. 4. 60. Illustr. t. 294. (Entoganum; Banks and Soland. MSS. Gærtn. t. 68.)—Class and order, *Octandria Monogynia*.—Nat. Ord. *Rutaceæ ?*

Gen. Ch. *Cal.* Perianth inferior, of one leaf, in four deep, equal, roundish segments, permanent. *Cor.* Petals four, equal, ovate-oblong, with a little blunt point, keeled, broad at the base, slightly spreading. Nectary of four large cloven glands, encompassing the base of the germen. *Stam.* Filaments eight, awl-shaped, equal, simple, smooth, shorter than the petals, inserted into the receptacle on the outside of the nectary; anthers terminal, erect, oblong, somewhat heart-shaped, simple, of two cells. *Pist.* Germen superior, ovate, four-lobed; style quadrangular, short; stigma dilated, quadrangular, umbilicated. *Peric.* Capsules four, elliptical, compressed, spreading, of one cell, opening at the upper margin. *Seeds* solitary, compressed, smooth, stalked.

Eff. Ch. Calyx in four deep segments. Petals four. Nectary of four cloven glands round the germen. Stamens simple. Stigma dilated. Capsules four, single-seeded.

1. M. *ternata*. Forst. Prod. 28. (Entoganum lævigatum; Gærtn. v. 1. 331.)—Gathered by Forster in New Zeeland. The only known species. A *shrub*, with smooth, round, leafy *branches*; the young ones somewhat quadrangular. *Leaves* opposite, stalked, ternate; *leaflets* an inch or inch and a half long, obovate, bluntly pointed, very obscurely and irregularly crenate, rather thickened or bordered at the margin, tapering at the base, single-ribbed, with a few oblique forked veins, quite smooth, of a pale green when dry, full of small, pellucid, resinous dots; the terminal leaflet larger than the rest. Common *footstalk* about an inch long, linear, channelled, smooth. The lower *leaves* on each branch are simple, and smaller. *Stipulas* none. *Flower-stalks* axillary, solitary, shorter than the leaves, forked, or perhaps somewhat corymbose, smooth, slightly angular, with a pair of minute, concave *bracteas* at each subdivision. Whenever any of the stalks fall off, a broad pale peltate scar is left behind on the branch. *Flowers* about a quarter of an inch in diameter, white or yellowish, each on a quadrangular partial stalk, a quarter of an inch long, dilated upwards under the calyx. *Capsules* spreading in four directions, somewhat leathery, smooth, each a quarter of an inch long.

Of this very little-known shrub we have seen but one mutilated specimen, given by Forster to Linnæus. Nothing is said by the author of the genus, any more than by Solander or Gærtner, to indicate its affinity to any other, nor could Jussieu form even a conjecture on the subject. The shape, and resinous dots, of the leaves, as well as the pallid hue which they, like the other parts, assume in drying, and even the aspect of the flowers, whose petals are full of resinous dots, all seem to indicate the natural order of *Aurantia*. But these characters, except perhaps the pale colour, equally belong to the *Rutaceæ*, at least to those genera which are subjoined by Jussieu to that natural order, and of which *Diosma* is the type; and the fruit strongly confirms the propriety of referring *Melicope* to them. With these Jussieu was but slightly acquainted. There are numerous genera of this tribe in New Holland (see CORRÆA, CROWEA, ERIOSTEMON); as well as *Boronia*, Sm. Tracts 287. t. 4—7, and *Tetratheca*, Sm. Exot. Bot. t. 20—22. The inflorescence of the genus before us, as far as can be discovered from our bad specimen, seems very nearly that of *Boronia pinnata*, Andr. Repos. t. 58. Its simple filaments and anthers, and, according to Gærtner's description, the want of an *arillus* to the seeds, are circumstances in which it differs from *Boronia* and most of its allies. The flavour of the dried leaves is a little bitter, scarcely aromatic. S.

MELICUCCA, in *Geography*, a town of Naples, in Calabria Ultra; 10 miles W.S.W. of Oppido.

MELICYTUS, in *Botany*, so named by Forster, from μελι, *honey*, and κυτος, *a cavity* or *cell*, alluding to the five oblong bodies, hollowed out at their summits, which he conceived to be nectaries bearing the anthers. Forst. Gen. t. 62. Schreb. 685. Mart. Mill. Dict. v. 3. Juss. 428. Lamarck Dict. v. 4. 59. Illustr. t. 812. Gærtn. t. 44. Class and order, *Diœcia Pentandria*. Nat. Ord. *Euphorbiæ ?*

Gen. Ch. Male, *Cal.* Perianth very short, with five teeth. *Cor.* Petals five, equal, ovate, acute, widely spreading, longer than the calyx. Nectary of five club-shaped bodies, hollowed out at the top, erect, bearing the stamens at their inside. *Stam.* Filaments none, except the nectaries be so considered; anthers five, roundish-ovate, with four furrows in front, attached lengthwise to the inner side of the nectaries, and extending slightly beyond them.

Female, *Cal.* and *Cor.* as in the male. Nectary of five triangular acute scales, shorter than the calyx, surrounding the germen closely at its base. *Pist.* Germen ovate; style none; stigma of four or five small, flat, rounded lobes. *Peric.* Capsule pulpy, globose, smooth, coriaceous, of one cell, with four or five valves. *Seeds* about five, convex on one side, angular on the other, lodged in pulp.

Eff. Ch. Male, Calyx with five teeth. Petals five. Nectary of five hollow-tipped bodies, bearing the stamens.

Female, Cal. and Cor. as in the male. Nectary of five scales round the germen. Stigma sessile, four or five-lobed. Capsule pulpy, of one cell and five valves. Seeds five.

1. M. *ramiflorus*. Forst. Prod. 70.—Native of the neighbourhood of Queen Charlotte's Sound, New Zeeland, flowering there in November. A *shrub*, or *tree*, with round, smooth, leafy *branches*. *Leaves* deciduous, scattered, on short smooth footstalks, elliptic-lanceolate or obovate, obtuse, bluntly serrated, smooth on both sides, with one rib and numerous interbranching reticulated veins, each leaf an inch and a half or two inches long, and nearly one broad. *Flower-stalks* several together, from scattered lateral or axillary buds, each about a quarter of an inch long, swelling upwards, simple, smooth, bearing about the middle a minute fringed concave *bractea*, single-flowered. *Flowers* very minute, whitish.

Jussieu knew not where to place this genus in his natural orders, but was led by its artificial characters, as it seems, to to fuppofe it akin to *Aftronium* of Jacquin and Linnæus. Gærtner having the fruit, which Forfter knew nothing of, more happily perceived its relationfhip to KIGGELARIA. (See that article, and ASTRONIUM.) This relationfhip has induced us to refer *Melicytus* to the *Euphorbiæ* of the great French botanift, notwithftanding the prefence of petals, which that natural order, it feems, ought to be without. We cannot however be fo far led by hypothefis as to deny real petals to *Kiggelaria*.

MELIDES, in *Geography*, a town of Portugal, in the province of Eftramadura; 21 miles S. of Setuval.

MELILITE. This fcarce mineral fubftance has hitherto been found only in minute but very regular cubic or parallelepipedic cryftals: they are of the fize of a millet feed, of a yellow colour, and externally covered by a brownifh or gold yellow cruft of iron ochre. Their hardnefs is fufficient to fcratch fteel.

The melilite melts before the blowpipe, without effervefcence, into a tranfparent folid glafs of a greenifh colour. Its powder forms a tranfparent jelly with nitric acid. It is not pyro-electric.

By thefe characters this microfcopic mineral is fufficiently diftinguifhable from mefotype, ftilbite, chabafie, and analcime, to which it bears fome diftant refemblance.

The cubic cryftals of the melilite pafs into the cuneiform octahedron.

Thefe fmall cryftals were difcovered by M. Fleurieu de Bellevue in the fiffures of a black, pretty compact lava, known under the name of *felce romano*, found at Capo di Bove, near Rome. They are accompanied by fmall, white, tranfparent, acicular cryftals, which appear to belong to fommite or nepheline. Brongn.

MELILLA, or MELELA, in *Geography*, a town of Africa, in the kingdom of Fez, fituated on the coaft of the Mediterranean, and belonging to the Spaniards. It was probably founded by the Carthaginians, and feems to have derived its name from the honey produced in its environs. The town is ftrongly fortified and furrounded by the fea. The only communication with the main land, inhabited by the Moors, is by a draw-bridge. It was abandoned by the Goths when the Arabs invaded the country, and being deferted by the Moors, was feized on by the Spaniards about the beginning of the 15th century. This town has large magazines and cifterns for preferving the water. The number of inhabitants is eftimated at 2000; 140 miles E. of Tetuan. N. lat. 35° 24'. W. long. 2° 54'.

MELILLI, a town of Sicily, fituated on mount Hybla, famous for its excellent honey, to which it owes its name; as well as alfo to the fertility of the adjacent territory, or the fugar-canes once cultivated there, but now abandoned.

MELILOBUS, in *Botany*, (from μελι, *honey*, and λοβος, *a pod*, or *legume*, alluding to the fweet pulp in which the feeds are lodged,) the original name given by Mitchell to the *Gleditfia* of Clayton and Linnæus, and undoubtedly a very expreffive one. It is much to be wifhed that fuch fhould always have a preference; and that no genus fhould ever be confecrated to any botanift, till an expreffive name, of Greek or Latin derivation, had firft been fought in vain. But alas! this is like wifhing for honefty and difintereftednefs in thofe who elect, and thofe who are elected.

MELILOT, a fpecies of trefoil, or *trifolium*; which fee. (See MELILOTUS.) This plant grows wild in moft parts of Europe, in corn-fields, paftures, and by way-fides. Among bread-corn it is a troublefome weed; and ripening about the fame time with the corn, is often ground with it, being difficult to feparate from it: in fuch a cafe it fpoils the bread, or whatever the flour is ufed for, by giving it a ftrong tafte, like the plafter made from it.

Melilot is fcarcely ever given internally; but ufed externally, it was formerly efteemed emollient and digeftive, and was employed as an ingredient in cataplafms, fomentations, and blifter-plafters; but it is now laid afide as being rather acrid and irritating than emollient. The flowers have been recommended by fome in infufion, in the manner of thofe of chamomile, as a remedy for the fluor albus. It formerly gave the name to one of the officinal plafters, which received from the melilot a green colour and an unpleafant fmell, without any addition to its efficacy.

MELILOTUS, μελιλωτος of Diofcorides, appears to be the *Trifolium Melilotus-officinalis* of Linnæus, which Dr. Sibthorp found growing wild, in low moift fituations, in Attica and different parts of Greece. This ingenious and learned traveller fufpected the other kind, which is mentioned by the above Greek writer as of a yellower colour and weaker fcent, and growing about Nola in Campania, might be *T. Melilotus-italica*, which is found on the dry ground of Mount Hymettus, near Athens. Dr. Sibthorp obferved the figure in the famous ancient manufcript at Vienna, to be evidently intended for one of thefe fpecies.

MELIN, in *Geography*, a town of Croatia; 12 miles S.S.W. of Varafdin.

MELINDA, a kingdom of Africa, fituated near the coaft of the Indian fea. This country is for the moft part fertile, producing almoft all the neceffaries of life, except wheat and rice, for want of which, thofe who cannot purchafe them are fupplied with potatoes, which are here large and plentiful. They abound with other roots and fruits, and with melons of excellent quality. Citrons here are abundant, and agreeably perfume the air during the greateft part of the year. They have alfo plenty of venifon, game, oxen, fheep, geefe, and other poultry; and a breed of fheep, whofe tails weigh in general between twenty and thirty pounds. The men are black, fwarthy, tawny, and white, and the women chiefly of an olive colour; their drefs is elegant, confifting of fine filks, girt with rich gold or filver girdles, collars, and bracelets, and their heads are covered with veils. The men wear a kind of turban; and in other refpects their drefs confifts of a piece of cotton wrapped round the middle, and reaching below the knees, the other parts of the body being naked. Thofe of the meaner clafs, and fuch as live in the interior of the country, wear little elfe befides a piece of cloth about their middle, except their fhield and military weapons, which are the bow and arrows, the fcymetar, and the javelin. Their religion is chiefly Mahometan; with a mixture of idolaters; and their government is monarchical, the king being treated with great refpect and veneration by his fubjects: and accompanied with attendants, who prefent him with incenfe and perfumes, whenever he goes abroad, and ladies who pay their homage to him with fongs and feveral kinds of mufical inftruments. The prince of this country was formerly tributary to the Portuguefe; but they are now obliged to purchafe, by annual prefents, permiffion to trade, and to fearch for gold. Adjoining to Melinda are five other kingdoms, to which the connection and influence of the Portuguefe extend. The natives, befides their commerce with the Portuguefe, carry on fome trade with their own veffels, in which they frequent the Red fea, and Arabian ports; and they fometimes traverfe the Indian feas, as far as Cambaya, in the territories of the great Mogul. On the other hand, the Arabians and Indians bring goods to Melinda: but the whole trade, which is little inferior to that of Mozambique, is ultimately tranfacted with the Portuguefe.

tuguefe. The articles brought to Melinda are gold from Sofala; as well as ivory, copper, quickfilver, all forts of filks and cottons from Europe and the Eaft Indies, together with fpices, rice, and other grain.

Melinda, the capital of the above-defcribed kingdom, pleafantly fituated on a beautiful plain near the coaft of the Indian fea, and furrounded by fine gardens and orchards, producing all forts of fruit-trees, efpecially citrons and oranges. The houfes are built of fquare ftone, many of them being conftructed in a magnificent ftyle, and all richly furnifhed, for the ftated refidence of rich merchants, and the occafional refort of foreigners, who carry on an extenfive commerce in gold, copper, quickfilver, ivory, wax, and drugs, in exchange for filk, cottons, linen cloths, corn, and other commodities. The harbour is difficult of accefs, on account of rocks and fhelves that intercept the approach to it, and oblige veffels to come to anchorage at fome diftance from it. The warehoufes at Melinda fupply the country with European goods to a great diftance within land, where they procure vaft quantities of ivory. This city was wholly built by the Portuguefe, and is faid to contain 30,000 Portuguefe, befides natives; and includes feventeen Chriftian churches, together with other religious houfes. S. lat. 3° 5'. E. long. 42° 40'.

Melinda, one of the Querimba iflands, in the Indian fea. S. lat. 10° 30'.

MELINGEN, a town of Switzerland, on the Rufs; 43 miles N.E. of Berne. N. lat. 47° 10'. E. long. 8° 15'.

MELINUM, in *Natural Hiftory*, the name of an earth, famous in the earlieft ages of painting, being the only white of the great painters of antiquity; and, according to Pliny's account, one of the colours with which alone they performed all their works.

It is a fine white marly earth, of a very compact texture, yet remarkably light; a fort of texture which muft render any earth fit for the painter's ufe, that is of a proper colour. It is frequently found forming a ftratum in the earth, lying immediately under the vegetable mould. It is of a very fmooth, but not gloffy furface; is very foft to the touch, adheres firmly to the tongue, is eafily broken between the fingers, and ftains the fkin in handling. It melts readily in the mouth, and is perfectly fine, leaving not the leaft grittinefs between the teeth. Thrown into water, it makes a great bubbling and loud hiffing noife, and moulders away into a fine powder. It does not ferment with acids, and fuffers no change in the fire. Thefe are the characters by which the melinum of the ancients is diftinguifhed from all the other white earths. It is ftill found in the fame place from whence the painters of old had it, which is that from whence it has its name, the ifland of Milo, called Melos by the Greeks, and is common in moft of the adjacent iflands. It has been of late tried here as a paint, and is found not to make fo bright a white as the other fubftances now in ufe among the painters, but feems not liable, like them, to turn yellow; and if fo, would be worth the confideration of perfons in the colour-trade, efpecially as it may be had in any quantities for carriage.

MELINUS Color, Μηλινον χρωμα, in *Antiquity*, a colour often mentioned in fpeaking of the habits of players. It was a reddifh-yellow, of the colour of ripe apples, in Greek called μηλα, and their colour μηλοειδες χρωμα.

MELIPILLA, in *Geography*, a town of South America, and capital of a jurifdiction in the kingdom of Chili; 42 miles S.E. of Valparaifo. S. lat. 33° 28'. W. long. 70° 7'.

MELIPU, a river of Ceylon, which runs into the fea near Matara.

MELIS, a town of Germany, in the principality of Gotha; 16 miles S. of Gotha.

MELISANA, a town of Italy, in the country of Friuli; 6 miles S. of Palma Nuova.

MELISEY, a town of France, in the department of the Upper Saone, and chief place of a canton, in the diftrict of Lure. The place contains 1499, and the canton 10,130 inhabitants, on a territory of 187½ kiliometres, in 12 communes.

MELISMATICO Stylo. See Style.

MELISSA, in *Botany*, from μελισσα, the Greek name of a bee; or rather, as that name itfelf, like the ancient proper names *Meliffa* and *Meliffus*, alfo originated from μελι, *honey*, becaufe of the abundant and excellent honey of the flowers of this herb, for which bees are faid greatly to frequent them.—Balm.—Linn. Gen. 298. Schreb. 394. Willd. Sp. Pl. v. 3. 146. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 3. 416. Juff. 115. Tourn. t. 92. Lamarck Dict. v. 4. 76. Illuftr. t. 512. (Horminum; Linn. Gen. 299. Juff. 116. Lamarck Dict. v. 3. 136. Illuftr. t. 515.)—Clafs and order, *Didynamia Gymnofpermia*. Nat. Ord. *Verticillatæ*, Linn. *Labiatæ*, Juff.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, nearly bell-fhaped, rather dry and fcariofe, fomewhat gaping, angular, ftriated, permanent, its mouth two-lipped; *upper lip* three-toothed, bent backwards, flat; *lower* fhorter, fharpifh, deeply cloven. *Cor.* of one petal, ringent; *tube* cylindrical; mouth gaping; *upper lip* fhorteft, erect, vaulted, roundifh, cloven; *lower* three-cleft, the middle fegment largeft and heart-fhaped. *Stam.* Filaments four, awl-fhaped, two of them the length of the corolla, two but half fo long; anthers fmall, cohering in pairs. *Pift.* Germen four-cleft; ftyle thread-fhaped, the length of the corolla, curved with the ftamens under the upper lip of the corolla; ftigma flender, cloven, reflexed. *Peric.* none, except the enlarged, but otherwife unaltered calyx. *Seeds* in the bottom of the calyx, four, ovate.

Eff. Ch. Calyx fcariofe, flattifh on the upper fide; its upper lip with three nearly level-pointed teeth. Upper lip of the corolla fomewhat vaulted, cloven; middle lobe of the lower lip heart-fhaped.

1. M. *officinalis*. Common Garden Balm. Linn. Sp. Pl. 827. Sm. Prod. Fl. Græc. Sibth. v. 1. 423. Stokes Mat. Med. v. 2. 365. Woodv. Med. Bot. t. 147. (Meliffa; Ger. em. 689. Apiaftrum five Meliffa; Matth. Valgr. v. 2. 181.)—Whorls halved. Bracteas oblong, ftalked. Leaves ovate, acute, ferrated.—Native of the mountains of Geneva, Savoy, and Italy. Dr. Sibthorp found it in fhady woods upon Mount Parnaffus, where it is ftill called μελισσόχορτον, or Balm-plant, which confirms the general opinion of its being the μελισσοφυλλον of Diofcorides, who mentions the lemon-like fcent for which this herb is fo remarkable, and on account of which it is fo generally ufed to make a grateful cooling infufion for perfons in fevers. In this fcent it much agrees with the more powerful *Verbena triphylla*, brought from Peru by the unfortunate Dombey, fee his life in its proper place. The *root* of this *Meliffa* is fibrous and perennial. *Stems* feveral, two or three feet high, leafy, fomewhat branched, acutely quadrangular, hairy and harfh to the touch. *Leaves* oppofite, ftalked, ovate, or very flightly heart-fhaped, ferrated, fomewhat hairy, ftrongly veined, an inch and half long. *Flowers* axillary, in halved whorls, leaning toward one fide; their ftalks downy, accompanied by fmall, oval, generally feffile *bracteas*. *Calyx* hairy. *Corolla* twice as long, white or pale-purplifh.

2. M. *altiffima*. Tall Greek Balm. Sibth. in Prodr. Fl. Græc. v. 1. 423.—Whorls halved, ftalked. Bracteas ftalked,

ſtalked. Leaves heart-ſhaped, ſharply crenate.—Common in ſhady ſituations in Greece, eſpecially under hedges, as well as in Crete. *Sibthorp.* This was ſuſpected by Dr. Sibthorp to be the third καλαμινθη of Dioſcorides, but that point is ſcarcely to be ſettled with any probability. Neither are we fully ſatisfied of our preſent plant being ſpecifically diſtinct from the firſt. By the ſpecimens and figure, which laſt is deſtined for *t.* 579 of the *Flora Græca*, it appears to be a taller and larger herb, with rather more heart-ſhaped *leaves*, and the *whorls* as well as *bracteas* are elevated on more evident ſtalks. The *flower* is repreſented white, with a pale pink upper lip; the lower lip hairy on the upper ſide near its baſe, its middle lobe broadeſt, but by no means heart-ſhaped.

3. M. *grandiflora*. Great-flowered Balm. Linn. Sp. Pl. 827. Curt. Mag. t. 208. (Calamentha flore magno; Riv. Monop. Irr. t. 46. f. 1. C. montana præſtantior; Ger. em. 687.)—Flower-ſtalks axillary, forked, longer than the footſtalks. Bracteas lanceolate, ſeſſile. Leaves ovate, ſerrated.—Native of hilly ground in Greece, Italy, and Germany. Gerard cultivated this ſpecies here in 1596, and it may ſtill be frequently ſeen in gardens, being, as Curtis obſerves, ſuitable for the decoration of rock-work. It thrives beſt in dry gravelly ground, and is perennial, flowering throughout the ſummer. *Root* fibrous. *Stems* about a foot high, weak and ſpreading. *Leaves* ovate, hairy. *Flowers* from three to ſeven on each long axillary ſtalk, with ſeveral ſmall ſeſſile *bracteas*. *Corolla* large, light crimſon, with a white ſtreak, and ſpots on the lower lip. The whole plant has a much more powerful ſcent than *M. officinalis*, without any of the lemon flavour.

4. M. *pyrenaica*. Pyrenean Balm. Jacq. Hort. Vind. v. 2. 86. t. 183. (M. pyrenaica, caule brevi, plantaginis folio; Tourn. Inſt. 193. Magn. Hort. 133. t. 17. Horminum pyrenaicum; Linn. Sp. Pl. 831.)—Stem leafleſs. Flowers whorled, turned to one ſide. Leaves oblong, bluntly toothed.—Native of the higheſt mountains among the Pyrenees, in the Tyrol and Carniola. We have ſeen it in no garden, but Jacquin cultivated this plant at Vienna. He was led by Scopoli to refer it to *Meliſſa*, inſtead of making it a diſtinct genus, as Linnæus had done. The *root* is long, woody, black, and perennial, flowering about the third year from the ſowing of the ſeed, in June. *Leaves* ſeveral, all radical, oblong or ſomewhat ovate, veiny, ſmooth, ſtrongly and bluntly toothed, decurrent at the baſe, on long ſtalks. *Flower-ſtalks* ſolitary, about a foot high, bearing ſeveral pairs of oppoſite, ovate, entire *bracteas*, and in the upper part numerous bracteated *whorls* of ſimply-ſtalked *flowers* leaning to one ſide. The *Corolla* is dark blue, about an inch long, handſome, more bell-ſhaped than in the foregoing, with ſhorter lips in rounded ſegments.

Such are all the genuine *Meliſſæ* known to us. The *M. Calamintha*, *Nepeta*, *cretica* and *fruticoſa* of Linnæus appear to us by their habit, as well as by the hairs which cloſe the mouth of the calyx, to belong to *Thymus*, to which genus the two firſt are referred in the *Flora Britannica*. It happened however that Willdenow did not receive this laſt-mentioned work, till he had written his *Sp. Pl.* as far as *Tetradynamia*, and as the *Hort. Kew.* generally follows him, theſe ſpecies continue there as they were. Indeed the ſubject is not without difficulty, as *M. officinalis* has ſome diſtant hairs in the mouth of the calyx; but its reflexed upper lip, with three teeth of equal height, is unlike that of the four ſpecies above named, though, we confeſs, too ſimilar in that reſpect to ſome kinds of *Thymus*. The middle ſegment of the lower lip of the corolla, ſuppoſed to be heart-ſhaped in *Meliſſa* and entire in *Thymus*, we find as little to be depended on as any of the above marks.

Melissa, in *Gardening*, comprehends plants of the hardy herbaceous, fibrous-rooted perennial kind, of which the ſpecies cultivated are, the officinal, or common garden baum or balm (M. officinalis); the great-flowered baum (M. grandiflora); the Cretan baum (M. cretica); and the ſhrubby baum (M. fruticoſa): as to theſe two laſt ſuppoſed ſpecies, ſee the laſt article.

The firſt ſort varies occaſionally with variegated leaves, and with the ſtalks ſlender, the leaves much ſhorter, the whole plant hairy, and of a ſtrong diſagreeable odour, the flowers in whorls, ſitting pretty cloſe to the branches, and ſmaller than thoſe of the common ſort; and has the name of Roman baum.

In the ſecond ſpecies there are varieties with white flowers, with red flowers, and with variegated leaves; but they are all inferior to the purple.

Method of Culture.—The two firſt ſorts may be readily increaſed by parting the roots, and planting them out in the early autumn, as October, time enough for the offſets to be eſtabliſhed before the winter froſts come on. They ſhould be divided into ſmall pieces, with three or four buds to each, and the firſt ſort planted two feet a-part, in beds of common garden earth, and the ſecond ſort in the borders or other parts ſingly, in larger offſet ſlips. The only culture they afterwards require is to keep them clean from weeds, and to cut off the decayed ſtalks annually in autumn, digging or ſtirring the ground between the plants in the common kind very well.

The third ſpecies may be raiſed by ſowing the ſeeds in the autumn or ſpring, but where the ſeeds are permitted to ſcatter, there will be a ſufficient ſupply of young plants without any further trouble.

And the fourth ſpecies may alſo be increaſed by ſeeds ſown in the ſpring on beds or in pots, or by cuttings planted in the ſame manner, in any of the ſummer months, and ſhaded from the ſun. They frequently live through the winter in warm borders; but it is always proper to keep a plant or two in pots, ſheltered under a frame during that ſeaſon, to prevent accidents.

In reſpect to the firſt ſort, it is uſeful for various domeſtic purpoſes, and the others ornamental, in the borders, clumps, and other parts, as well as affording variety among potted plants in many caſes.

Melissa *Officinalis*, *Common Balm*, in the *Materia Medica*. The herb, in its recent ſtate, has a weak, roughiſh, aromatic taſte, and a pleaſant ſmell, ſomewhat of the lemon kind: and hence this ſpecies has been denominated "Meliſſa odore citri." On diſtilling the freſh herb with water, it impregnates the firſt runnings pretty ſtrongly with its grateful flavour: and when large quantities are employed in this way, there ſeparates and riſes to the ſurface of the aqueous fluid a ſmall portion of eſſential oil, in colour yellowiſh, and of a very fragrant ſmell. Balm was formerly eſteemed of great uſe, in all complaints ſuppoſed to proceed from a diſordered ſtate of the nervous ſyſtem, and it was very generally recommended in melancholic and hypochondriacal affections, ſo that, in the opinion of Paracelſus, the "primum ens Meliſſæ" promiſed a complete renovation of man. Hoffmann and Boerhaave inclined to the opinion of the Arab phyſicians, and deemed it an efficacious remedy. S. Paulli and others ſpeak of its effects as an emmenagogue: but neither this nor any other medicinal power is now attributed to balm. As tea, however, it makes a grateful diluent drink in fevers, and in this way it is commonly uſed, either by itſelf or acidulated with lemons. The eſſential oil probably poſſeſſes no qualities different

ferent from many other aromatics and cordials. Lewis and Woodville.

Melissa, in *Geography*, a town of Naples, in Calabria Citra; 4 miles N. of Strongoli.

MELISSOPHYLLUM, in *Botany*. See Melittis.

MELISSUS, in *Biography*, a philosopher of Samos, of the Eleatic sect, who flourished about the eighty-fourth Olympiad, or the year 440 B.C. He was a disciple of Parmenides, to whose doctrines he closely adhered. As a public man, he was conversant with affairs of the state, and acquired great influence among his countrymen, who had a high veneration for his talents and virtues. Being appointed by them to the command of a fleet, he obtained a great naval victory over the Athenians. As a philosopher, he maintained that the principle of all things is one and immutable, or that whatever exists is one being; that this one being includes all things, and is infinite, without beginning or end; that there is neither vacuum nor motion in the universe, nor any such thing as production or decay, that the changes which it seems to suffer, are only illusions of our senses, and mere appearances; and that we ought not to lay down any thing positively concerning the gods, since our knowledge of them is so uncertain. Themistocles is said to have been of the number of his pupils. Enfield's Hist. Phil.

MELISTAURUM, in *Botany*, so called by Forster, from μελι, *honey*, and ςαυρος, *a stake*, or *a row of sharp pales*, the nectary bearing a resemblance to a circular fence of that kind. This author declares the genus to belong to *Polygamia Dioecia*, and professes to describe a male flower only, having never seen the hermaphrodite ones. How he ascertained the existence of such, without having seen them, in a plant known to himself alone, does not appear. In his Prodromus, p. 93, this is ranged among the obscure plants, of which he had seen imperfect specimens only, by the name of *Melistaurum distichum*, and said to be a native of New Caledonia. The male flower is figured in his *Genera*, t. 72, and thus described.

" *Cal.* none, unless the corolla be taken for such. *Cor.* minute, in five deep, roundish, concave, spreading segments. Nectary bell-shaped, abrupt, inserted into the corolla, bearing the stamens on its margin. *Stam.* Filaments twenty, inserted into the edge of the nectary, alternately awl-shaped, with roundish anthers, and of a thicker shape, hairy at the top, without anthers. *Pist.* Germen thickish, in the centre of the flower; style cylindrical, short; stigma blunt. *Peric.* and *Seeds* unknown, as well as the hermaphrodite flowers." *Forster.*

Every reader must perceive this to be the description of an hermaphrodite flower; so that we apprehend some misapplication of terms. However this may be, the description and figure are sufficient to justify Jussieu, who in his *Genera*, p. 438, refers Forster's plant to his own *Anavinga*, Lamarck Illustr. t. 355, which is *Casearia*, Schreb. Gen. 298, nearly allied to the *Samyda* of Linnæus. See Anavinga and Casearia.

MELITA, in *Ancient Geography*, an island in the Mediterranean, concerning which geographers have entertained different opinions. Ptolemy places it very near to Africa. Silius Italicus gives it the epithet of " Lanigera" on account of its wool. Cicero speaks of a temple of Juno, which was in this island, situated near a town of the same name. As it was upon an island of this name that St. Paul was shipwrecked, in his voyage to Rome, after his appeal to Cæsar (see Acts, chap. xxvii. and xxviii.), the situation of this island has been the subject of curious and diligent investigation. But no person has employed more labour and more learning in the research than Mr. Bryant. In the history, we find, that having been tossed for some time in the Adria, they were at last cast upon the island called Melite. The only question is, which is the sea, called Adria or Adriatic; and what island can be found in that sea under this name. The Adriatic sea is that large gulf which lies between Italy and the ancient Illyria, and retains its name to this day. And as to the island we are seeking, there was one in that sea called " Melite," which is mentioned under that name by the best geographical writers. It appears from ancient authorities, that Melita was an Illyrian island in the Adriatic sea; and that it lay between Corcyra Nigra and the main land, very near the river Naro and the isthmus above it. It was called by the ancients Melite, Melitene, and Melitassa; at this day it is denominated Meleda, and by the Sclavonians, Mlect, and is in the jurisdiction of Ragusa. Nevertheless it has been the common opinion, that the Melita, now called Malta, was the true place of the apostle's shipwreck; and the natives have a tradition of long standing to support this notion. Mr. Bryant, however, undertakes to prove, that this could not be the island mentioned by the writer of the book of Acts. But in doing this he contends with a host of learning and criticism; Grotius, Cluver, Beza, Bochart, and Bentley. In order to support this opinion, it is necessary for them to prove that Malta is an Adriatic island. This Bochart has much laboured to do; depending upon the authority of the poets, and a few of the later historians, who have extended the Adriatic to the coast of Africa. Polybius, Diodorus, Strabo, and Pliny, give a very different account of this matter. Mr. Bryant, after having fairly and fully stated the arguments of Bochart in favour of Malta, in his own words, undertakes to produce incontestible proof that Malta was not the place mentioned by the sacred historian, and that Melita Illyrica was. It must be allowed that, by the aid of the most approved geographers and historians, he has produced very strong, and to us satisfactory evidence, that the Adriatic sea was comprehended within the great Illyrian gulf, and never reached farther. Strabo expressly determines its extent by two fixed boundaries, that cannot be mistaken; it was included between Italy and the opposite continent. " Where then," says our author, " was St. Paul shipwrecked? Certainly between Italy and Illyria, that is, the opposite continent. Is Malta to be found in this situation? It is far off, in a sea that has no affinity, no connection with those coasts. But the other Melita, taken notice of by Scylax, Agathemerus, and Pliny, is situated in the Adria, agreeable to the apostle's account; therefore, Melita Illyrica is certainly the island there mentioned." Mr. Bryant strengthens his other arguments by adverting to the character of the natives, who are described as Βαρβαροι, barbarians. This character could not consistently be applied to the inhabitants of Melita Africana (Malta), which was first colonized by Phœnicians, and afterwards inhabited successively by Carthaginians, Greeks, and Romans. " Who will be so hardy as to denominate any of these nations barbarous? They were each of them renowned for arts, of great power and wealth, and of particular elegance and refinement. As the ancestry was good, the posterity did not fall off. The testimony of Diodorus Siculus (Hist. Bibl. l. v.) will sufficiently vindicate them from the charge of being barbarous. We have an account of some remains of antiquity in this island that will serve to guide our judgment concerning this people. The temples of Juno and Hercules appear to have been very magnificent, and of great extent: and the coins that were originally struck there are said to be of no ordinary cast. Nor can it be said that those even of the lower class were rude and savage; because from them St. Paul experienced nothing but civility. But if we take a view of Melita Illyrica, the scene will be changed, and the appellation will be found to be more applicable. The character of the Illyrians, near whom this island was situated, is represented as barbarous beyond measure. Modern travellers report of Malta that it harbours no serpents; a blessing, we are told, bequeathed to the island by St. Paul at his departure. If this be true of Malta, what is allowed as a test of the apostle's having been upon the island, is a proof to me, says our author, that he never was there. As there are no serpents now, my conclusion is, that there never were any; and consequently it could not be the place where St. Paul exhibited the miracle. For other particulars we must refer to Mr. Bryant himself. Bryant's Observations and Inquiries, &c. 1767, 4to.

MELITENE, Meledni, a country of Asia, in Armenia Minor, which extended to the right of the Euphrates, and was traversed by the river Meles.—Also, a town of Cappadocia, to the S.E., upon a stream which discharged itself into the river Meles.—Also, a country of Asia, in Cappadocia, occupying the S.E. part of it.

MELITENSIS Terra, *Earth of Malta*, in the *Materia Medica*, an earth of which there are two very different kinds, the one of the genus of the boles, the other of the marles. The latter is that known by medicinal authors under this name; the former is the Malta earth now in use: but both being brought from the same place, are confusedly called by the same name.

The Maltese bole, which is what we use now, is a fine earth, of a close compact texture, very heavy; when dug it is of a very pure white, but it is apt to contract a yellowness in drying, and become of a cream colour. It is of a very smooth and shining surface, scarcely at all stains the skin in handling, adheres strongly to the tongue, and melts into a butter-like substance in the mouth. It makes no effervescence with aquafortis, or any other acid menstruum, and suffers no change of colour in the fire. Hill. For the character of boles, see Boles. The Maltese marle, which is the terra Melitensis of medicinal authors, is a loose, crumbly, and very light earth, of an unequal and irregular texture, and when exposed to the weather, soon falls into fine soft powder; but when preserved and dried, it becomes a loose light mass, of a dirty white colour, with a greyish cast: it is rough to the touch, adheres firmly to the tongue, is very easily crumbled to powder between the fingers, and stains the hands. Thrown into water it swells, and afterwards moulders away into a fine powder. It ferments very violently with acid menstruums.

Both kinds are found in great abundance in the island of Malta, and the latter has been much esteemed as a remedy against the bites of venomous animals, but with how much justice we cannot say. The other has supplied its place in the German shops, and is used there as a cordial, a sudorific, and astringent. For the character of marles, see Marle.

MELITIA, in *Geography*, a town of European Turkey, in Thessaly; 24 miles S. of Larissa.

MELITITES, Μελιτιτης, in *Natural History*, an indurated clay, of a yellowish colour, but in many respects approaching to the nature of the morocthus or French chalk: which, when pulverized, yields with water a milky liquor, of a taste somewhat like honey: whence it takes its name.

It is a smooth substance, of a compact texture and great weight, of a fine, even, glossy surface, smooth and soft to the touch, does not adhere to the tongue, nor stain the fingers; but drawn along a rough surface, leaves a fine slender white line, and shaved into very thin pieces, has some degree of transparence. It does not ferment with acids, and burns to a pure white.

It is found in mines of metals, and seems to partake pretty much of the nature of lead; having a sweetness somewhat like that of the sal saturni, but much fainter. It only differs from the galactite, in that it is milder to the taste. (See Galactites.) The ancients used it in inflammations of the eyes, and to dry ulcers.

They also applied it externally in ulcers, and gave it inwardly as a soporific to people who were to suffer pain, supposing it would make them less sensible of it. It is at present very common in Italy, and probably in many other places, but is not known or regarded.

Melitites *Lapis*, a name given by some authors to some of the rounder species of echinitæ, from their resembling an apple in their shape.

MELITO, in *Biography*, an ancient Christian father, who flourished in the second century, was bishop of Sardis. Some moderns have supposed him the same as the angel of the church of Sardis, to whom the epistle in the book of Revelation was directed, but the most judicious critics have abandoned this idea. He travelled into Palestine for the purpose of ascertaining the number of books of the Old Testament, and he is the first Christian writer who has given us a catalogue of those books, which agrees with that of the Jews, excepting that it does not contain the book of Esther. Melito was in the number of those fathers who wrote in defence of the Christian faith, and addressed an apology to the emperor Marcus Antoninus in behalf of the persecuted Christians, of which a fragment is preserved by Eusebius. In this piece he intreats the emperor to examine the accusations which were preferred against the Christians, and to put an end to their persecutions and sufferings, by revoking the edict that he had published against them. He represented to him, "that so far was the Roman empire from having been injured or weakened by Christianity, that it was the more firmly established since the introduction of that religion into it." He boldly stated that the Christian religion had been persecuted only by wicked emperors, such as Nero and Domitian: and that, therefore, they naturally indulged the hope, that from his known clemency and goodness they should receive the same protection which they had enjoyed under the reign of Adrian. The date of this apology is fixed by Eusebius to 170, but Lardner and some others, from internal evidence, give it the date of 175 or 177. Melito was author of various treatises, the titles of which may be seen in the works of Eusebius, but of these only a few fragments remain. From the title of one of those pieces, "Concerning the Revelation of John," critics have inferred that he esteemed the book of Revelation of canonical authority, and to have been written by the apostle John. We have no account of Melito's death, except what is gathered from a letter of Polycrates to Victor, bishop of Rome, which proves it took place before the election of that pontiff, in the year 192. Lardner. Gen. Biog.

Melito, in *Geography*, a small town and bishop's see of Naples, in Calabria Ultra, several miles S. of Monte Leone.

MELITOPOL, a town of Russia, in the province of Tauris, situated on a lake about 12 miles from the sea of Azof. N. lat. 46° 12′. E. long. 35° 10′.

MELITTIS, in *Botany*, from μελιττα, which in the attic dialect is the name of a bee; so that this word is, in fact, equivalent to *Melissa*, and was adopted by Linnæus therefore for the Bastard Balm.—Linn. Gen. 299. Schreb. 395. Willd. Sp. Pl. v. 3. 157. Mart. Mill. Dict. v. 3. Sm.

Fl.

Fl. Brit. 643. Ait. Hort. Kew. ed. 2. v. 3. 421. Juff. 116. Lamarck Dict. v. 4. 80. Illuftr. t. 513.—Clafs and order, *Didynamia Gymnofpermia*. Nat. Ord. *Verticillatæ*, Linn. *Labiatæ*, Juff.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, bell-fhaped, round, ftraight, its mouth two-lipped; *upper lip* longeft, acute; *lower* fhorteft, cloven, acute, its fegments gaping. *Cor.* of one petal, ringent; *tube* much narrower than the calyx; mouth not much wider; *upper lip* erect, roundifh, undivided; *lower* fpreading, three-cleft, obtufe, its middle fegment largeft, flat, undivided, crenate. *Stam.* Filaments four, awl-fhaped, fheltered by the upper lip, the two intermediate ones fhorter than the outer ones; anthers cohering in pairs, forming a crofs, cloven, obtufe. *Pift.* Germen obtufe, four-cleft, hairy; ftyle thread-fhaped, the length and fituation of the ftamens; ftigma cloven, acute. *Peric.* none, except the unchanged calyx. *Seeds* four, in the bottom of the calyx.

Obf. The fegments of the calyx differ in number in the different fpecies.

Eff. Ch. Calyx unequal, much wider than the tube of the corolla. Upper lip of the corolla flat; lower three-lobed, crenate. Anthers forming a crofs.

1. M. *Meliffophyllum*. Reddifh Baftard-Balm. Linn. Sp. Pl. 832. Engl. Bot. t. 577. Jacq. Auftr. t. 26. (Meliffophyllum; Rivin. Monop. Irr. t. 21. f. 2. Meliffa Fuchfii; Camer. Hort. t. 30.)—Calyx three-lobed, nearly fmooth.—Native of rather mountainous woods and thickets in Germany, Switzerland, France, Greece, and the fouth-weft extremity of England, flowering in the beginning of fummer. The *root* is fibrous and perennial. *Stems* herbaceous, erect, fimple, fquare, leafy, hairy, about eighteen inches high. *Leaves* oppofite, ftalked, ovate, ferrated, hairy, full two inches long and one broad; paler and rather polifhed beneath. *Flowers* axillary, about three on each fide, moftly turned one way, on fimple reddifh round ftalks. *Calyx* purplifh, with hairy ribs, ample, three-lobed; the upper lobe or lip longeft, acute, often notched or toothed at each fide; lower lip in two vertical, equal, pointed or notched, fide-lobes. *Corolla* large and handfome, thrice the length of the calyx, externally flefh-coloured; internally whitifh, the lip marked with a divided crimfon fpot, and a few dots on its principal fegment, and more or lefs of a ftain on its two lateral lobes. The whole *herb* has, when frefh, rather an offenfive fmell; when dried it acquires the fcent of new hay, like woodruff, which is alfo the cafe with the next. Some of the old authors miftook this *Melittis*, or the following, for they did not always diftinguifh the two, for the μελισσοφυλλον of Diofcorides; but that is evidently rather our *Meliffa officinalis*, and as far as can be concluded from the fynonym of *Apiaftrum*, the *Meliffophyllum* of Pliny. Haller therefore is to blame in citing the Roman author, to fupport his own preference of this laft-mentioned name, to that adopted by Linnæus, for the genus before us.

2. M. *grandiflora*. Purple and White Baftard-Balm. Engl. Bot. t. 636. (M. Meliffophyllum; Curt. Lond. fafc. 6. t. 39. Mill. Illuftr. t. 52. Meliffophyllum; Rivin. Monop. Irr. t. 21. f. 1. M. adulterinum; Fuchs. Hift. 497. fig. 498, verum.)—Calyx in four equal lobes, nearly fmooth.—Native of woods in Hungary and Switzerland, as well as in Devonfhire and Cornwall, flowering early in the fummer. Linnæus, Haller, and their pupils for the moft part, have confounded this with the foregoing, from which it differs effentially in the *calyx*, whofe lobes are four, all lateral, none vertical, for the moft part entire, though fometimes notched. The *corolla* is larger than the other fpecies, white, with a pale tinge of yellow or cream colour in its upper part, the middle fegment of its lower lip purple with a white margin. The general habit form and fcent of the two plants agree, but this is rather the moft ornamental. Clufius diftinguifhed them in his *Hift. v.* 2. 37, as did after him Johnfon in Ger. em. 690. The figure in Fuchfius marked *Meliffophyllum verum*, is evidently intended for our prefent plant, the calyx being very clearly defined; but his account can only belong to the Garden Balm, *Meliffa officinalis*, as the lemon fcent is particularly noticed. It feems therefore that the cuts of thefe two very diffimilar plants have been tranfpofed by his printer, a miftake hitherto unnoticed. Hence Fuchfius is very erroneoufly quoted by Vaillant, Haller, and others, as making this *Melittis* the true *Meliffa*, or μελισσοφυλλον.

3. M. *japonica*. Japan Baftard-Balm. Thunb. Tr. of Linn. Soc. v. 2. 338. Willd. n. 2. (M. Meliffophyllum, Thunb. Jap. 248.)—Calyx hairy. Leaves alternate, ovate, obtufe, unequally ferrated.—Native, as it is prefumed, of Japan, though Thunberg faw only one plant, cultivated in a pot, in the ifland of Nipon, in his journey towards Jeddo, flowering in May and June. The Japanefe called it *Sjuwo*. *Stem* erect, villous, fimple, a fpan high. *Leaves* alternate, ftalked, ovate, obtufe, unequally and doubly ferrated, villous, fpreading, a finger's length. *Footftalks* the length of the nail. *Flowers* axillary, folitary, each on a hairy ftalk, an inch long. *Calyx* rough with briftles, drooping. *Thunb.*

The *leaves* being alternate, is fo improbable in this genus, that we cannot but fufpect a miftake in that particular, or in the generic characters of the plant. We know nothing of this fpecies but what Thunberg has given above.

Melittis, in *Gardening*, comprehends a plant of the flowery perennial kind, of which the fpecies cultivated is, the baftard balm (M. meliffophyllum).

In this plant there is much honey fecreted, from a gland that encircles the bafe of the germ; it is of courfe a favourite plant with bees.

And there is a variety fmaller in all refpects, with the leaves ovate and heart-fhaped, the flowers not fo large, and ufually of a pale red, but fometimes white, which is a native of Switzerland, and other fimilar fituations.

Method of Culture.—Plants of this fort are capable of being increafed by parting the roots and planting them out early in the autumn, where they are to remain; but the roots fhould not be parted oftener than every third year. When feeds can be procured, they may alfo be raifed by fowing them in the early fpring, where they are to remain. The plants fucceed beft in a loamy foil and eaftern afpect, where they can be had.

They are capable of affording ornament in the borders and other parts of pleafure-grounds and gardens.

MELIUS Inquirendum, in *Law*, a writ which lieth for a fecond inquiry to be made of what lands and tenements a man died feifed, where partiality is fufpected upon the writ called *diem claufit extremum*.

A "melius inquirendum" fhall be awarded out of B.R. where a coroner is guilty of corrupt practices, directed to fpecial commiffioners. 1 Vent. 181.

MELIZZANO, in *Geography*, a town of Naples, in Lavora; 15 miles E. of Capua.

MELKOVATE, a town of Bulgaria; 52 miles S. of Viddin.

MELKSHAM, a confiderable market-town in the hundred of Melkfham and county of Wilts, England; is pleafantly fituated on the river Avon, at the diftance of 23 miles from Bath, and 96 from London. In ancient times it is faid to have been a place of confiderable note by the

the authors of the Magna Britannia, who aſſert that the Conqueror eſtabliſhed a court of royal juriſdiction here Edward I., according to the ſame authority, had likewiſe a foreſt in this neighbourhood, which was joined to that of Chippenham, and committed to the cuſtody of Matthew Fitz-John, who was governor of the caſtle of Devizes. But if thus important in early times it ſeems to have greatly decayed before the age of Leland, as neither he, nor his ſucceſſor Camden, ſo much as mention it, though the former was undoubtedly in this part of the county. Of late years, however, it has again riſen to ſome degree of conſequence by the influence of trade. For a conſiderable period Melkſham has been celebrated for its manufacture of ſuperfine cloths and caſſimere. The buildings of this town are in general conſtructed of freeſtone, poſſeſſing, individually, an appearance of much neatneſs, but the ſtreets are irregular and narrow. The church, of which the living is a vicarage in the gift of the dean and chapter of Saliſbury, is a ſpacious edifice, with a handſome tower in the centre. Here are likewiſe meeting-houſes for diſſenters of different denominations, particularly Independents and Baptiſts. Methodiſts are leſs numerous than in moſt other towns of the ſame extent in England, though they have increaſed conſiderably of late years. According to the parliamentary returns of 1801, the number of inhabitants in the whole pariſh was eſtimated at 4030 perſons, 1864 males, and 2166 females, of whom 1299 were engaged in trade, and 370 in agriculture. The proportion of poor is very great, owing to the manufactories which have again begun to decline, and will probably ſoon leave the town entirely, as has already taken place with regard to Corſham. Since the introduction of the new proceſs in the cloth manufacture, Melkſham has loſt the advantages it was formerly ſuppoſed to poſſeſs in reſpect of ſituation on the banks of the Avon. The petty ſeſſions for Melkſham and Tinehead diviſion are held here. The market is on every alternate Monday. A branch of the Wilts and Berkſhire canal comes cloſe up to the town, and communicates with Bath and Briſtol. About two miles weſt of Melkſham is Shaw-hill-houſe, the ſeat of R. Heathcote, eſq. Magna Britannia, Wiltſhire. Britton's Beauties of Wiltſhire.

MELL Islands, a cluſter of ſmall iſlands, near the W. coaſt of Scotland. N. lat. 58° 15′. W. long. 4° 57′.

MELLABA, a town of Africa, in the country of Barca. N. lat. 31° 5′. E. long. 23° 44′.

MELLARIA, in *Ancient Geography*, *Fuentes Ovejuna*, a town of Hiſpania, in Bœtica, at the foot of the mountains, and S.W. of Siſapa; which was a conſiderable place, and is mentioned in the Itinerary of Antonine.—Alſo, a town of Hiſpania, in Bœtica (now *Tarifa*), ſituated towards the ſouth on a ſtrait, famous for its ſalt-works and for its commerce in ſalted proviſions. According to the Itinerary of Antonine, it was 12 miles towards the W. from Portus Albus.

MELLATS, in *Chemiſtry*, are combinations of an acid called the mellitic with certain baſes. See Mellitic *Acid*.

MELLE, in *Geography*, a town of France, and principal place of a diſtrict in the department of the Two Sevres; 13 miles S.E. of Niort. The place contains 1741, and the canton 7782 inhabitants, on a territory of 165 kiliometres, in 13 communes. N. lat. 46° 13′. W. long. 0° 4′. —Alſo, a town of Weſtphalia, in the biſhopric of Oſnabruck; 11 miles S.E. of Vorden.

MELLEGETTA, Melegetta, or *Milleguetta*, in *Botany*, the African name, if we miſtake not, of the Grains of Paradiſe, *Amomum Grana Paradiſi* of Linnæus; see Amomum, ſp. 15. See alſo Grain-*Coaſt*, where this word is ſpelt *Malaguetta*, and ſuppoſed to be of Portugueſe origin. It is likewiſe the Spaniſh name of the ſame drug, and, wherever it may have originated, is now in common uſe amongſt the black natives of Sierra Leone. From thence we obtained, many years ago, by the kindneſs of Dr. Adam Afzelius, ſpecimens of theſe grains in their native huſk or capſule, a thing heretofore unknown among collectors of *Materia Medica* in England. We received alſo, at the ſame time, ſpecimens of the plant, which is a genuine *Amomum*, according to Mr. Roſcoe's able elucidation of the Linnæan order of *Scitamineæ*, ſee Tr. of Linn. Soc. v. 8. 351. t. 20. f. 11; and is now growing, in many of the Engliſh ſtoves, from ſeeds brought over by Dr. Afzelius; but we have never heard of its flowering. The new edition of Ait. Hort. Kew. does not contain this ſpecies, but it is admitted into the catalogue of the Cambridge garden by Mr. Donn, we believe with perfect propriety. As no authentic characters or deſcriptions of this plant have appeared, and its ſynonyms are altogether confuſed, even in the beſt writers, we ſhall attempt to clear up the whole of its hiſtory.

Amomum *Grana Paradiſi*, Grains of Paradiſe. (True Mellegetta Pepper. *Afzelius*.) Linn. Sp. Pl. 2. Berg. Mat. Med. v. 1. 3. (A. n. 3; Linn. Mat. Med. 2, with an erroneous character. Grana Paradiſi officin; Dale Pharmac. 277; Bauh. Pin. 413; both with many wrong ſynonyms. Melligetta; Cord. Hiſt. 195. Melegueta; Bauh. Prod. 158. Lobel. Adverſ. 445.)—Stalk ſimple. Bracteas numerous, cloſely imbricated. Leaves crowded, ovato-lanceolate, pointed. Capſule oblong, bluntly triangular, minutely hiſpid. Seeds roundiſh.—Native of Guinea, about Sierra Leone, from whence the ſeeds were brought very ſoon after the diſcovery of that country by European navigators. The *root* is perennial, woody, creeping horizontally. *Stems* erect, ſimple, ſlender, three feet high, leafy, but deſtitute of flowers. *Leaves* numerous, crowded, two-ranked, alternate, a ſpan long and an inch broad, lanceolate, or ſlightly ovate, with a long taper point, entire, ſmooth, ſingle-ribbed, ſtriated with innumerable oblique veins. Their flavour is ſlightly aromatic, after having been dried twenty years. *Footſtalks* ſheathing, linear, very long, ſmooth, ſtriated. *Flower-ſtalks* radical, ſolitary, an inch or two in length, aſcending, clothed with numerous, cloſe, ſheathing *bracteas*, all abrupt, ribbed, ſomewhat hairy and fringed; the lower ones very ſhort; the upper gradually much larger. Of the parts of the *flower* nothing can be made out from our ſpecimens. *Capſule* an inch and half long, half an inch in diameter, oblong, bluntly triangular, ſcarcely ovate, beaked, of a dark reddiſh-brown, ribbed, coriaceous, rough with minute deciduous briſtly hairs. When broken it is very powerfully aromatic, even after being kept twenty years, with a peculiar pepper-like flavour, rather too ſtrong to be agreeable. *Seeds* numerous, enveloped in membranes formed of the dried pulp, roundiſh or ſomewhat angular, of a ſhining golden brown, minutely rough or granulated, extremely aromatic, hot, and acrid.

Of this plant or its capſule we have in vain ſought for a figure in any book within our reach. The old authors confounded with it the *Cardamomum majus*, of which a figure may be found in Camerarius's Epitome 11. f. 1. Tabern. Kreuterb. 1319. Matth. Valgr. v. 1. 25. Ger. em. 1542, the largeſt kind. Bauh. Hiſt. v. 2. 204. This is *Amomum anguſtifolium* of Sonnerat's Voyage aux Indes, v. 2. 242. t. 137, found in marſhy ground in Madagaſcar. The habit of this ſpecies is not unlike what we have deſcribed; but the *capſule*, (of which old authors miſtake the baſe for the ſummit, and therefore compare it to a fig,) is very different, being

being ovate, flattened at one side, striated, but smooth, nearly twice the size of the above. *Seeds* larger than the former, but otherwise not very unlike in appearance, though totally different in their flavour, which much resembles that of the small East Indian Cardamom, and has none of that vehemently hot acrid taste, for which the Grains of Paradise are remarkable.

Gærtner has mistaken for the Mellegetta Pepper another very different species of *Amomum*, for which genus he perversely retains the name *Zingiber*. This is figured in his t. 12, by the name of *Z. Melegueta*, and is remarkable for the large and copious bracteas, each two inches long, encompassing the capsule. The latter is nearly as long, ovate, with a corrugated beak. Seeds ovate or nearly globular, partly angular, smooth and polished, lead-coloured, livid, or glaucous, with a strong umbilicated scar at their base, surrounded with a whitish rather tumid margin. Professor Afzelius has favoured us with some seeds which answer very well to this description, except in being twice as large as Gærtner represents them. But this is not an unfrequent error with him. Of the capsule, or plant producing these seeds, we have no information.

Another species, nearly akin to this of Gærtner, (and which we should almost have taken for his plant, were it not for the seeds just mentioned, considered as such by our friend Afzelius,) is described in Clusius, (*Exot.* 38. *fig.* 14.) of which we have one capsule, with seeds. The author describes this as bearing four capsules together at the top of the stalk, encompassed with *short* bracteas at the base, not long ones as in Gærtner. The capsules are two inches in length, ovate with a long beak, slightly triangular, cartilaginous rather than leathery, striated, smooth, reddish-brown. Seeds ovate inclining to cylindrical, dark brown, exquisitely smooth and shining, with a light brown corrugated and notched margin surrounding the scar. They are but slightly aromatic. Clusius seems to have received from Madagascar the true *Cardamomum majus*, *Amomum angustifolium* of Sonnerat mentioned above, which he rightly distinguishes from the Mellegetta Pepper, and seems to imply that it is also distinct from his fig. 14, of which there can be no doubt.

By the above remarks it appears that the species of this genus are very imperfectly known. We have, besides, specimens of some that are not at all described. It is highly desirable that botanical travellers should pay particular attention to this tribe, the seeds of several of which are important articles of commerce, and not useless in medicine. The botanical history of none of the Cardamoms was properly known to Linnæus, and that of the *Cardamomum medium*, *Zingiber Ensal* of Gærtner, is still entirely in the dark. By the inflorescence we presume it of Dr. Maton's genus *Elettaria*, Tr. of Linn. Soc. v. 10. 254. S.

MELLI, or Lamlem, in *Geography*, a country of Africa, bounded on the N. by Cashna, on the E. by Wangara, on the S. by Guinea, from which it is separated by mountains, and on the W. by Gago; 500 miles in length from E. to W., and from 150 to 200 in breadth. N. lat. 11° 30′ to 15°. E. long. 5° 30′ to 14° 50′.

MELLID, a town of Spain, in Gallicia; 20 miles E. of Compostella.

MELLIFAVIUM, (from *mel* and *favus*, a honey-comb,) in *Surgery*. See Meliceris.

MELLITE; *Honig-stein*, Wern.; *Honey-stone*, Jameson; *Mellite*, Haüy, Broch. Brongn.; *Mellilite*, Kirw.

This mineral, which, by most mineralogists, is classed with the inflammable substances, was mistaken, by Born and other writers, for a crystallized variety of amber, till Werner and Laumont, and principally Klaproth, determined its true nature, which is totally different from that of any other mineral substance we are acquainted with.

Its colour is honey-yellow, of more or less purity and intensity, passing into wax and sometimes into straw and greyish-yellow.

It is seldom found massive and in detached grains; generally crystallized.

The primitive form of the crystals is an octohedron with common base perfectly square; the inclination of each face of the four-sided pyramid, on its corresponding face in the other pyramid, is, according to Haüy, $= 93° 22'$. This primitive crystal (Mellite *primitif*, Haüy, pl. 62. f. 12.) occurs more frequently than the following modifications.

1. The primitive octohedron having all the solid angles of the base replaced by quadrilateral planes, which, when they meet, form a rhomboidal dodecahedron, which is, however, different from the garnet dodecahedron in the measurement of its angles. (Mellite *dodécaèdre*, Haüy, ib. fig. 14.)

2. The primitive octohedron, with the solid angles of the base as well as those of the summit of the pyramids, each replaced by a quadrilateral plane, the surface of which is sometimes more or less convex or curvilinear. (Mellite *épointé*, Haüy, ib. fig. 13.)

The crystals, which are small and very small, are generally singly dispersed, sometimes grouped together; their surfaces are smooth and shining, seldom rough, and, as it were, corroded.

Internally it is splendent; lustre intermediate between vitreous and resinous.

Fracture perfectly conchoidal; the fragments are indeterminately angular, and pretty sharp-edged.

It is seldom found perfectly transparent; oftener translucent and opaque, and possesses a very distinct double refraction.

It is soft; more so than amber. Brittle. Easily frangible, and yields a yellowish-grey powder. Specif. gravity 1.550, Klapr., 1.5858, Haüy, 1.666 Abich. The purer crystals become slightly electric by friction.

Exposed to the flame of a candle, or on a burning coal, it first becomes opaque, and white spotted with black, which soon gives way to a pure white. No smoke, flame, or odour are perceived during this process. Projected on melted nitre no real detonation takes place, but only a slight scintillation; and the earthy part remains mixed with the nitre.

It is entirely soluble in nitric acid without heat, and the fragments remain translucid; in muriatic acid, on the other hand, the fragments become more or less opaque.

Abich and Lampadius have given analyses of mellite, which are completely superseded by those performed by Klaproth, according to which this substance is composed of

Alumine	16
Mellitic acid	46
Water of crystallization	38
	100 Kl. Beitr. ii. p. 134.

This analysis has been confirmed by Vauquelin in Ann. de Ch. vol. xxxvi. p. 203.

This substance has been hitherto found only at Artern, in Thuringia, on a bed of bituminous wood and brown coal, accompanied by small crystals of native sulphur, which by the inattentive observer might be easily mistaken for the straw-yellow variety of mellite. Langenbogen in the Saal circle has been mentioned as another locality of this mineral, as likewise Switzerland, where it is said to have been found with flaggy asphaltum.

MELLITIC Acid, in *Chemistry*, is a product obtained

tained from the mineral called mellite, or honey-stone. It was discovered by Klaproth in the year 1799 (Beiträge, tom. iii. p. 114.); and the existence of it was shortly afterwards confirmed by the researches of Vauquelin (Annales de Chimie, tom. xxxvi. p. 203.) To procure this acid, it is merely necessary to boil the mellite, reduced to powder, in about seventy times its weight of water. The alumine with which it is combined in its native state, is by this process precipitated, and after filtering the solution, and evaporating it to a sufficient degree, the acid appears in a state of tolerable purity. It may be still contaminated with the presence of a little earthy matter; but, by exposing it to the action of alcohol, this will be detached, and it may then be obtained crystallized under the form of needles, or short prisms. In Vauquelin's analysis, the substance under enquiry was procured by adding the pulverized mellite to a solution of carbonat of potash; carbonic acid being evolved, and the mellitic acid uniting to the alkali. Nitric acid was afterwards presented to take up the alkaline base, and the mellitic acid separated, in the course of a few hours, in short prismatic crystals. Thus crystallized, this acid has a brownish-yellow tinge; its taste is slightly sour, accompanied with bitterness; and it is but sparingly soluble in water. Exposed to heat, it is easily decomposed, and emits a dense smoke which has no odour. With the alkalies, earths, and metallic oxyds, it enters into combination, and forms a class of salts, which, in conformity with the principles of the present chemical nomenclature, are denominated *mellats*. The properties of these, however, have been but very imperfectly examined. Mellat of potash crystallizes in prisms, which apparently differ from those of the acid in being longer. The form of mellat of soda is a cube, or three-sided table. The union of mellitic acid with ammonia yields fine transparent six-sided prisms, which become opaque on exposure to the air. Barytes, strontian, and lime, form insoluble compounds; as also does alumine. Solutions of silver, lead, and mercury afford each a white precipitate; but from iron a yellow compound is deposited. This acid, in many of its properties, bears a very near resemblance to the oxalic; but, in others, it exhibits a sufficient difference to forbid our considering them identical. The products it affords when decomposed by heat, are pretty much like those yielded by the vegetable acids. This species of analysis, however, has been, hitherto, so rude and unsatisfactory, that no very accurate comparison can be grounded upon the evidence which it supplies. The acute researches of M. M. Gay Lussac and Thenard have, in a very eminent degree, removed this defect; and we may shortly hope, aided by the light which their genius has diffused over these subjects, to find vegetable chemistry equally demonstrative and certain in its operations with the most accurate branches of experimental science. See Recherches Physico-Chimiques par Gay Lussac et Thenard, tom. ii.

MELLO-MESQUITELA, in *Geography*, a town of Portugal, in the province of Beira; 12 miles W. of Guarda.

MELLOON, or MELONE, a town of the Birman empire, on the W. side of the Ava, rich in temples, but in no other respect distinguished. N. lat. 20° 10′. E. long. 96° 9′.

MELLOOR, a town of Hindoostan, in Madura; 12 miles N.E. of Madura.

MELLOUNOSH, a town of Africa, on the E. coast of Tunis; 20 miles S.E. of Jemme.

MELLYPOUR, a town of Hindoostan, in Bahar; 38 miles W.S.W. of Boglipour.

MELMOTH, WILLIAM, in *Biography*, an eminent and learned pleader at the bar, and member of Lincoln's-Inn, was born in 1666. He became a bencher of that honourable society, and, in conjunction with Mr. Peere Williams, published Vernon's "Reports," under an order of the court of Chancery. It appears that he had an intention of printing his own Reports, and even advertised them as actually preparing for the press. They have not, however, made their appearance. But the work by which he is best known, and for which he will be very long remembered, is entitled "The Great Importance of a Religious Life." This little tract has gone through many editions; more than 40,000 copies were circulated in the course of twenty years, independently of other large impressions that have been taken off, as well for sale as for charitable purposes: and while this article was writing, several copies of a new edition of this valuable tract came into the hands of the writer, from a friend who has undertaken the office of editor, with the view of circulating it among persons into whose hands it would, without his exertions, scarcely have come: and with the hope, that by omitting certain expressions in controverted theology, "the work might recommend itself to a numerous and additional body of rational disciples of our common master." It is a singular circumstance, that the author of this treatise, so much read and highly applauded, should not have been known till the fact was revealed by his son. It was commonly attributed to the first earl of Egmont, to whom it had been given by Mr. Walpole in his Catalogue. Mr. Melmoth died on the 6th of April 1743, and was buried under the cloister of Lincoln's-Inn chapel. His character has been drawn by his son, the subject of the next article, in the following words: "The author's life was one uniform exemplar of those precepts which, with so generous a zeal, and such an elegant and affecting simplicity of style, he endeavours to recommend to general practice. He possessed by temper every moral virtue; by religion every Christian grace. He had a humanity that melted at every distress; a charity which not only thought no evil, but suspected none. He exercised his profession with a skill and integrity which nothing could equal, but the disinterested motive that animated his labours, or the amiable modesty which accompanied all his virtues. He employed his industry, not to gratify his own desires; no man indulged himself less: not to accumulate useless wealth, no man more disdained so unworthy a pursuit: it was for the decent advancement of his family, for the generous assistance of his friends, for the ready relief of the indigent. How often did he exert his distinguished abilities, yet refused the reward of them, in defence of the widow, the fatherless, and him that had none to help him! In a word, few people have ever passed a more useful, not one a more blameless life; and his whole time was employed in doing good, or in meditating it." See preface to "The Great Importance of a Religious Life, &c." 1812. Also "Memoirs of a late eminent Advocate, &c." By William Melmoth, esq. 1796.

MELMOTH, WILLIAM, son of the above, was born in 1710, and first appeared as a writer about the year 1742, in a volume of "Letters" under the name of Fitzosborne, which have been much admired for the elegance of their language, and their just and liberal remarks on various topics, moral and literary. In 1747 he published "A Translation of the Letters of Pliny," in 2 vols. 8vo., which was regarded as one of the best versions of a Latin author that had appeared in our language. In 1753, he gave a translation of the "Letters of Cicero to several of his Friends, with Remarks," in 3 vols. He had previously to this, written an anſwer to Mr. Bryant's attack, in his Treatiſe on the Truth of the Chriſtian Religion, on his remarks on Trajan's Perſecution of the Chriſtians in Bithynia, which made a note to his tranſlation of Pliny's Letters. He was the tranſlator likewiſe of Cicero's treatiſes "De Amicitia" and "De Senectute," which were publiſhed in 1773 and 1777. Theſe he enriched with remarks, literary and philoſophical, which added much to their value. In the former he refuted lord Shaftſbury, who had imputed it as a defect to Chriſtianity, that it gave no precepts in favour of friendſhip, and Soame Jenyns, who had repreſented that very omiſſion as a proof of its divine origin. The concluding work of Mr. Melmoth was a tribute of filial affection, in the Memoirs of his father, of which we have already made uſe. After a long and reſpectable life paſſed in literary purſuits, and the practice of private virtue, Mr. Melmoth died at Bath, March 15, 1799, at the age of 89. He had been twice married; firſt to the daughter of the celebrated Dr. King, principal of St. Mary's-hall, Oxford, and ſecondly to Mrs. Ogle. "The author of 'The Purſuits of Literature,' ſays Mr. Melmoth, "is a happy example of the mild influence of learning on a cultivated mind; I mean that learning which is declared to be the aliment of youth, and the delight and conſolation of declining years. Who would not envy this fortunate old man, his moſt finiſhed tranſlation and comment on Tully's Cato? Or rather, who would not rejoice in the refined and mellowed pleaſure of ſo accompliſhed a gentleman, and ſo liberal a ſcholar?" Gent. Mag. Preface to Fitzoſborne's Letters, 1805.

MELNERSENS, in *Geography*, a town of Weſtphalia, in the principality of Luneburg-Zelle; 16 miles S.E. of Zelle.

MELNIK, a town of Bohemia, in the circle of Boleſlaw, at the conflux of the rivers Elbe and Moldau; 18 miles N. of Prague. N. lat. 50° 20'. E. long. 14° 40'.

MELO, in *Botany*, from μηλον, *an apple*, the Melon. See CUCUMIS.

MELOCACTUS, ſo called from *Melo*, a Melon, and *Cactus*, the Torch-thiſtle, becauſe the whole plant reſembles a large green deeply-furrowed melon. See CACTUS.

MELOCHIA, a name adopted by Dillenius from Proſper Alpinus. Sonnini ſays it is the Arabic appellation of *Corchorus olitorius*, a plant agreeing in many particulars of habit and properties with the genus in queſtion. Linn. Gen. 348. Schreb. 454. Willd. Sp. Pl. v. 3. 600. Mart. Mill. Dict. v. 3. Juſſ. 274. Cavan. Diſſ. 318. Lamarck Dict. v. 4. 81. Illuſtr. t. 571. Gærtn. t. 113.—Claſs and order, *Monadelphia Pentandria*. Nat. Ord. *Columniferæ*, Linn. *Malvaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, cut half-way down into five, half-ovate, acute, permanent ſegments, and ſometimes accompanied by an external unilateral calyx of three leaves. *Cor.* Petals five, inverſely heart-ſhaped, large and ſpreading. *Stam.* Filaments five, awl-ſhaped, united at the baſe into a little cup embracing the germen; anthers ſimple. *Piſt.* Germen ſuperior, roundiſh; ſtyles five, awl-ſhaped, erect, the length of the ſtamens, permanent; ſtigmas ſimple. *Peric.* Capſule roundiſh, or five-ſided, of five cells and five acute valves, with double partitions contrary to the valves. *Seeds* either ſolitary or in pairs, roundiſh on one ſide, angular from compreſſion at the other.

Eſſ. Ch. Calyx ſingle or double. Petals five, ſpreading. Filaments awl-ſhaped. Styles five. Capſule of five cells. Seeds one or two in each cell.

A tropical, and principally Weſt Indian genus of plants, for the moſt part ſhrubby, and agreeing with *Sida*, more than with any other of the ſame natural order, in habit and appearance. The 14th edition of Syſt. Veg. enumerates ſeven ſpecies; Willdenow has fourteen. The *leaves* in all are ſtalked, ſimple, ſcarcely lobed, unequally crenate or ſerrated, and of courſe alternate. *Flowers* various in ſize, ſituation, and colour. The following examples may ſuffice.

M. *pyramidata*. Linn. Sp. Pl. 943. Jacq. Hort. Vind. v. 1. 11. t. 30. Cavan. Diſſ. 319. t. 172. f. 1.—Flowers in lateral umbels. Capſule pyramidal, with five ſharp-pointed angles. Leaves naked.—Native of Braſil and the Caribbee iſlands. It has long been known in the ſtoves of this country, but is kept rather as a curioſity than an ornament. The *ſtem* and *branches* are round, ſtraight and wand-like. *Leaves* ovate, pointed, ſerrated, two or three inches long and one broad, ſmooth, with one rib, and many ſtraight, parallel, oblique veins. *Flowers* ſmall, purple, four or five together, in lateral hairy umbels.

M. *concatenata*. Linn. Sp. Pl. 944. Cavan. Diſſ. 322. t. 175. f. 2. (Althæa indica, floſculis parvis, &c.; Pluk. Phyt. t. 9. f. 5.)—Spikes terminal, crowded. Capſules globoſe. Leaves ſerrated, naked.—Native of both Indies. We have not met with it in any garden. The *inflorescence*, and very ſmall *flowers*, diſtinguiſh this from the foregoing; and the globular capſules, about the ſize of peas, encompaſſed with the long linear ſegments of the *calyx*, and diſpoſed in *ſpikes*, like beads, are peculiar.

M. *odorata*. Linn. Suppl. 302. Forſt. Prod. 47. Cavan. Diſſ. 320. t. 173. f. 2.—Leaves ovate, ſomewhat heart-ſhaped, doubly ſerrated, naked. Corymbs axillary, many-flowered, downy, on long ſtalks.—Gathered by Forſter in the iſlands of Tanna and Amſterdam. A very fine ſpecies, with broad ovate *leaves*, three or four inches long, doubly and coarſely ſerrated, naked but roughiſh to the touch. The very abundant large and handſome *flowers*, which we preſume are fragrant, grow on long, corymboſe, finely downy, axillary *ſtalks*. *Calyx* downy, globoſe, with long ſharp ſegments. *Petals* much longer than the calyx, of what colour we know not.

M. *lupulina*. Swartz. Ind. Occ. v. 2. 1141.—Cluſters compound, crowded, axillary, ſomewhat umbellate, hairy. Leaves ovate or heart-ſhaped, doubly ſerrated, ſoft and hairy beneath.—Native of Jamaica. Communicated to the younger Linnæus by ſir Joſeph Banks. The ſhape of the *leaves* is not unlike the laſt, but their under ſide is clothed with minute hairs, very ſoft to the touch. The permanent ſcarioſe *calyx* has a tawny hue and ſomewhat of the aſpect of hops. *Corolla* ſmall, white.

M. *corchorifolia*. Linn. Sp. Pl. 944. Dill. Elth. t. 176. f. 217.—Flowers in axillary ſeſſile hairy heads. Leaves ovate, obſcurely lobed, crenate, ſmooth.—Native of the Eaſt Indies. The *leaves* are about two inches long, very ſmooth. *Flowers* ſmall, pale fleſh-coloured, in ſmall axillary heads.

MELODIA, Lat. and Ital., *Melodie*, Fr., μελωδια, Gr., from μελος and ωδη, *continuata ſonorum connexio*; *Melody*, Eng.

To deſcribe all the rules and prohibitions in framing melodies, would require a code of laws equal to an art of poetry.

Dr. Pepuſch (Treatiſe on Harmony) gives a very ſhort, but intelligible definition of melody; which, he ſays, "is the progreſſion of ſound proceeding from one note to another ſucceſſively in a ſingle part."

Rouſſeau is eloquent on the ſubject. Melody he defines, "the ſucceſſion of ſounds according to the laws of rhythm and modulation, ſo as to form muſical phraſes agreeable to the

the ear; vocal melody is called *chant* by the French, inſtrumental is called *ſymphonie*."

The Italians called melody *cantilena*; by the Engliſh it is termed air, tune, principal or treble part.

A ſeries of ſounds only becomes melody by being in ſome ſpeciſic time, or meaſure, that is, by being arranged in regular proportions of time, called *bars*; which, however divided and ſubdivided into notes of different value, muſt be performed iſochronally, that is, in equal time, and theſe bars have their laws likewiſe, and are governed by *accents*. See ACCENT and BAR.

Though melody is ſo neceſſary in the treble part of a compoſition, it is not neceſſary in the baſe, at leaſt of the ſame kind. A polyphonic compoſition is admired by maſters when all the parts *ſing*, that is, when each part has a ſeries of notes that may be called melody; unleſs in fugues and imitations, it is not neceſſary that the inferior part ſhould move in the ſame kind of notes as the principal. For as only thirds and ſixths can move together in a regular aſcent or deſcent in the ſame kind of notes diatonically, they ſoon tire, and manifeſt a want of reſources in the compoſer. And though melody is admired and expected in the ſeveral parts, it is beſt when of a different character from the principal part.

It is in the following periods that the eloquence, feeling, refined taſte, and enlarged views of Rouſſeau appear in this article.

"Melody," he ſays, "is founded on two different principles: conſidered in the relations which the ſounds of a key bear to each other, it has its principle in harmony, as it is an harmonical analyſis, which gives the degrees of the gammut, the chords of the key, and the laws of modulation, the only elements of melody. Upon this principle all the force of melody is confined to the flattering the ear with agreeable ſounds, as the eye is flattered by an agreeable change of colours, without their repreſenting by their mixture any particular object or deſign. But conſidered as an art of imitation, by which we can awaken different images in the mind, move the heart with different ſentiments, excite and calm the paſſions, operate, in ſhort, moral effects beyond the immediate empire of the ſenſes, we muſt ſeek another principle; for no ſuch effects as theſe can be derived from harmony.

"What then is the ſecond principle? It is in nature as well as the firſt; but it can only be diſcovered by more ſubtle and penetrating obſervation, to which nature only gives birth, and which cannot be taught. It is inſtinctive, and often unknown to the poſſeſſor. This principle is the ſame as that which varies the tone of voice in ſpeech, according to what we ſay, and what we feel in ſaying it. It is the accent of languages which determines the melody of every country; it is the accent which ſpeaks in ſinging; and we ſpeak with more or leſs energy, as the language has more or leſs accent. The language in which the accent is moſt marked, produces a melody the moſt lively and impaſſioned; and that which has little or no accent, can only ſuggeſt a languid and cold melody, without character and without expreſſion. Theſe are the true principles. When we quit them, and ſpeak of the power of muſic over the human heart, we know not what we talk about. If muſic only paints by the power of melody, and derives from melody all its force, it follows that all muſic which does not *ſing*, however harmonious it may be, is not an imitative muſic; for as it can neither move the affections nor paint with its fine chords, it ſoon tires the ear and leaves the heart cold. It follows, then, that in ſpite of the multiplicity of parts which harmony can furniſh, and which is ſo often abuſed, as ſoon as two melodies are heard at once, they mutually enfeeble and efface each other, however excellent they may be in themſelves."

This is the language which the Chineſe, and every people not accuſtomed to harmony, talk. See CHINESE *Muſic*.

Rouſſeau is a champion for melody, and M. Laborde for harmony; but we think now, as we did forty years ago, that melody and harmony are as imperfect when ſeparate, as an animal formed by nature with two legs or two arms, is with one. In muſic, melody and harmony have each diſtinct and peculiar beauties; but after being heard together, nothing can compenſate for their ſeparation. Melody ſhould be poliſhed, and harmony purified; but it was one of the paradoxes of the ingenious Jean Jacques, in aſſerting "that harmony was an imperfection, a Gothic and barbarous invention; only wanted by the groſs and obtuſe organs of northern regions."

Rhythm is as neceſſary to melody, as that the ſounds ſhould follow each other in a manner agreeable to the ear. Sounds of the ſame length can form no intereſting melody; they muſt be broken into notes of different duration, muſt be phraſed, and have ſome ſenſe given them, as well as words in literature and grammar.

MELODIEUX, *Fr.* Melodious. This epithet is ſeldom applied with accuracy. A ſweet-toned voice in ſpeech or ſong may be called *melodious*; but to ſay that an air or tune, or a piece of muſic is melodious, is a pleonaſm that borders on vulgarity: as theſe words themſelves imply melody; therefore to ſay that an air or tune is melodious, is ſaying that melody is melodious.

MELODINUS, in *Botany*, is one of Forſter's genera, derived from *μηλον, an apple*, and *δινεω, to entwine*, becauſe the plant bears globular fruit reſembling apples, and its ſtem is twiſted or ſcandent.—Forſt. Nov. Gen. 19. Linn. Suppl. 23. Schreb. 165. Willd. Sp. Pl. v. 1. 1274. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 74. Juſſ. 148. Lamarck Illuſtr. t. 179.—Claſs and order, *Pentandria Digynia*. Nat. Ord. *Contortæ*, Linn. *Apocineæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, permanent, of one leaf, cloven into five, ovate ſegments, folding over each other at the margin. *Cor.* of one petal, ſalver-ſhaped; tube cylindrical, thrice as long as the calyx; limb flat, cloven into five, ſickle-ſhaped, crenulated ſegments, twiſted to the right, ſhorter than the tube. Nectary in the mouth of the tube, ſtellated, compoſed of five, cloven, lacerated ſegments. *Stam.* Filaments five, awl-ſhaped, very ſhort, in the middle of the tube; anthers ovate. *Piſt.* Germen ſuperior, globoſe; ſtyle round, the length of the calyx, diviſible into two parts; ſtigma conical, acute. *Peric.* Berry fleſhy, globoſe, with a fleſhy partition. *Seeds* numerous, ovate, or roundiſh, rather compreſſed, imbedded in pulp.

Eſſ. Ch. Corolla contorted, its mouth crowned with five cloven jagged valves. Berry globoſe, of two cells, with many ſeeds.

1. M. *ſcandens*. Climbing Melodinus. Linn. Suppl. 167. Forſt. Prod. 20.—Gathered in New Caledonia by Forſter, who ſent it to Kew Garden in 1775. It is kept in the ſtove, but does not appear to have flowered. The *ſtem* is ſhrubby, climbing, with round, ſmooth, leafy branches. *Leaves* oppoſite, ovate-oblong, with a blunt point, entire, three or four inches long, thick-edged, ſmooth and ſhining, with one rib, and numerous, fine, reticulated veins; paler beneath. *Footſtalks* very ſhort and thick. *Stipulas* none. *Flowers* terminal, numerous, in a denſe downy panicle, with oppoſite ſtalks, and ſmall, ovate bracteas. The *corolla* is externally downy, about half an inch long. *Fruit* the

the ſize of a ſmall orange. The habit of this plant, and form of the flowers, are much like *Rauwolfia*, but the numerous ſeeds afford a ſufficient mark of diſtinction.

MELODORUM, ſo named by Loureiro, from *mel*, *honey*, and *odorum*, *fragrant*, on account of the remarkable ſweetneſs and fragrance of the fruit; as he himſelf informs us.—Loureir. Cochinch. 351.—Claſs and order, *Polyandria Polygynia*. Nat. Ord. *Coadunatæ*, Linn. *Anonæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of three ſhort, acute, ſpreading, permanent leaves. *Cor.* Petals ſix, triangular, nearly equilateral, fleſhy, inflexed and cloſed, in a double row, concealing the organs of impregnation. *Stam.* Filaments none; anthers numerous, oblong, club-ſhaped, affixed to a ſlightly convex receptacle. *Piſt.* Germens ten, oblong, preſſed together by the ſurrounding anthers; ſtyles none; ſtigmas forming a circle, very ſhort. *Peric.* Berries ten, ovate-oblong, rather cylindrical, rough, of one cell, with many ſeeds. *Seeds* compreſſed, imbedded in pulp.

Eſſ. Ch. Calyx of three leaves. Petals ſix, triangular, equilateral, cloſed. Berries numerous, oblong, many-ſeeded.

1. M. *fruticoſum*. Cây Bo gie of the Cochinchineſe.—Leaves lanceolate, ſmooth. Stem ſhrubby.—Native of buſhy places in Cochinchina. *Stem* four feet high, erect, with ſpreading *branches*. *Leaves* alternate, lanceolate, entire, ſmooth, fragrant. *Flowers* ſcattered, ſolitary, yellowiſh-brown. *Berries* of the ſame colour, an inch and a half long, with many ſeeds, and a very ſmall quantity of highly delicious pulp. A decoction of the *leaves* is uſed for removing obſtructions.

2. M. *arboreum*. Cây Nhaoc of the ſame people.—Leaves oblong, downy. Stem arboreous.—Native of woods in Cochinchina. A large *tree*, with aſcending *branches*. *Leaves* alternate, ſtalked, ovate-oblong, pointed, entire; downy beneath. *Flowers* ſcattered, ſolitary, whitiſh-green, fleſhy, downy, on very ſhort ſtalks. *Berries* numerous from each flower, not eatable. The timber is uſed for building.

Theſe plants appear, by the above deſcriptions, to be very nearly allied to the genus *Uvaria*, to which indeed we ſhould, without much heſitation, refer them. Willdenow has omitted them.

MELO-DRAMA, Lat., a drama written for muſic. In 1772, when a few perſons in France began to perceive that it was poſſible for operas to be ſet to better muſic than that of Lulli and Rameau, an anonymous treatiſe was publiſhed at Paris, under the title of "Traité du Melo-drame, ou Reflexion ſur la Muſique dramatique," 8vo.

In 1765, a ſmall tract was publiſhed by the chevalier de Chaſtellux, "On the Union of Poetry and Muſic;" and in 1772, the anonymous "Treatiſe on Muſical Drama." The former had a correſpondence with Metaſtaſio on the ſubject of his book. The poet's anſwers to his letters are preſerved in late editions of his works, and tranſlations inſerted in the memoirs of his life and writings publiſhed in 1796. In the tract of M. de Chaſtellux, he gives in his parallel between muſic and poetry, the *pas* to the former. In the treatiſe on the melo-drama, the preference is decidedly given to poetry; and muſic degraded into his menial ſervant, with no better employment than that of rendering the voice of declamation more audible than that of common ſpeech.

Theſe two writers were the precurſors of the Gluckiſts and Piccinists at Paris. And the diſpute is reduced to this ſimple queſtion; Which, in an opera or muſical drama, is to be the tyrant, and which the ſlave? Metaſtaſio long ſince with reaſon and good taſte determined in his dramas that no tyranny or ſlavery ſhould ſubſiſt; but that the two ſiſters ſhould mutually aſſiſt each other. He gave all the buſineſs of the fable to *recitative*, or muſical declamation, and the embelliſhing ſentiment to the *airs* in a recapitulation of the dialogue at the end of each ſcene.

Though the poetry of Metaſtaſio's operas has always been admired as the beſt, and almoſt the only poetry truly lyrical in modern languages; yet it muſt be allowed that beautiful air, impaſſioned ſtrains, picturesque muſic, grateful harmony, fine voices highly cultivated, and great vocal talents, have rendered operas more attractive and captivating than the poetry alone, with all its high poliſh and beautiful ſentiments could have done. Metaſtaſio in his latter days joined in the complaints of French reformers of the Italian operas, againſt fine muſic and fine ſinging. No ſuch jealouſy appears in his letters to Farinelli, or to any other correſpondent, till he had ceaſed writing, when muſical compoſition and vocal talents were much more admired and applauded than at preſent.

MELOE, in *Geography*, a ſmall iſland in the Baltic; 14 miles E.N.E. of cape Lindeſneſs.

MELOE, the Bloſſom-eater, in *Natural Hiſtory*, a genus of inſects of the order Coleoptera; of which the character is antennæ moniliform; thorax roundiſh; head inflected and gibbous; ſhells ſoft and flexile. This genus is ſeparated into two diviſions, *viz.* into thoſe that have wings and thoſe that have none, of which the latter is ſubdivided. There are, in the ſeveral diviſions or ſections, about 36 ſpecies: of theſe only four are common to our own country, the others are diſtributed over the globe.

Section A. The inſects of this diviſion have no wings, and their ſhells are abbreviated.

Species.

* PROSCARABÆUS. This ſpecies is entirely of a blue-black, or dark violet colour. It inhabits Europe, and is deſcribed and figured in Mr. Donovan's Engliſh Inſects. Its trivial name is the "oil-beetle:" thorax narrower than the head; ſhells very ſhort and oval; abdomen long; the female is thrice as large as the male. It is found very frequently in the ſpring of the year in our own fields and paſtures creeping ſlowly, the body appearing to be ſo much diſtended with eggs as to cauſe the inſect to move with great difficulty. When touched it exudes a yellowiſh moiſture like oil from its pores, whence it derives its name, which was formerly celebrated for its ſuppoſed efficacy in the rheumatiſm, applied to the parts in the form of an embrocation. It has been likewiſe recommended as a remedy in hydrophobia.

* VARIEGATUS. This is of a dull green; thorax edged with red; ſhells punctured; inhabits Europe; the antennæ are purple; head and thorax dull green, edged with purpliſh red; the ſhells are ſhort, very minutely punctured; body large, above variegated with red, green, and copper, beneath and legs purple.

MAJALIS. Dorſal ſegments of the abdomen red. It inhabits divers parts of Europe, and very much reſembles the proſcarabæus, and has been thought to be only a variety of it.

MARGINATA. Black; thorax and ſhells edged with ferruginous; it inhabits Italy; the ſhells are ſhort, ſmooth, coriaceous; the abdomen and legs are black.

* PUNCTATA. Black; thorax and ſhells with minute punctures: inhabits England.

* TECTA. Blue-black; ſhells nearly as long as the abdomen; antennæ thicker in the middle: it inhabits Europe, is ſmaller than the proſcarabæus, and differs in the ſtructure of the antennæ, having the ſhells nearly as long as the abdomen.

Section

Section B. Winged; ſhells as long as the abdomen; divided into

α, Jaw horny, bifid, containing 26 ſpecies, and conſtituting the tribe *Mylabris* of Fabricius; and

ϐ, Jaw linear, entire; containing four ſpecies, which are comprized in the *Cecroma* of Fabricius.

Species in ſubdivion α, Jaw horny, bifid.

FASCIATA. Black; ſhells with a yellow band in the middle. Is found in India; head black; eyes teſtaceous; thorax black, with a ferruginous ſpot on each ſide; wings hyaline, with ferruginous ribs and veins.

CICHOREI. Black; the elytra yellow, marked with three black bands. It is a native of Aſia and the eaſtern parts of Europe. It is uſed in medicine among the Chineſe. The antennæ are ſometimes yellow at the tips. Found on the cichoreum or ſuccory, and varies much in the colour of the ſhells and diſpoſition of the bands.

PRÆUSTA. Black; tip of the ſhells teſtaceous, with a black ſpot: inhabits Barbary and is found among corn.

MARGINALIS. Black; ſhells with a ferruginous margin; inhabits Barbary, and, like the other, is found among the corn.

ALGIRICA. This alſo is black; ſhells teſtaceous, immaculate: it is found in various parts of India.

CAPENSIS. Black; ſhells with ſix yellow ſpots, the firſt is curved: it inhabits the Cape of Good Hope.

HERMANNIÆ. Villous, black; ſhells with a yellow ſpot at the baſe and two indented yellow bands. It inhabits Guinea; reſembles the cichorei, but is not half ſo large. The antennæ are black, ferruginous at the tip; head and thorax black with a few cinereous hairs.

PUNCTUM. Villous, black; ſhells with two bands, the firſt yellow with a black dot, the hinder one reddiſh. It inhabits Tranquebar.

DECEM-PUNCTATA. Black; ſhells teſtaceous, with five black dots: it is found in Italy.

QUADRI-PUNCTATA. Black; ſhells teſtaceous, with two black dots: inhabits Ruſſia and reſembles the laſt.

TRI-MACULATA. Black; ſhells yellow, with a brown band and common dot. It inhabits the Eaſt. The ſhells have a common brown ſpot in the middle, and a brown band behind which hardly reaches the outer margin.

ARGENTATA. Covered with ſilvery down; the ſhells have yellowiſh ſpots, moſt of them connected at the margin. It inhabits Senegal; the antennæ are ferruginous; the ſhells have a ſmall yellowiſh ſpot at the baſe; three marginal ones and one near the tip all ſurrounded with a black ring; the tip is yellowiſh, having a ſmall black dot in the middle; the legs are ferruginous.

AMERICANA. Black; thorax ſemi-circular; the ſhells have three yellow bands. It inhabits America. The tip of the antennæ is clavate.

INDICA. This ſpecies is black; the ſhells are yellowiſh, fulvous behind, with a black dot and three-lobed ſpot at the baſe, indented band in the middle and ſemi-lunar margin at the tip. It is found in India.

ELONGATA. Gloſſy-black; ſhells yellow varied with blue.

AUREA. Green-gold; ſhells fulvous.

ARCUATA. Black, hairy; ſhells with a curved yellow ſpot on the fore-part, and two waved yellow bands. Antennæ black, clavate at the tip.

BI-FASCIATA. Black, hairy; ſhells with a yellow round ſpot on the fore part and at the outer angle, and two yellow bands. It is found in India. Antennæ yellow; baſe of the ſhells piceous. The yellow ſpot at the angle of the ſhells is ſometimes wanting.

TRI-FASCIATA. Steel-blue, with a greeniſh ſilky gloſs; ſhells grey, with two greeniſh-black bands, one of them common. It inhabits near the Caſpian ſea.

ARATA. Deep gloſſy-black; ſhells with a yellow waved band towards the tip. It inhabits near the Caſpian ſea; the antennæ are clavate at the end; the legs ſecrete a kind of oil.

NECYDALEA. Black; ſhells red, a little ſhorter than the abdomen, diſtinct at the tip. It is found in Ruſſia.

PENNSYLVANICA. This ſpecies is entirely black and opaque: it inhabits Pennſylvania in America.

CHLOROPTERA. Black, ſubvillous; ſhells yellow: it inhabits France. The firſt joint of the antennæ is three times as large as the reſt.

MELANURA. Shells yellow, with four black ſpots, the tip black; antennæ clavate: it inhabits Calabria.

OCHROPTERA. Black; ſhells ſaffron, black at the baſe, on each ſide before and behind the middle is a ſaffron dot, with a black interrupted band and tip.

BICOLOR. Black; ſhells yellow, with a black dot on each ſide at the baſe; the tip and band in the middle, which is broader at the edges, are black.

Species, in ſubdiviſion ϐ, Jaw linear and entire.

SCHÆFFERI. Green; antennæ and legs entire. Inhabits Europe. Shanks and tarſi of the male dilated, appendaged.

VAHLII. Green; antennæ and legs black: an inhabitant of Barbary. Abdomen reddiſh at the baſe.

SCHRÆBERI. Green; antennæ, legs, and three ſegments of the abdomen, yellow.

GOUANI. Black; ſhells with a ſanguineous band and tip.

The larvæ as well as the perfect inſects of this genus feed on leaves.

The officinalis cantharis, or Spaniſh-fly, was till very lately ſuppoſed to be a meloe, and indeed is generally ſo arranged in our pharmacopeias; but more minute and accurate obſervations have ſhewn that it is a ſpecies of the LYTTA genus; which ſee.

MELOLONTHA, the name of a very peculiar ſort of beetle, which is found in all parts of England, and in many other countries among trees and hedges. The French call them *banneton*, and we *cock-chafers*, *dorrs*, and by many other names. The name melolontha is as old as Ariſtotle, and is given this creature from its feeding on the bloſſoms of the crab or wild apple. We have, of late years, had great damages done by the grubs of theſe beetles working under ground; but in Ireland they have been uſed to come in ſwarms, in certain years, in the beetle ſtate, and have been ſo terrible to that country, that the people have called them locuſts.

The firſt time they are remembered by authors to have appeared in this vaſt abundance, in that country, was in the year 1688. They then appeared in the ſouth-weſt part of the county of Galway; they appeared firſt upon the coaſt, and were brought by a ſouth-weſt wind, a wind ſo common there, that it may almoſt be called the trade wind of Ireland; from the coaſt they ſoon ſpread over the inland parts of the country, and were ſeen every where in ſuch numbers, as were ſcarcely to be conceived. They never ſtirred in the day time, but were ſeen covering the leaves and branches of trees and hedges, and in many places hanging down in prodigious cluſters on one another's backs, in the manner of bees when they ſwarm. As ſoon as the ſun ſet, they uſed to leave the hedges, &c. and take wing, gathering in bodies, and making a humming confuſed noiſe like that of drums at a diſtance. They ſometimes formed bodies together, that darkened the air for three or four miles ſquare. They flew ſo low ſometimes, that it was ſcarcely poſſible for a perſon going along to make his way through them; and by ſtriking againſt the faces and necks of women and children, they did much miſchief, every one leaving a mark behind it; and thoſe of this ſex or age, who had been among them, came home all over bruiſes.

This, however, was little to the miſchief they did the fields; for though the middle of the ſummer was the ſeaſon in which they came, they had in a few days eaten up all the leaves of the trees ſo completely, that they all looked as bare as in the depth of winter. The noiſe they made, while eating in vaſt numbers together, was like that of ſawing timber. The gardens fared no better than the hedges, for they eat up leaves, young ſtalks, and fruit, and every thing that was green and ſoft there, and left only a parcel of naked ſticks behind them. Many of the trees, thus ſtripped, wholly periſhed. Phil. Tranſ. N° 234. See SCARABÆUS *Melolontha.*

MELOMELI, a word uſed by the ancients to expreſs honey impregnated with quinces.

MELON, in *Gardening*, the common name of a well known plant, which is much employed in forcing-frames, &c. See CUCUMIS, and FORCING.

MELON-*ground*, the ſpace or portion of ground in the kitchen-garden, or other place, which is appropriated to the culture of melons and other vegetables that require artificial heat. See GARDEN, and MELONARY.

MELON-*thiſtle*, the common name of a plant of the thiſtle kind. See CACTUS.

MELON, *Water*, or *Citrul*. See CUCURBITA.

MELONS, *Petrified*, a name given by the people who have written books of travels, &c. to certain ſtones found on mount Carmel. The monks who inhabit that mountain at this time, and who pretend to be the followers of Elias the prophet, tell a legendary ſtory about theſe ſtones, which has given occaſion to the name. They ſay that when Elias lived on that mount, a certain gardener paſſing by his cave with melons, the prophet aſked one of them; but the fellow replying, that they were not melons, but ſtones that he carried, the prophet miraculouſly fulfilled the ſaying, and converted them into ſtones. Travellers who are fond of theſe ſtories were uſually glad to pick up one of theſe ſacred ſtones as they went on; and the monks have been careful enough to gather all they could find for the better opportunity of obliging their viſitors; ſo that though they were once very common, they are now only to be had by the favour of theſe people.

Breynius is the only author who has given a good account of them; he ſays, that they are ſpheric or ſpheroidal ſtones, of various ſizes, from that of a hen's egg to that of the largeſt melon, or even more than that. They are generally found bedded in a very hard ſand-ſtone, of a greyiſh or aſh-colour; but they come out whole on breaking the ſtone, and are of a ſmooth ſurface; a greyiſh colour, or ſometimes a browniſh ferruginous hue. When they are broken, there is always a cavity found in them, ſometimes regular and even, ſometimes very irregular, and generally proportioned to the bigneſs of the ſtone. This cavity is lined on both ſides with minute cryſtals, which are very bright and pellucid, and have their points ſtanding toward the centre of the cavity. This ſubſtance of the ſtone itſelf approaches to the nature of marble, of a yellowiſh colour, and capable of a good poliſh; when wrought looking very like the Florentine marble. This is a cruſt of about half an inch or an inch in thickneſs, according to the bigneſs of the ſtone, and ſometimes this is covered with a paler-coloured cruſt, of the thickneſs of a ſtraw, which in ſome degree reſembles the bark or rind of the fruit. Theſe ſtones are truly a ſort of concave natural nodules, of the nature of our hollow flints. They have had no fruit for their matrix, nor have ever had any of the ribs and furrows which the melon has, nor any mark of the ſtalk; and within they have neither the natural diviſions of the melon, nor any thing reſembling the ſeeds. It is not only the want of many parts abſolutely eſſential to the fruit ſuppoſed to be petrified, which ſhews that opinion to be erroneous; but the courſe of nature, in petrifactions in general, argues alſo greatly againſt it.

The things we meet with, in this ſtate, are all of them ſuch as are naturally hard, dry, and permanent, and none of the tender and ſucculent bodies, ſuch as the melon, and the like fleſhy fruits, which muſt neceſſarily rot in the water that conveys the ſtony matter, before it could at all enter their pores. And the ſtones are certainly analogous to thoſe concave nodules of a ferruginous colour, in the cavities of which amethyſts are produced; and to that genus of ſtones which Woodward calls concave cryſtalline balls, common in many parts of the world.

The fallacy of an extravagant opinion in regard to foſſils of any particular form, is not peculiar to theſe ſtones, as witneſs the ſmall ſhells petrified and found in Egypt, which from their flat and roundiſh ſhape, are ſaid to be the lentiles, which the children of Iſrael eat when making the pyramids: the *cornua Ammonis*, which is the remains of a ſea-ſhell, and yet is ſuppoſed to be a petrified ſerpent; the *nummi minerales*, which are the operculums of ſhell-fiſh, but are generally ſuppoſed by the vulgar, about the places where they are found, to be medals and coins petrified with lying in the earth, and many the like follies. Breyn. de Melon. Petr. Mont. Carm.

MELONARY, in *Gardening*, the portion of ground in the kitchen-garden principally allotted for the buſineſs of early and general hot-bed work, in the culture of melons and cucumbers as well as occaſionally in other framing culture.

Theſe compartments are moſtly incloſed by ſome ſort of fence, and are particularly convenient and uſeful, as in the practice of hot-bed culture there is unavoidably a conſiderable littering occaſioned at times, by means of the neceſſary ſupplies of hot-dung, ſtraw, litter, and other materials, both in the making of the beds and after-culture; which by this means being confined to a particular part, the whole is performed more conveniently, and without incommoding the economy of the other parts of the garden.

They are alſo very uſeful when properly choſen in the drieſt and warmeſt ſituations, in the advantage of having the hot-beds on dry ground, and ſheltered from cutting winds, with the full benefit of the whole day's ſun, as well as in being more ſecure. In conſiderable gardens, the places allotted for this uſe are ſometimes of ſuch extent, as to have the hot-houſes, or forcing houſes, and other appurtenances of that kind, where culture by artificial heat is required, near together, by which time and trouble is ſaved, and great advantage in other reſpects gained.

In the choice of a place for this purpoſe, ſome part of the warmeſt, beſt-ſheltered, dry quarter of the garden, which is well defended from the northerly and north-eaſterly winds, not liable to inundation or the ſtagnation of water, and conveniently ſituated for bringing in dung, tan, earth, &c. ſhould be fixed upon. And if, with theſe advantages, it lies rather a little higher or very gently ſloping towards ſome lower part, it will be more proper, eſpecially when towards the full ſun from riſing to ſetting, ſo as to admit of ranging the

the hot-beds longitudinally eaſt and weſt, or as nearly in that direction as poſſible. See Garden.

With reſpect to the extent or dimenſions, they muſt be according to the quantity of hot-bed framing required, as from two or three, to ten, twenty, or thirty frames, or more; and ſometimes alſo for hot-bed ridges for hand-glaſſes in the ſame proportions. They may of courſe be from two or three to five or ten rods ſquare, or to that of a quarter, or half an acre, or more; in which, beſides the part immediately allotted for the hot-beds, it is convenient to have room for the previous preparation of the dung, &c. for earthing the hot-beds. And in reſpect to form the moſt eligible ſhape is that of a ſquare, either an equal or an oblong ſquare.

When incloſed, the fences may be ſix, ſeven, or eight feet high in the northerly or back part and five or ſix in front, the ſides correſponding, though when extenſive they may be nearly of equal height all around. And the internal part, or immediate place for the hot-beds, even when dry, ſhould be a little elevated to throw off the falling wet of heavy rain, &c. and when unavoidably low, or liable to be wet in winter or ſpring, be raiſed, with ſome dry materials, conſiderably above the general level, that the hot-beds may ſtand dry, as well as to afford advantage in performing the buſineſs of cultivation.

The ground for the immediate place of the hot-beds may generally remain even or level; ſome, however, form ſhallow trenches the width and length of the intended hot-beds, as from ſix to twelve inches deep, and make the lower part of the bed in the trench; which, however, is more proper in a dry or ſomewhat elevated ſituation than in low or wet ground, as water is apt to ſettle in the bottom, and chill the beds, occaſioning the heat to decline ſuddenly.

Beſides, by having the hot-beds wholly above ground, there is a better opportunity of applying the occaſional linings quite from the bottom upwards. By proper attention in the conſtruction of the different parts of theſe grounds and in the building of the fences, they may alſo be rendered highly uſeful in raiſing various kinds of fruit, which could not otherwiſe be the caſe.

MELONGENA, in *Botany*, a word of Arabian origin, according to Ambroſinus, from whence the Italian *Melanzana* ſeems to have come, rather than from *Mala inſana*, as is commonly ſuppoſed; the Egg Plant. This fruit is ſaid to be much uſed for food among the Arabs. It is alſo, according to Matthiolus, commonly eaten in Italy, being dreſſed in the form of fritters, with flour and oil, or butter, and ſeaſoned with pepper and ſalt. That author gives *Melongena* as the vulgar Lombard name of the fruit, which he ſays is called by the Tuſcans *Petranciani*. We cannot but ſuſpect the Latin name *Mala inſana*, Mad Apples, which this fruit does not appear in any manner to deſerve, to have been a corruption of the Arabic or Italian appellation, rather than the reverſe. See Solanum.

MELOPEPO, from *Melo*, a Melon, and *Pepo*, a Pompion, the name of various round kinds of Gourd. See Cucumis.

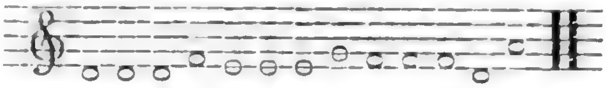
MELOPŒIA, Gr., *Melopée*, Fr., a term in the muſic of the ancients, which implied the ſelection and arrangement of ſuch ſounds as were fit for ſong. The word is derived from μελος, *cantus*, οιεω, *facio*, *fingo*, *fabrico*, *compono*, "to build the lofty rhyme."

Melopœia had its particular rules, ſeveral of which are come down to us, and are ſtill clear and intelligible: ſuch as that an air, or piece of melody, ſhould be compoſed in ſome particular genus, and be chiefly confined to the ſounds of ſome certain mode. As to the ſucceſſion, or order of theſe ſounds in the courſe of the air, that was in general confined to four kinds, which Euclid ſpecifies in his Harmonic Introduction. Theſe we ſhall endeavour to deſcribe with exactneſs, as they may throw ſome light upon ancient melody.

Euclid tells us, firſt, that ſounds may move either aſcending or deſcending regularly; as thus:

which was called ἀγωγη: ſecondly, by leaps of greater intervals than a ſecond; thus,

which was called πλοκη, *interwoven*: thirdly, by repeating the ſame ſound ſeveral times, which was called πεττεια, *iteration*; as in ſinging theſe notes,



and fourthly, that ſounds may be ſuſtained in the ſame tone, which we call a *holding note*, and which the Greeks expreſſed by the word τονη.

There were many rules to be obſerved in moving by leaps, or disjunct degrees, the principal of which was to prefer, in general, conſonant to diſſonant intervals. It was likewiſe enjoined not to divide any two ſemitones into quarter tones, together, or two ſucceſſive tones into ſemitones, nor were two major thirds to follow each other.

But theſe, and a great number of other rules laid down by Ariſtoxenus, with reſpect to the ſucceſſion of intervals, were all derived from the genera, the rules for which were rules for melody. The diatonic genus of the ancients reſembled our natural ſcale in every particular; and it is allowed by Ariſtoxenus even that three tones may ſucceed each other, aſcending or deſcending, which is all that is allowed in our diatonic, except in minor keys, where we aſcend to the octave of the key note by a ſharp ſeventh, which the ancients ſeem never to have admitted.

A further detail or explanation of theſe rules would not make the matter much clearer; however, there are ſome particulars collected together in the firſt book of Ariſtides Quintilianus, that ſeem to merit attention.

He ſets off by dividing Melopœia into three ſpecies, taken from the great and general ſyſtem, which he names after the ſounds called *hypate*, *meſe*, and *nete*; that is, loweſt, middle, and higheſt; and theſe denominations reſembled, with reſpect to melody, our diſtinctions of baſe, tenor, and treble.

With regard to modulation in melody, he has the ſame diſtinctions as Euclid for the ſeveral ſpecies, though he differs a little from him in his manner of defining them: but theſe differences are of ſmall importance to us now; and indeed the authority of Euclid is ſo ſuperior to that of Ariſtides Quintilianus, that nothing which can be cited from him would have weight ſufficient to invalidate the teſtimony of ſo exact and reſpectable a writer.

However, the moral diſtinctions of Melopœia to be found in Ariſtides Quintilianus are ſo curious and fanciful, that we ſhall inſert a few of them here.

He allows of three modes (τροποι) or ſtyles of Melopœia: the *dithyrambic*, or bacchanal; the *nomic*, conſecrated to Apollo;

Apollo; and the *tragic;* and acquaints us that the first of these modes employed the strings, or sounds, in the middle of the great system; the second, those at top; and the third, those at the bottom.

These modes had other subaltern modes that were dependent on them; such as the *erotic*, or amorous; the *comic;* and the *encomiastic*, used in panegyrics. All these being thought proper to excite or to calm certain passions, were, by our author, imagined to have had great influence upon the manners (ἤθη); and, with respect to this influence, Melopœia was divided into three kinds: first, the *systaltic*, or that which inspired the soft and tender passions, as well as the plaintive, or, as the term implies, such as affect and penetrate the heart; secondly, the *diastaltic*, or that which was capable of exhilarating, by kindling joy, or inspiring courage, magnanimity, and sublime sentiments; thirdly, the *hesuchastic*, which held the mean between the other two, that is, which could restore the mind to a state of tranquillity and moderation.

The first kind of Melopœia suited poetical subjects of love and gallantry, of complaint and lamentation; the second was reserved for tragic and heroic subjects; the third for hymns, panegyrics, and as a vehicle of exhortation and precept.

All these rules concerning the ancient Melopœia afford only general notions, which, to be rendered clear and intelligible, would require particular discussions, as well as illustrations by example; but the Greek writers on music have absolutely denied us that satisfaction, reserving, perhaps, when they published their works, all such minutiæ for the lessons which they gave their scholars in private; for in no one of the seven treatises upon ancient music, collected and published by Meibomius, is a single air or passage of Greek melody come down to us; which is the more extraordinary, as there are few treatises upon modern music, without innumerable examples in notes, to illustrate the precepts they contain.

But whatever were the rules for arranging different sounds in such order as would flatter the ear in the most agreeable manner, it is easy to imagine that this regular disposition, and beautiful order of sounds, constituted nothing more than the mere body of melody, which could only be animated and vivified by the assistance of rhythm or measure. See Music *of the Greeks*.

MELORA, in *Geography*, a small island in the Mediterranean, near the coast of Etruria; 4 miles W. of Leghorn.

MELOS, in *Ancient Geography*, one of the Grecian islands, situated about 24 miles from cape Scyllæum, in the Peloponnesus, south-west of the isle of Siphnos, west of that of Sicinos, and east of the promontory of Malea, in Laconia. It was estimated at about 60 miles in compass, and, according to Pliny, it was almost round. This island, though small, made a very considerable figure in the flourishing ages of Greece. It enjoyed its liberty, says Thucydides, 700 years before the Peloponnesian war. The inhabitants were originally Lacedæmonians, and therefore, in the time of the war just mentioned, refused to join the Athenians, declaring that they would maintain a strict neutrality. They suffered severely for their attachment to Lacedæmon. All who were able to bear arms were put to the sword; the women and children were carried into Attica, and sold for slaves. The island being thus desolated, a new colony was sent thither from Athens. But not long after, Lysander, the Lacedæmonian general, having obliged the Athenians, in their turn, to surrender at discretion, released the captive Melians, and restored them to their native country, after having expelled the Athenian colony. Melos afterwards experienced the common fate of the other islands of the Ægean sea, being reduced, with them, to a Roman province. This island abounded with iron mines, and was formerly famous for its wine and honey. The pastures and mineral waters of this island were also commended; and the alum of Melos was in great repute among the Romans, and preferred by them to that of any other country, except the Egyptian. See Milo.

Melos and *Melodias*, which Meibomius has rendered by the Latin words, *modulatio* and *cantilena*, had no other signification than the change of sounds in singing, or, as we should call it, melody; and this is clear from a passage in Bacchius senior, where, in his Introduction to the Art of Music, by question and answer, it is asked, How many kinds of modulation there are? He answers, four; and these, he says, are *rising*, *falling*, *repeating* the same sound to different words, and *remaining upon*, or *holding out*, a musical tone. See Melopœia.

MELOSIS, from μηλη, *a probe*, in *Surgery*, the examination of a diseased part with a probe.

MELOT, John Baptist, in *Biography*, a learned Frenchman, was born at Dijon in 1697, and died at Paris in 1760. He was librarian to the king, and wrote some papers in the "Memoirs of the Academy of Inscriptions," of which he was a member. He was also editor of Jourville's Life of St. Louis, with a glossary.

MELOTHRIA, in *Botany*, a name borrowed by Linnæus, in his *Hortus Cliffortianus*, from the μηλωθρον of Dioscorides, one of the synonyms of his αμπελος λευκη, or White Vine, which is supposed to be the *Bryonia*, a plant of the same habit and natural order as the present. Linn. Gen. 24. Schreb. 32. Willd. Sp. Pl. v. 1. 189. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 1. 78. Juss. 395. Lamarck Illustr. t. 28.—Class and order, *Triandria Monogynia*. Nat. Ord. *Cucurbitaceæ*, Linn. Juss.

Gen. Ch. *Cal.* Perianth superior, of one leaf, bell-shaped, swelling, five-toothed, deciduous. *Cor.* of one petal, wheel-shaped; tube the length of the calyx, to which it is on every side united; limb flat, in five deep very blunt segments, dilated outwards. *Stam.* Filaments three, conical, inserted into the tube of the corolla, and equal to it in length; anthers of two roundish lobes, compressed. *Pist.* Germen almost entirely inferior, ovate-oblong, pointed; style cylindrical, the length of the stamens; stigmas three, thickish, oblong. *Peric.* Berry ovate-oblong, internally divided into three parts, without partitions. *Seeds* several, oblong, compressed.

Obs. Linnæus remarks that he once saw two flowers with stamens only.

Ess. Ch. Calyx bell-shaped, five-cleft. Corolla wheel-shaped, of one petal. Berry of three cells, with many seeds.

1. M. *pendula.* Pendulous Melothria, or American Bryony. Linn. Sp. Pl. 49. (Bryonia olivæ fructu rubro, minor; Plum. Ic. 55. t. 66. f. 2. Cucumis parva repens virginiana, fructu minimo; Pluk. Phyt. t. 85. f. 5.)—Native of North America and the West Indies. *Root* annual. *Stem* slender, branched, climbing by means of simple tendrils. *Leaves* heart-shaped, five-lobed, obscurely toothed, rough, on thick twisted stalks. *Flower-stalks* axillary, solitary, simple, capillary, about an inch long. *Flowers* small, yellow. *Fruit* red, the size and shape of a small olive. Jussieu says two of the filaments bear each two anthers, which is the case in *Bryonia*, to which genus this plant is certainly very nearly akin. Vahl having omitted the genus in its proper place, had perhaps a design of uniting it to *Bryonia*.

MELOTIS,

MELOTIS, a word used by the chirurgical writers to express a small probe, properly one intended to be used only to the ear.

MELOZZO, Francesco, in *Biography*, an historical painter, who flourished about 1471. He is celebrated as being one of the first who introduced the fore-shortening of figures upon ceilings, so as to make them appear ascending or descending; and a picture of his, over the great altar in the church of the Apostles at Rome, which represents the ascension of our Saviour, is celebrated with the warmest praises. Vasari says, that the figure of Christ seems to pierce the roof. This work was painted for cardinal Riario, nephew of Nicholas V. about 1472; and when that chapel was repaired, it was cut out and placed in the Quirinal palace, where it is still seen with this epigraphe: "Opus Melotii Forotiviensis, qui summos fornices pingendi artem vel primus invenit vel illustravit." Some heads of the apostles were likewise preserved in the Vatican: they are well turned, almost always fore-shortened, and wrought with great finish, diligence, and grace. It is to be lamented that so uncommon a genius has not met with an exact historian, who would have informed us of his preparatory studies. He is best known by the name of Melozzo da Forli.

MELPIGNANO, in *Geography*, a town of Naples, in Otranto; 9 miles W.N.W. of Otranto.

MELPILLY, a town of Hindoostan, in the Carnatic; 25 miles N. of Nellore.

MELPOMENE, the name of one of the nine Muses; who is represented with a mask, to denote her presiding over the stage; and distinguished from Thalia, the comic Muse, by greater dignity in her look, stature, and dress. Melpomene was supposed to preside over all melancholy subjects, as well as tragedy. See Horace, lib. i. od. 24. v. 4. lib. iii. od. 30. v. ult.

MELRICKSTADT, in *Geography*, a town of the duchy of Wurzburg, on the Streys; 19 miles N. of Schweinfurt. N. lat. 50° 27′. E. long. 10° 27′.

MELROSE, a considerable town, and a free borough of barony, situated on the banks of the river Tweed, in the shire of Roxburgh, Scotland. The river divides the town, which extends about a mile in length, into two parts. It is governed by a magistracy, elected annually by the burgesses; and, considering its inland position, may be regarded as a flourishing place. The whole parish, according to the parliamentary returns of 1801, contains 1355 houses, occupied by a population of 6947 inhabitants, *viz.* 3300 males and 3647 females. Of this number, 668 were reported as being employed in different branches of trade, but principally in the manufacture of linen and coarse woollens.

The parish of Melrose and its immediate neighbourhood are distinguished by numerous and splendid remains of antiquity. The abbey of Melrose is one of the most remarkable monastic structures in Scotland. Its original foundation probably took place towards the close of the sixth century. In the works of the venerable Bede, we have an account of the situation of the more ancient edifice, on the bank of the Tweed, as likewise of its abbots. This place was a celebrated school for learned and religious men, and seems to have continued to flourish till the reign of king David, by whom the new abbey was founded, in the year 1136. The former establishment was at Old Melrose, the name of which still serves to remind the inhabitants that they tread on ground rendered sacred by the piety of their ancestors. The foundation of the wall, which inclosed the ancient monastery and its precincts, can still be discovered, stretching across a sort of promontory, formed by a curvature of the Tweed; but all vestiges of the buildings are entirely lost. It seems probable, therefore, that they were of little comparative magnitude, and might perhaps have been constructed only of wood, or other perishable materials, as most of the churches of that age undoubtedly were. Of a similar description was the edifice erected by king David, which was rebuilt first in the thirteenth century, and again after the accession of Robert Bruce, who granted a revenue for its restoration. This last appears, from its ruins, to have been a truly magnificent and spacious structure. Indeed the size and workmanship of its columns, its symmetrical proportions, and the quality of the stone of which it is constructed, entitle it to rank among the most superb edifices which devotion or superstition has reared in Great Britain. From the charters granted to this monastery by different Scottish monarchs, its inmates appear to have been monks of the Cistercian order, and to have enjoyed a pre-eminence or species of jurisdiction over all their brethren in Scotland. Among the more distinguished of these monks was the celebrated St. Cuthbert, who entered as a monk under Boisil, about the year 601, and had the honour of founding the bishopric of Durham.

The church belonging to this abbey constitutes the most entire part of its ruins. It was built in the form of St. John's cross, and is dedicated to the Virgin Mary. The present extent of this building is 258 feet in length, and 137½ in breadth; its circumference measuring 943 That these are not the original dimensions, however, are evident from the state of the western division, the greater part of which has been destroyed, and that so completely, that it is impossible to determine to what distance it reached. Both the exterior and the interior of this edifice were formerly adorned with a variety of sculptured figures of men and animals. Many of the former, in particular, were destroyed in the reigns of Henry VIII., Edward VI., and Elizabeth, whose statesmen and warriors were no less egregious fanatics than the infuriated Scotch reformer John Knox, in whose time, likewise, this building sustained much additional injury. The niches in which they stood display much curious and beautiful workmanship. The tower, which rose from the middle of the cross or transept, was a noble piece of architecture. Part of it still remains, but the spire is entirely gone. The east window is most magnificent, and consists of four mullions with tracery, variously ornamented. On each side appear several elegant niches, and on the top is the figure of an old man, with a globe in his left hand, resting on his knee; and another of a young man on his right; both in sitting postures, with an open crown over their heads. Underneath this window, in the inside, stood the altar-piece. A great number of piscinas, niches, &c. excellently sculptured, are dispersed throughout the church. Many of the pillars are perfect and beautiful, and the embellishments upon them still seem as if newly executed; a decisive evidence of the excellence both of the stone and of the workmanship. Part of this church continues to be used for divine service.

The ruins yet standing, besides the church, consist chiefly of a part of the walls of the cloisters; the other buildings, of which there were many, being almost entirely levelled with the ground. All of these, together with the gardens, and other conveniences, were enclosed within a lofty wall, which extended about a mile in circuit. A large and elegant chapel formerly occupied the scite of the present manse; and to the north of this house there has been lately discovered the foundation of a curious oratory, or private chapel, from which

which was dug up a large ciftern, formed from one ftone, having a leaden pipe appended to it, for the conveyance of water.

At fome diftance to the fouth of this town are the three Eldon-hills, on the northernmoft of which is a large Roman encampment, and below it are the remains of an extenfive Britifh fortrefs. Around this were feveral fmaller forts, alfo of Britifh origin, fome of which the Romans appear to have converted into more defenfible pofts. Three entrenchments on thefe hills were connected by a very fingular kind of military road, defcribed by Mr. Kinghorn, who furveyed it in 1803, as being in general about 40 feet broad, but in fome places 50, where the unevennefs of the ground required fuch a breadth. On each fide of this road is a ditch, from 12 to 28 feet wide, whence the earth is thrown up fo as to form a mound on the exterior fide. As this remain differs materially from all other Roman roads in this country, it feems probable that it has been the work of the Romanized Britons, during their contefts with the Picts and Scots, after the departure of their enlightened conquerors, whofe modes of warfare they would naturally endeavour to imitate. From the Britifh fort on Eldon-hills to the fortrefs on Caldfheds-hill there likewife runs a foffe and rampart, which feems to have been carried through the diftance between thefe fortreffes as a defenfible boundary. The great Roman road croffes the Tweed at the village of Galtonfide, a little above Melrofe. On the declivity of the hill, on which this village ftands, are the remains of a fpacious encampment. The ftone wall around it is ftill tolerably entire. Half a mile to the eaft is another entrenchment, called Chefter-Knows, which was probably the moft confiderable ftation they poffeffed in this part of the country, being nearly three-quarters of a mile in circumference. Chalmer's Caledonia, vol. ii. 4to. 1810. Beauties of Scotland, vol. ii. Sinclair's Statiftical Account of Scotland.

MELSACK, a town of Pruffia, in the province of Ermeland; 36 miles S.W. of Königfberg. N. lat. 54° 12′. E. long. 20 7′.

MELSO, a town of Italy, in Friuli; 9 miles N.W. of Udina.

MELT. See MILT.

MELTING-CONE, in *Affaying*, is a fmall veffel made of copper or brafs, of a conic figure, and of a nicely polifhed furface within. Its ufe is to receive melted metals, and ferve for their precipitation, which is effected, when two bodies melted together, and yet not mixing perfectly with one another in the fufion, feparate in the cooling into two ftrata, on account of their different fpecific gravity. This precipitation might be made in the fame veffel in which the fufion is performed; but then the melting-pot or crucible muft be broken every time to get it out, whereas the conic fhape, and polifhed furface of this veffel, makes it eafily got out without violence. The fhape of this veffel is alfo of another ufe in the operation; for by means of it, the heavy matter fubfiding to a point, is formed into a perfect and feparate regulus, even where the whole quantity, as is very frequently the cafe, has been but very fmall.

When the quantity of the melted matter is great, it is common to ufe, inftead of this cone, a large brafs or iron mortar, or any other conveniently fhaped brafs or iron veffel. It is neceffary, when the cone is of brafs, to be cautious that it be not made too hot; for the brittlenefs of that metal, when hot, makes it eafily break, on the ftriking with any force on that occafion, to make the melted mafs fall out.

Thefe, and all other moulds for the receiving melted metals, muft always be well heated before the mafs is poured into them, left they fhould have contracted a moifture from the air, or have been wetted by accident; in which cafe the melted metal will be thrown out of them with great violence and danger. They ought alfo to be fmeared over with tallow on their infide, that the regulus may be the more eafily taken out of them, and the furface of the mould not corroded by the melted mafs poured in.

If a very large quantity of a metal is, however, to be received into them, and efpecially if any thing fulphureous have place among it, this caution of tallowing the moulds does not prove fufficient; for the large quantity of the mafs makes it continue hot fo long, that this becomes but a flight defence to the furface of the mould. In this cafe the affayer has recourfe to a lute, reduced to a thin pap with water, which being applied in form of a very thin cruft, all over the infide of the cone, or mould, foon dries up, indeed, but always preferves the fides of the veffel from the corrofion of the mafs. And this caution is found neceffary, even when pure copper is melted alone, without any mixture of fulphur.

MELTING *Fire*. See FIRE.

MELTING, *Surveyor of*. See SURVEYOR.

MELTON-MOWBRAY, in *Geography*, in ancient writings called Medeltune and Meltone, a fmall market-town, in the hundred of Framland, and county of Leicefter, England, is fituated in a vale on the banks of the river Eye, 15 miles from Leicefter, and 104 from London. Connected with this town are three bridges over the rivers Eye and Sealford. Thefe are repaired, and the ftreets preferved in good condition, with lamps, &c. from the rents arifing out of the town eftates. The church, which Leland calls "a faire paroche church, fumtime an hofpital and cell to Lewis in Suffex," is a fpacious ftructure, confifting of a nave, aifles, tranfepts, and chancel, with a tower in the centre, and a porch at the weft end. The latter is a peculiar feature to the building, and has an elegant door-way, with an ozee arch. Above this porch is the large weftern window, comprifing five lights, with four lofty mullions. The whole church is crowned with an embattled parapet, and at each angle is a crocketed pinnacle. The tower confifts of two well-proportioned ftories above the church. The poor of this town derive affiftance from feveral charitable benefactions; among which are fome public fchools. So early as the reign of Henry III. we find thefe taken under the immediate patronage of that monarch. A free fchool for girls was eftablifhed here in 1795. In the population report of the year 1801, Melton-Mowbray was ftated to contain 348 houfes and 1766 inhabitants. The market-day is Tuefday; and at every alternate market is generally a large fhow of cattle. Here are alfo three annual fairs, and a ftatute for hiring fervants.

Among the more eminent natives of Melton were John de Kirkby, who was appointed keeper of the great feal in 1272, lord high treafurer in 1283, and bifhop of Ely in 1286; William de Melton, fucceffively lord high treafurer, lord chancellor, and archbifhop of York, in the reigns of Edward II. and III.; John Henley, better known by the popular appellation of Orator Henley, who diftinguifhed himfelf, about the middle of the laft century, by his eccentric lectures. See HENLEY.

At Burton-Lazars, a hamlet to Melton, about two miles from the town, an hofpital, for leprous brethren of the order of St. Auguftine, was founded in the reign of king Stephen, by a general collection throughout England, but chiefly by the affiftance of Roger de Mowbray. In adopting

ing this situation, the founders were probably influenced by a bath or spring, the waters of which were formerly in high estimation for the disorder called leprosy, and are still said to afford considerable benefit to persons in scorbutic complaints. A bathing-room and drinking-room were built here about the year 1760, for the accommodation of the afflicted visitors. Nichols's History of Leicestershire, vol. i. Beauties of England and Wales, vol. ix., by J. Britton.

MELTZ, a town of Bavaria; 10 miles N. of Bamberg.

MELVIL, *Sir* JAMES, in *Biography*, a statesman and historian, was born at Hall-hill, in Fifeshire, in 1530. At the age of fourteen he entered the service of the queen-regent, and was appointed page to her daughter Mary, then wife to the dauphin of France. After passing some time in her service, she permitted him to enter into that of the constable Montmorenci, who sent him over to Scotland in 1559, in order that he might obtain a faithful account of the state of parties in that kingdom. Having remained several years in the employ of that nobleman, he visited the court of the elector palatine, who detained him three years in various negociations with the German princes. He then passed through Italy and Switzerland, and returned to the elector's court, where he found a summons from Mary, who had now returned to take possession of the crown of her native country. He followed her to Scotland, in 1561, in the character of gentleman of the bed-chamber, and was employed by her confidentially in various important affairs till her imprisonment in Lochleven castle. He had been appointed one of her privy-counsellors, and was sent more than once to the court of Elizabeth. He maintained a correspondence in England in favour of Mary's succession to the crown of that kingdom, but upon the manifestation of her unhappy partiality for Bothwell, after her husband's murder, he ventured upon the strongest remonstrances with her. She not only disregarded these admonitions, but communicated them to Bothwell, in consequence of which the faithful Melvil was obliged, for some time, to absent himself from court. When Mary was detained a prisoner in England, she recommended her faithful servant to her son James VI., who consulted him and made use of his services till he acceded to the throne of England. He was ever the adviser of prudent and moderate measures, and retained the esteem of his royal master, who would willingly have taken him to England as one of his ministers. Melvil, however, thought himself too far advanced in years for so important a change in his habits, and he retired to his family seat, where he died in the year 1606. He left behind him in MS. an historical work, which came into the possession of his grandson, and was published in 1683, by Mr. George Scott, under the title of "Memoirs of sir James Melvil of Hall-hill, containing an impartial account of the most remarkable affairs of state during the last age, not mentioned by other historians, more particularly relating to the kingdoms of England and Scotland, under the reigns of queen Elizabeth, Mary queen of Scots, and king James. In all which transactions the author was publicly concerned." To this work the reader is referred for more information relating to the author: and also to Robertson's History of Scotland. A brother of sir James was also in the service of Mary, and is probably the sir Andrew Melvil who was present at her death.

MELVIN-LOUGH, in *Geography*, a considerable lake of Ireland, between the counties of Fermanagh and Leitrim, from which a small river flows to the bay of Donegal.

MELUING, a town of Norway, in the diocese of Drontheim; 32 miles W.N.W. of Romsdal.

MELUN, a city of France, and principal place of the department of the Seine and Marne, of which it is the capital, situated on the Seine; before the revolution it contained one collegiate and three parish churches, two convents and two abbies. It carries on a trade with Paris in corn, meal, wine, and cheese. The place contains 6124, and the two cantons, into which it is divided, 18,022 inhabitants, on a territory consisting of 287½ kiliometres, in 31 communes. N. lat. 48° 32′. E. long. 2° 44′.

MELYKUT, a town of Hungary; 16 miles E. of Baja.

MELYRIS, in *Natural History*, a genus of insects of the order Coleoptera; the generic character is, antennæ entirely perfoliate; head inflected under the thorax; thorax margined; lip clavate, emarginate; jaw one-toothed, pointed. There are three

Species.

VIRIDIS. Green; shells with three raised lines; it inhabits the Cape; antennæ black; thorax reflected at the edge, and grooved on the back, scutel small and round; shells rough.

NIGER. Black; shells with three raised lines. A specimen of this species of the melyris is in sir Joseph Banks' museum. It is only about one-third the size of the last; thorax a little prominent before; the shells rough.

LINEATUS; Green; shell with three raised lines, and one on each side the thorax: it is about half the size of the viridis; thorax grooved, with a raised line on each side; lines on the shells crenate.

MELZEN, or MELTZEN, in *Geography*, a town of Saxony, in Thuringia; six miles S. of Weissensels.

MELZO, a town of Italy; 14 miles N.E. of Milan.

MEMAUN, a town of Persia, in Khorasan; 18 miles E.S.E. of Velazghard.

MEMBERS, in *Anatomy*, the exterior parts, arising from the trunk or body of an animal like the boughs from the trunk of a tree.

In which sense, members, *membra*, amount to much the same with limbs, *artus*: though some make a difference between the two: restraining members more immediately to the fleshy parts which cover the limbs, and artus to the bones and nerves. Physicians divide the body into three regions or venters; the head, the breast, and the lower ventricle; and the extremities, which are the members. See EXTREMITIES.

MEMBER, in *Architecture*, denotes any part of a building; as a frieze, cornice, or the like.

MEMBER is sometimes also used for moulding.

MEMBER, in *Grammar*, is applied to the parts of a period, or sentence.

MEMBER is also used to denote some particular order or rank in a state or government: thus we say, member of a corporation, member of parliament, member of the council, &c.

MEMBERED, or MEMBRED, in *Heraldry*, is when the beak, or legs, or feet of an eagle, griffin, or other bird, are of a different colour from the rest of the body.

MEMBIG, in *Geography*, a town of Syria, in the pachalic of Aleppo; 30 miles N. of Aleppo.

MEMBRANA, in *Anatomy*. See MEMBRANE.

MEMBRANA *Arachnoidea*, one of the coverings of the brain and medulla spinalis. See BRAIN.

MEMBRANA *Conjunctiva*, the mucous membrane lining the eye-lids, and covering the anterior surface of the eye. See EYE.

MEMBRANA *Decidua*, one of the coverings of the ovum. See EMBRYO.

MEMBRANA *Hyaloidea*, the tranfparent covering of the vitreous humour of the eye. See EYE.

MEMBRANA *Mucofa*, the febaceous fubftance covering the membrana tympani in the fœtus. See EAR.

MEMBRANA *Nictitans*, a peculiar fold of the conjunctiva, which can be drawn acrofs the front of the eye by means of two peculiar mufcles connected with it. (See BIRDS, *Anatomy of*.) In quadrupeds a piece of cartilage is placed in a fold or the fame kind, and the eye can be rolled behind it. See MAMMALIA, *Anatomy of*.

MEMBRANA *Pituitaria*, the mucous membrane lining the cavities of the nofe. See NOSE.

MEMBRANA *Pupillaris*, an exceedingly thin production filling the aperture of the pupil in the fœtus. See EYE.

MEMBRANA *Ruyfchiana*, the internal furface of the choroid membrane of the eye. See EYE.

MEMBRANA *Tympani*, a membrane terminating the meatus auditorius externus, and forming the boundary between it and the cavity of the tympanum. See EAR.

MEMBRANE is a term applied to feveral parts of the body, which confift of thin fheets of animal fubftance, in which the thicknefs bears a very fmall proportion to the furface. This difpofition is found in feveral tiffues; the term, therefore, denotes a peculiarity of arrangement and form, and not of internal ftructure, and hence it includes parts differing from each other very widely in organifation, properties, and functions.

Membranes never have an infulated exiftence: they are diffeminated among the other organs of the body, and concur in their formation; hence their hiftory has generally been affociated to that of the organs on which they are expanded. This is a convenient arrangement for purpofes of defcription, but it occafions us to lofe fight of the analogies between the particular membranes, and to neglect thofe general confiderations, which form a very interefting part of the ftudy of anatomy, which exhibit to us nature every where uniform in her proceedings, varying only in their refults, fparing of the means which fhe employs, profufe in the effects obtained from them, modifying in a thoufand ways fome general principles, which, differently applied, prefide over the animal economy, and are the fources of its innumerable phenomena. Haller has fome general remarks on the membranes, but he eftablifhes no demarcations between them. He defcribes them all as analogous in their texture, and having for their common bafis the cellular organ, to which he fays that they may all be eafily reduced, principally by means of maceration. That this view is incorrect in many points, will appear from the fequel of the prefent article: how, indeed, can we expect the compofition to be the fame, when the conformation, the vital properties, and the functions are different?

Bichat is the anatomift to whom we are the moft indebted for an elucidation of this fubject. His "Traité des Membranes en general, et des diverfes Membranes en particulier," Paris, an 8, contains a diftribution of thefe organs into certain claffes, a general account of each of thefe, and a particular defcription of the individual membrane. "When," fays he, "we obferve all the membranes in a general view, it feems that their claffification muft be very complicated, both on account of their great number, and their apparent variety. The extent of the different membranes, compared to that of the fkin, cannot be lefs than in the proportion of eight to one: yet, perhaps, no two of them exactly agree in appearance. An examination of their ftructure and functions quickly fhews us that feveral come near to each other, and are diftinguifhed only by their form." Bichat eftablifhes two general divifions, *viz.* the fimple and compound membranes: the latter are compofed of two of the former united together, and exhibit a combination of the characters of each. He makes three claffes of fimple membranes. 1. The mucous, fo named from the fluid which moiftens their furface. 2. The ferous, characterifed alfo by the particular fluid which covers them, and containing the membranes that line the feveral circumfcribed cavities connected with the different vifcera, and the fmooth coverings of the joints, burfæ mucofæ, &c. 3. The fibrous, moiftened by no fluid, and diftinguifhed by the fibres that enter into their compofition.

From the union of thefe proceed the fibro-ferous, fero-mucous, and fibro-mucous membranes.

There are moreover fome, which either exift infulated, or are little known, and confequently cannot be brought under any claffification.

The mucous membranes occupy the interior of the cavities, which communicate with the fkin at the various openings of the latter on the furface of the body. Their number appears confiderable on the firft view of the fubject; for the organs which they line are very numerous. The mouth, ftomach, inteftines, œfophagus, bladder, urethra, uterus, the ureters, all the excretory tubes, &c. &c. derive a part of their texture from thefe membranes. However, when we confider that they are every where continuous, that they arife by prolongations, one from the other, as we fee them originally derived from the fkin, their number muft be very much reduced. In fact, when we regard them thus in a general view, as expanded over all the organs in which they are continuous, and not as infulated in each particular organ, they are reduced to two general furfaces, which may be named, from the various parts over which they are extended, the gaftro-pulmonary, and the genito-urinary. The former is found in the head, neck, and abdomen: the latter in the abdomen, and more particularly in the pelvis.

There is one fmall infulated mucous furface, *viz.* that which enters the openings on the nipple, and lines the lactiferous ducts. As the obfervations on the others are applicable to this, we fhall not examine it in detail.

The gaftro-pulmonary furface enters the body by the mouth, the nofe, and the front of the eye. 1. It lines the two firft mentioned cavities, is continued from one of them into the excretory tubes of the parotid and fubmaxillary glands, and from the other into all the finufes of the nofe; it forms the conjunctiva, enters the puncta lacrymalia, lines the lacrymal fac and nafal duct, from which it is continued into the nofe. 2. It defcends into the pharynx, and penetrates through the Euftachian tube into the ear. 3. It goes into the larynx and trachea, and is expanded over all the air-tubes and veficles of the lungs. 4. It lines the œfophagus and ftomach. 5. It enters the duodenum, and furnifhes two prolongations, one to the ductus choledochus, the hepatic duct and its numerous ramifications, the cyftic duct and gall-bladder, the other to the pancreatic duct and its branches. 6. It is then continued into the fmall and large inteftines, and laftly ends at the anus, where it is identified with the fkin.

The fecond general mucous furface enters, in the male fubject, at the urethra, and thence is expanded, on one fide, over the bladder, ureters, pelvifes, and calyces of the kidnies, the papillæ of the fame organs and capillary tubes which open on their points; on the other it enters the excretory ducts of the proftate, the feminal orejaculatory tubes,

veficulæ

veficulæ feminales, vafa deferentia, and the numerous intricate ducts which arife from them. In the female this membrane enters at the colon, extends over the urinary organs as in man, penetrates the vagina, and lines that canal as well as the uterus and the Fallopian tubes, at the apertures of which it is continuous with the peritoneum. This is the only example in the animal economy of a communication between mucous and ferous furfaces.

The phrafes of membranes entering cavities, being prolonged or extended from one part to another, &c. are not to be underftood as indicating the progrefs of nature in the formation of parts, but merely as defcriptive of the relations exifting between the organs when fully formed. The membranes belonging to every part are formed independently in it, and not derived from any other.

The diftinction of the two great divifions of the mucous fyftem, and the connection of all the parts in each fyftem are manifefted, not only by anatomical refearches, but alfo by pathological phenomena. In epidemic catarrhs one of thefe furfaces is often affected throughout, while the other efcapes entirely; the gaftro-pulmonary membrane is the feat of the difeafe in all its divifions, and the genito-urinary is completely unconcerned in the affection.

Irritation of any point often caufes pain in fome other part of the fame furface; thus ftone in the bladder produces uneafinefs at the front end of the urethra, worms in the inteftines caufe itching of the nofe, &c. But it is very uncommon for partial irritation of one membrane to affect the other: yet there are examples of fuch an occurrence, as in the bleeding from the lungs, which frequently fupplies the place of menftruation, when it is interrupted accidentally.

The two mucous furfaces are united by means of the fkin: the latter organ with the former may be regarded as a general and continuous membrane, covering the exterior furface of the body at all points, and prolonged in the interior over moft of the important organs. Every mucous membrane has two furfaces; the one adhering to the neighbouring parts, the other free, in many cafes villous, and always moiftened with a mucous fluid.

The adhering furface correfponds almoft univerfally to mufcles, either of the animal or the organic life. The mouth, the pharynx, the whole alimentary canal, the bladder, a part of the urethra, &c. prefent a mufcular ftratum embracing the mucous membrane on the outfide. This difpofition agrees entirely with that of the fkin in animals which have a panniculus carnofus: there are indeed many points of refemblance between thefe organs, which we have already obferved to be continuous. It fubjects the mucous membranes to habitual motions, which probably favour the fecretion of their fluid and its fubfequent excretion, as well as the various other functions of thefe organs. The mufcular ftratum is inferted into the clofe and denfe tiffue, named by Bichat the tiffu foumuqueux, in which the ftrength of the organ refides, and which according to him decides and maintains the form of the part.

The free furface of the mucous membranes, habitually moiftened by the fluid, from which their name is derived, prefents three kinds of folds.

1. The firft are compofed by the mufcular as well as the mucous coat; their fituation is defined by a depreffion on the exterior furface of the organ, and they exift conftantly whatever may be its ftate in refpect to contraction or dilatation. The pylorus and valve of the colon are of this kind.

2. Others are formed in the mucous membrane only, are conftantly feen, whether the part be full or empty, but are rather lefs fenfible in the latter ftate. They arife from the membrane being much more extenfive than the furfaces to which it is applied, and being folded, compenfate this difference. The valvulæ conniventes of the fmall inteftine exemplify thefe very well. The cut edges of the mufcular and ferous coverings, as feen in a longitudinal fection of the inteftine, form ftraight lines, while that of the mucous furface is a very waving line.

3. The laft kind may be regarded in a manner as accidental, and is feen only when the organ is contracted; fuch are thofe of the ftomach and large inteftines. The cavity of the former, in particular, prefents, in this ftate, very numerous and large folds, which may be compared, in fome meafure, fo far as their appearance goes, to the cerebral convolutions. Diftend it fully, and the furface becomes completely fmooth. The exhauftion of the vital forces in individuals who die after lingering and debilitating difeafes, occafions their ftomachs to be frequently deftitute of thefe folds, although they may be empty. But if the full ftomach be cut longitudinally in a living animal, or in one recently killed, the contraction of the mufcular coat will fpeedily produce the folds in a very marked degree. It follows from this circumftance, that the furface of the mucous membranes is nearly as extenfive in the contracted as in the dilated ftate of the organs which they line. But all parts are not alike in this refpect; the obfervation is true of the œfophagus, ftomach, and large inteftine; but it is not equally applicable to the urinary and gall-bladders.

The free furface of the mucous membrane is every where in contact with bodies heterogeneous to that of the animal; which are either introduced from without for various purpofes, as in the alimentary canal and trachea, or derived from within, as in the excretory tubes of glands, all of which open on cavities lined by mucous membranes. Hence thefe membranes may be regarded as a kind of barriers, placed between our organs and extraneous fubftances, and protecting them from the noxious impreffions of the latter, and ferving the fame purpofe in the interior of the body, which the fkin fulfils on the outfide with regard to the objects that furround us, and are inceffantly acting upon us.

The organifation and vital properties of the mucous fyftem are accommodated to this habitual contact with foreign fubftances. Solid matters, as metals, ftone, wood, &c. introduced into the interior of other parts, inevitably excite inflammation and fuppuration by their fimple contact; but they traverfe the mucous fyftem with impunity, provided their angles or afperities do not tear it; various things for example go through the alimentary canal, and are voided per anum, without having excited an uneafy feeling. Irritating fluids may be fwallowed, or injected per anum, although they would produce abfceffes, if conveyed into the cellular fyftem.

On the other hand, this fyftem may be expofed with impunity to external agents, where any part of it is protruded either through the natural, or through artificial apertures. This is exemplified in prolapfus of the uterus and rectum, of the inteftine through an artificial anus, &c. In thefe inftances the mucous furfaces feem to ferve the office of integuments, and furrounding bodies hardly affect them more than they do the fkin. The ferous fyftem, on the contrary, when expofed, as in the operation of hernia, &c. inevitably inflames. The cellular, mufcular, nervous, and glandular tiffues exhibit the fame phenomenon.

Fiftulous openings are every where furrounded by a callous fubftance, which defends the cellular and mufcular tiffues traverfed by the fiftula: an expofed mucous furface exhibits nothing of this kind, becaufe its organifation fufficiently protects

protects it. The urinary and other fluids never escape through artificial canals excavated in the surrounding organs, without callosities being formed in the course of these canals; on the contrary, they traverse mucous surfaces with impunity. Cut an opening in a limb, and leave a tube in it; a callous canal will be formed round that tube. Leave a catheter in the urethra, and no alteration of structure is produced. "Let us conclude," says Bichat, "from all these considerations, that the mucous and cutaneous systems only are so organised as to support the contact of foreign bodies without being affected by their presence, or at least without feeling any further effect than an augmentation of secretion, which is not at all dangerous. These two systems then form two limits, an internal and an external one, between which are placed the organs, whose structure, or peculiar sensibility, incapacitates them from bearing the contact of extraneous bodies. The influence of the excitation produced by such bodies reaches no farther than these boundaries; the other organs feel nothing of it. We may conceive that the acute sensibility possessed by these systems acts as a kind of centinel, placed by nature at the confines of the organic domain of the soul, to warn it of the approach of every thing hurtful."

There are two points to be considered in the organisation of the proper tissue of the mucous system; *viz.* a more or less thick stratum making up its chief bulk, and which, from its analogy to the corion of the skin, may be called the mucous corion; and a number of small prominences surmounting the latter, and called villi or papillæ. The epidermis is considered with that of the skin, under the article INTEGUMENTS. It does not agree in any respect with the colouring substance of the skin, which is placed between the papillæ and the epidermis. In fact, we know that in the black, as well as in the white races, this tissue is of a bright red, derived from the blood-vessels.

Mucous Corion.—This important part of the mucous tissue, which regulates the thickness, form, and very nature of the organ, has a soft and spongy appearance; it appears at the first view like a thick pulp, covering the dense cellular tissue which lies under it. Its softness distinguishes it from the cutaneous corion, which indeed resembles it but little in its intimate nature. Its thickness varies very considerably; in the gums and palate it is thickest, and decreases successively in the following organs, *viz.* the nose and stomach, small intestine and gall-bladder, large intestine, urinary bladder, urethra, and the various excretory tubes. When cautiously removed in the latter, it appears transparent, like a serous membrane. It is thinnest in the sinuses of the head, and the cavity of the ear. The lining of the latter has been generally called periosteum by anatomists; but its continuity with the pituitary membrane through the Eustachian tube, the mucous fluid that habitually covers it, and every circumstance that we can observe of its appearance and texture, shew that it belongs to the mucous system; and its diseases agree with those of that system. Diseases produce great changes in its thickness; and distention or contraction of the organs to which it belongs have analogous effects. The degree of softness which it exhibits, is very different in different situations. In the nose, stomach, and intestines, it is like velvet, and the name of villous coat characterises it very well. At the origins of the system, as the mouth, nose, glans penis, &c. it is much more dense, so as to approximate in its nature to the cutaneous corion. In the latter situations it is the seat of variolous pustules, which are often seen on the tongue, palate, and cheeks, but never on the internal mucous surfaces. It becomes dry and very thin by exposure to the air, but preserves a certain degree of resistance. The muscular and serous coats of an intestine are pliable when dried, while the mucous covering is rigid. It is transparent after desiccation, in organs where it is naturally pale, as in the rectum and bladder; it exhibits a darker tint in parts where it is redder, as in the stomach, and has even a blackish cast when much blood is accumulated in it by preceding inflammation. It putrifies with great facility, and acquires a very fetid odour: this is one reason why the abdomen of a dead body passes so soon into the putrid state. In this change it acquires a greyish colour, and as the subjacent cellular tissue decays much more slowly, it may be removed by very slight pressure in the form of a disorganised and fetid pulp. Gangrene attacks it much less frequently than the cutaneous tissue; yet it occurs sometimes, as in putrid sore throat. It yields very speedily to maceration; quicker indeed than any organ, except the brain. It is converted into a reddish pulp, very different from that produced by putrefaction in the open air. Ebullition extracts from it a greenish froth, very different from that produced by the muscular and cellular tissues. Before the water begins to boil, it curls up, but in a less degree than other structures. In fact the tissu soumuqueux then contracts much more than it, so as to throw it into a recurved state. In the same way, the contraction of the serous and muscular strata of the stomach during life, being much greater than that of the mucous, produces the numerous folds of the latter. A concentrated acid has the same effect. After having been dried for a long time, it still is curled up when plunged into boiling water. The valvulæ conniventes of the intestine, which disappear on drying, are then reproduced. Long ebullition brings it to a dark grey colour; it is not rendered softer, but may be more easily torn. In this respect it is contrasted with the subjacent cellular stratum, which preserves its power of resistance much longer. It never has the gelatinous appearance, which the cutaneous corion, the fibrous organs, cartilages, and other structures which afford much gelatine, present on boiling. The action of acids reduces it into a pulp much more quickly than any other tissues. Caustics act on it more rapidly than on the skin, where the epidermis protects the corion. Nitric acid, taken into the alimentary canal, produces a whitish scar on the mucous surface, which, when death does not follow suddenly, is gradually detached in the form of a membrane. All mucous surfaces, and particularly those of the stomach and intestines, have the power of coagulating milk. That of the former still possesses this power after desiccation.

Mucous Papillæ.—The peculiar mode of sensibility enjoyed by the skin is usually ascribed to its papillary structure, which is not very readily demonstrable. The sensibility of mucous membranes, analogous, in many respects, to that of the skin, arises probably from the same kind of texture, which is here more readily discerned. The existence of papillæ cannot be doubted at the origins of the system, and at the commencement of the cavities, as on the tongue, the palate, the alæ nasi, glans penis, &c. The villosities with which the internal surfaces are every where covered, must be regarded as an analogous organisation; and the existence of an analogous sensibility on these surfaces strengthens the opinion. A very different function has generally been assigned to these villi; they have been regarded in the alimentary canal, as destined to the exhalation of various fluids, the absorption of chyle, &c. Bichat considers it incorrect to ascribe to an organ so similar in all parts such a diversity of offices. He considers that the microscopical observations, on which is grounded the opinion that the villi absorb the chyle, do not deserve much confidence, as different observers give such different reports. And he cannot account for

for the villi of the pituitary membrane, urethra and bladder, unless on the supposition of their being connected with the sensibility of the parts. The delicacy of the objects renders their structure so obscure, and their investigation so difficult, that the question can hardly be decided by direct observation. Analogy and observation of the vital properties must guide us in forming an opinion.

The papillæ exhibit very numerous varieties; they are remarkably long on the tongue, small intestine, stomach, and gall-bladder; less distinct in the œsophagus, large intestine, urinary bladder, and the excretory tubes; the latter, in fact, are almost completely smooth on their mucous surfaces.

Besides blood-vessels, exhalants, and absorbents, which enter into the structure of this system, as into that of all others, it presents another common organ of a glandular nature, which is generally insulated, but here forms part of the system. The mucous glands probably exist throughout the system. Situated under the corion, or in its substance, they constantly pour out a mucilaginous fluid, which lubricates the free surface of the membrane, protecting it from the action of the bodies that come in contact with it, and facilitating their passage. They are very apparent in the trachea and bronchi, the œsophagus and intestines; they cannot be shewn in the urinary and gall-bladders, the uterus, the vesiculæ seminales, &c.: their existence in these organs can therefore only be inferred from the circumstance of a mucous fluid being produced analogous to what is found where the glands are manifest.

If we admit the force of this reasoning, and allow that identity of the secreted fluid proves identity of the secreting organ, we shall establish as a striking difference between the mucous and serous membranes, that the fluid of the former is produced by secretion, that of the latter by exhalation. Their size varies in different organs; they are largest in the lips, cheeks and palate. They generally have a rounded form, are dense in their texture, and surrounded by cellular substance, but contain very little of that substance in their interior. Little or nothing is known of their diseases. For further particulars, see GLAND.

A difficulty occurs in ascertaining the composition of mucous fluids, because they are formed in very small quantity in health, and are probably changed in their composition when increased in quantity in disease. They are generally insipid, colourless, and tenacious; but their colour, viscidity, and odour, differ in different organs. For a further chemical account of them, see MUCUS.

Their use in the animal economy is obvious: they protect the mucous surfaces from the impressions of those heterogeneous substances, with which they are all in contact, by forming a stratum, which compensates for the extreme thinness or even the entire absence of epidermis. Hence they are more abundant where foreign matters lodge for some time, as in the alimentary canal, than where they only pass occasionally, as in the excretory tubes. For the same reason, they are poured out more abundantly where any foreign body of an unusual kind is left permanently in contact with a mucous surface, as a catheter in the urethra, a tube in the trachea, &c. In all these cases the effect must be referred to an irritation of the excretory orifices; for the body does not come in contact with the glands themselves.

By the secretion continually going on in the mucous membranes, they perform another important part in the animal economy. They are one of the great emunctories, by which the residue of nutrition is carried off, and, consequently, one of the principal agents in that habitual decomposition, which the solids of the living body are constantly undergoing. All the mucous fluids are rejected from the body; that of the ureters, bladder, and urethra, with the urine; that of the alimentary canal with the feces, which are often very copious when nothing is taken in by the mouth; &c. If we consider that the two mucous surfaces, taken together, are of equal, if not greater extent than the skin, we shall deem their functions very important in this point of view. When these fluids have remained for some time in rather considerable quantity on their respective surfaces, a disagreeable sensation is produced, and leads to their expulsion in various ways. The air-passages are cleared by coughing; the stomach by vomiting, &c. Mucous membranes possess a great number of blood-vessels, and are hence distinguished by a remarkable redness, which however is not an uniform character. In the sinuses of the head, and the internal ear, they are whitish, and appear the more so, because their extreme thinness allows us to discern the bone, on which they are applied. In the bladder, the large intestine, and the excretory tubes, the colour is deeper, but still pale. In the stomach, small intestine, vagina, pituitary membrane, and mouth, the redness is strongly marked. It arises from a vascular network, the branches of which, after being ramified in the mucous corion, are expanded in a state of very minute division on the mucous surface. Their unsupported position makes them liable to rupture on the application of any force, as in the bronchi from coughing, in the ear and nose from blows on the head, &c. The passage of stones will produce bleeding from the ureters or bladder, and that of catheters from the urethra.

The superficial situation of these vessels enables us to judge by them of the state of the circulation; hence the lividity of the lips, nose, &c. in asphyxia.

Whether the quantity of blood in the mucous membranes be constantly the same, and particularly whether it varies in those organs, which are seen in very different states of contraction and dilatation, as the alimentary canal, are points concerning which we possess hitherto no means of judging.

The number of blood-vessels belonging to the mucous system, the fact that the blood is changed in respiration by exposure to the air through its containing vessels, and that it will also become red when placed in a bladder immersed in oxygen, led to an inquiry whether any change is produced by the air in the blood of mucous surfaces. Bichat could not discern any alteration from enclosing oxygen gas in a portion of intestine, or from making it pass backwards and forwards through a part of the canal.

This author conceives, that the red colour of the mucous is analogous to that of the muscular system, and derived from the colouring matter of the blood combined with the tissue of the part; except at the origins of these surfaces, where the cause of colour is principally in the blood contained in the vessels. Asphyxia does not affect the deeply-seated parts, so much as those which are superficial, and communicate with the skin; the latter become suddenly white in syncope, where the heart sends no more blood into the arteries. Repeated washings take away the red colour; and sudden whiteness is produced by immersion in boiling water or in acids. It is, on the contrary, increased to a remarkable degree of intensity in inflammations, on account of the increased quantity of blood accumulated in the capillary system.

It is a question, whether exhalation takes place on mucous surfaces: the analogy of the skin seems to indicate that it does. The pulmonary vapour, which is best seen when condensed by cold air, has been generally referred to the exhalants of the air-paſſages; the gaſtric fluid, and fluid of the inteſtines, has been aſcribed to the ſame ſource. It ſeems difficult to arrive at any certainty on ſuch a point.

There is a great tendency in the exhalant veſſels of the mucous organs to allow the paſſage of blood; hemorrhages without rupture are very frequent in them.

That abſorption is carried on from mucous ſurfaces is proved by numerous familiar phenomena; *viz.* by the chyle and fluids taken up from the ſtomach and inteſtines; by the vapour of turpentine from the lungs; by the removal of the aqueous portions of the bile and urine, &c. This abſorption is by no means conſtant and uninterrupted, as in the ſerous membranes; it exhibits numerous varieties according to the ſtate of the vital powers of the part.

The origins of the mucous ſyſtem, where the animal ſenſibility is clearly marked, and ſerves, as in the ſkin, to eſtabliſh our relations with external bodies, poſſeſs cerebral nerves. In the pituitary and palatine membranes, the conjunctiva, the rectum, glans, prepuce, &c. this fact is evident; hardly any nervous twigs from the ganglia are ſeen in theſe ſituations. The latter, on the contrary, predominate in the inteſtines, the excretory tubes, the reſervoirs of ſecreted fluids, &c. where the organic ſenſibility is more marked.

Properties of the Mucous Syſtem.—The extenſibility and contractility of tiſſue are much leſs extenſive in this ſyſtem than they would appear to be on the firſt view, on account of the numerous folds which it preſents in the hollow organs, when they are contracted. Yet theſe properties are very apparent under certain circumſtances; the excretory tubes are often diſtended much beyond their natural ſize; the ureters ſometimes are almoſt as large as an inteſtine, and the ductus choledochus and the pancreatic duct exhibit ſimilar enlargements. The urethra and ſalivary ducts, on the contrary, do not readily yield to diſtention.

Theſe properties are called into action very rapidly in the mucous ſyſtem; the ſtomach, inteſtines, bladder, &c. paſs in a moment from a dilated to a contracted ſtate.

When mucous canals are no longer traverſed by the fluids which are habitual to them, they remain permanently contracted, but are not obliterated on account of the preſence of their mucous ſecretions. This fact may be obſerved in the inteſtinal canal in the caſe of artificial anus, in the urethra when the urine has run for a long time through the wound made in lithotomy, &c. Neither do they contract adheſions under inflammation, as is the caſe in ſerous cavities, and in the cellular tiſſue. The importance of this circumſtance to the great functions of life is very obvious: the mucous cavities would be rendered uſeleſs if they were ſubject to the frequent adheſions which we obſerve in pleuriſy, peritonitis, &c.

Vital Properties. 1. *Properties of the Animal Life.*—Like the integuments, mucous ſurfaces are conſtantly in contact with external bodies, and therefore require a ſenſibility, which may enable the mind to perceive the relations between us and thoſe bodies, particularly at the origin of the ſurfaces. Hence the animal ſenſibility exiſts there in a very marked degree. In many places it is even ſuperior to that of the ſkin, which poſſeſſes no feeling ſo lively as thoſe produced by odours on the pituitary membrane, by ſavours on that of the mouth, on the vagina, urethra, and glans, at the moment of coition, &c. This ſenſibility, like that of the ſkin, is ſubject to the powerful influence of habit, which conſtantly tends to render our ſenſations leſs lively, and brings to a ſtate of indifference the pleaſure and pain which they produce. A catheter left in the urethra, produces at firſt great pain; it becomes leſs and leſs troubleſome, and is at laſt hardly felt. Peſſaries in the vagina, tents in the rectum and other ſituations, &c. are further proofs of this fact. On this obſervation is grounded the poſſibility of keeping tubes in the trachea and œſophagus, for carrying on the functions of reſpiration and deglutition. This remarkable influence of habit is exerted only with reſpect to ſenſations produced by ſimple contact, and not ſuch as are cauſed by actual injury, as cutting, tearing, &c.; hence it does not make the bladder leſs ſenſible to the excruciating pain of the ſtone, the noſe to a polypus, or the trachea to a foreign body accidentally introduced. To this effect of habit we may probably refer in part the gradual diminution of the functions of the mucous ſyſtem in old age. The active ſenſibility of the alimentary, biliary, urinary ſurfaces, &c. in the young ſubject, is the chief cauſe why the digeſtive and ſecretory phenomena ſucceed each other ſo rapidly: the ſame phenomena take place more ſlowly in an old perſon, from the ſenſibility being rendered more obtuſe by the habit of contact.

The animal ſenſibility, which is acute at the origins of the mucous ſurfaces, as in the mouth, noſe, glans penis, opening of the rectum, &c. is leſs marked in the more deeply-ſeated organs. In the former parts we always perceive the bodies that come in contact, but there is no ſuch perception in the latter. Does this ariſe from the uniformity of the impreſſion in the latter caſe affording no term of compariſon? For each of theſe organs is brought into contact with one kind of ſubſtance only, while the others are expoſed to a variety of excitations. In fact we perceive impreſſions made on the deeply-ſeated organs, when they are brought into contact with extraneous bodies; as when a catheter is introduced into the bladder, &c.

The ſenſibility of the mucous ſyſtem is much increaſed in diſeaſe; acute catarrhs are very painful. We not only perceive the contact of bodies then, but find it very diſtreſſing. Yet the ſenſibility in theſe caſes never riſes to the point which it reaches in inflammations of the cellular, ſerous, fibrous, and other tiſſues.

The mucous ſyſtem exhibits no animal contractility.

Properties of the Organic Life.—The organic ſenſibility and the inſenſible contractility are ſtrongly marked in the mucous ſyſtem. They are called into action by four different cauſes: 1, by the nutrition of the ſyſtem; 2, by the abſorption, which either takes place naturally, or accidentally; 3, by the exhalation; 4, by the continual ſecretion of the glands. Theſe two properties are the primary cauſes of all theſe functions, the augmentation or diminution of which indicate their degree of activity. As numerous cauſes are conſtantly acting on the mucous ſurfaces, particularly at their origins, this degree is very frequently changing, as well as the functions which reſult from it.

The mucous ſyſtem then differs from moſt others, in having its organic properties habitually more active, on account of the more numerous functions, over which they preſide; and in having them change ſo frequently from variations in the excitation applied to them. In the bony, fibrous, cartilaginous, muſcular, nervous, and other ſyſtems, theſe properties are only called into exerciſe by nutrition; and, on the other hand, no excitation can be applied to them; ſo that the properties remain permanently at the ſame degree.

From the preceding view, we cannot be ſurpriſed that the diſeaſes, which particularly put in action the organic ſenſibility, and the inſenſible contractility, ſhould be ſo frequent in the mucous organs. All the catarrhal affections, whether

whether acute or chronic, the hæmorrhages, the various tumours, polypi, funguſes, &c. all kinds of excoriation, ulcers, &c., which are ſeen in theſe organs, ariſe from the various alterations of which the organic properties are ſuſceptible.

The mucous ſyſtem does not ſeem to poſſeſs the ſenſible organic contractility; yet it ſometimes exhibits phenomena, which ſeem to indicate ſomething more than the inſenſible oſcillations which compoſe the inſenſible organic contractility. The parotid duct ſometimes throws out its contents to ſome diſtance from the mouth, although it ſeems entirely of a mucous ſtructure, and has no muſcular agent of impulſion at its origin. Perhaps the excretory ducts of the glands, which open on the deeply-ſeated mucous ſurfaces, exhibit the ſame phenomenon, which has been obſerved in ſome degree in the lactiferous tubes. Theſe motions, analogous to thoſe of the dartos, the cellular tiſſue, &c. ſeem to hold a middle place between thoſe of tonicity and irritability.

The ſympathies of the mucous ſyſtem are very numerous.

Active Sympathies.—When any part of this ſyſtem is inflamed or irritated in any manner, all the vital powers may be ſeparately called into action in other ſyſtems. Sometimes the animal contractility is exerted; thus the muſcles of reſpiration produce ſneezing or cough, when the pituitary or bronchial membrane is irritated; or even when the ſurface of the ſtomach is affected. A general ſpaſm is obſerved, when a foreign body lodges about the glottis. Stone in the bladder cauſes contraction of the cremaſter. In other caſes the animal ſenſibility is excited by affections of the mucous ſurfaces. Stone in the bladder produces itching of the glans penis. And a ſimilar effect is produced in the noſe by worms in the inteſtines.

The ſenſible organic contractility may be ſympathetically excited by affections of the mucous ſyſtem. The organic muſcles generally contract from the excitation of a contiguous mucous ſurface. A ſtone in the pelvis of the kidney, or irritation of the uvula, produces vomiting. The action of the heart is accelerated when the ſeminal fluid is paſſing over the urethra.

Sympathy of the organic ſenſibility is exemplified in the furred tongue, connected with the affections of the ſtomach, in the hæmorrhages which ſupply the place of ſuppreſſed menſtruation, in the diminution of the cutaneous tranſpiration obſerved by Sanctorius at the time of digeſtion, &c.

Paſſive Sympathies.—In various diſeaſes, a ſenſation of burning heat is felt in the mouth, ſtomach, and inteſtines, although theſe parts do not ſeem to be actually hotter than is natural.

Cold bodies applied to the neighbouring ſkin ſtop bleeding from the noſe and uterus. Moſt catarrhs ſeem to be produced by the action of cold on the ſkin. A cold atmoſphere confines the functions of the ſkin, and occaſions thoſe of the mucous ſyſtem to be proportionally extended. The pulmonary exhalation is more ſtrongly marked, the internal ſecretions more abundant, digeſtion more rapid, and the appetite conſequently more eaſily excited. In warm ſeaſons and weather, on the contrary, the ſkin acts more powerfully, the ſecretions, particularly of the urine, are diminiſhed, the digeſtive phenomena proceed ſlowly, and the appetite is recovered more difficultly. In ſcarlet fever the throat is remarkably affected. In the laſt ſtages of organic diſeaſes of the viſcera, as of the lungs, heart, liver, in cancers of the uterus, &c. the mucous membranes are uſually affected: hence the colliquative diarrhœas ſo common in theſe caſes.

Character of the Vital Properties.—In this ſyſtem, as in the ſkin, the vital properties are almoſt permanently in action, as it is conſtantly in contact with ſubſtances that affect it in ſome way or other. But they are not the ſame in all parts: they undergo, in each, particular modifications, ariſing probably from the differences of ſtructure already pointed out, in the nature of the corion, the diſpoſition of the papillæ, the diſtribution of the veſſels and nerves, of the glands, &c. We ſee how widely the animal ſenſibility of the pituitary membrane differs from that of the mouth, how the urethra and glans are affected by the paſſage of the ſeminal fluid, which would make no impreſſion on any other mucous ſurface. Each part bears a certain relation to the fluid which habitually covers it, and could not bear the contact of others without pain. The urine would excite the ſtomach, and the gaſtric juice the bladder; the bile, which remains quietly in the gall-bladder, would irritate the pituitary membrane, or veſiculæ ſeminales.

From theſe varieties in the vital powers of the different diviſions of the mucous ſyſtem, we naturally derive the differences obſerved in the diſeaſes affecting this ſyſtem. To the ſame cauſe we muſt alſo refer the differences of the ſympathies. Each part has a peculiar ſympathetic action on other organs. Irritation of the pituitary membrane alone cauſes ſneezing: that of the fauces, vomiting, &c.

Developement of the Mucous Syſtem.—It is proportional, in general, to that of the organs to which it belongs, and is, therefore, earlier in the gaſtric apparatus, later in the pulmonary organs, and ſtill more ſo in thoſe of generation. The tiſſue is very delicate, and the papillæ hardly ſenſible in the fœtus. Its redneſs is not ſo clearly marked: leſs blood penetrates it, becauſe the functions, of which it will at a future time be the ſeat, are either exerted feebly, or have not yet commenced. At this time the cutaneous ſyſtem is in the oppoſite ſtate with reſpect to the quantity of its blood. The mucous ſurfaces are often livid from the nature of the blood contained in their arteries. Its adheſions to the ſurrounding parts are weaker: hence it may be drawn out of the inteſtines in an entire piece.

At the time of birth reſpiration and digeſtion begin ſuddenly, and the ſecretions are increaſed: hence the mucous ſyſtem exhibits a remarkable degree of activity. New ſubſtances come in contact with it, and ſtimulate it: red blood enters its veſſels, augments its energy and ſenſibility, and renders it more fit to receive impreſſions. When the internal functions are once eſtabliſhed in a ſtate of activity, the mucous ſurfaces exhibit no further ſudden changes. They act with conſiderable energy during the time of youth. Active hæmorrhages are frequent, as thoſe of the noſe, air-paſſages, and even of the ſtomach: yet, in general, they are not frequent in the organs below the diaphragm. They are much more common in men in the gaſtro-pulmonary, than in the genito-urinary ſurface: in women, on the contrary, who have a natural evacuation of blood from one part of the latter ſurface, they are moſt frequent in it: at the epocha of puberty, the developement of the organs of generation in both ſexes gives an increaſed activity to one part of the genito-urinary ſurface: but this is not accompanied with any debilitation of other parts, all of which, on the contrary, ſeem to acquire at this time a more energetic action. The mucous ſyſtem becomes thicker and firmer in the years ſubſequent to puberty. Its vital energy ſtill predominates for ſome time in the ſuperior ſurfaces; but, as age advances, this predominance, as well as that of other organs, is transferred to the abdomen.

Numerous cauſes change the ſtate of this ſyſtem during life. It will hardly be found to exhibit the ſame colour, denſity,

density, or external appearance in any two subjects. This may be seen in any particular surfaces, as that of the stomach for example.

The redness of the mucous system is clearly marked till the thirtieth year; beyond this time it changes. It receives less blood, grows more and more pale, and becomes more dense in the old subject. The remarkable soft and villous touch is no longer perceived. The vital powers grow languid; yet the mucous glands often separate their fluids abundantly, and even in increased quantity. Absorption takes place difficultly at this time from mucous surfaces, as from all others. The chyle is taken up more slowly; so that the digestion is longer, and contagious diseases are less readily taken.

The serous membranes consist of two kinds essentially distinct from each other. The first includes the pleura, pericardium, peritoneum, arachnoid, tunica vaginalis, and in general all the membranes of the great cavities. These are the proper *serous* membranes. The second comprehends the membranes that line the joints, and those which form the bursæ mucosæ, which may go by the common name of *synovial* membranes. These two kinds are joined in one class on account of their both possessing the external character of forming a bag without openings, of their being composed of cellular tissue, and being the seat of alternate exhalation and absorption. A strong line of demarcation is established by the different nature of the fluid that lubricates them, by the synovial membranes being exempted from the general dropsical affections of the serous, and of the cellular tissue, and *vice versâ*.

The serous membranes generally cover the outside of those organs which are lined by mucous membranes, as the stomach, intestines, bladders, lungs, &c.; and it surrounds all those which are essential to life, as the brain, heart, gastric viscera, &c.

It does not form, like the mucous system, a surface every where continuous over the numerous organs to which it belongs; but its different divisions are insulated, and these are rather numerous. When taken altogether they surpass in extent the mucous surfaces. The particular membranes vary considerably in their extent, from the peritoneum, which is the largest, to the tunica vaginalis, which is the smallest. When taken altogether, they would form a surface greater than that of the skin.

Every serous membrane represents a bag without an opening, extended over the various organs which it includes, which may be either very numerous, as in the peritoneum, or single, as in the pericardium. It covers the organs in such a manner that they are not contained in its cavity, and that, if it were possible to dissect it completely off from them, it would form a perfect bag. In this respect it may be compared to the double night-cap, of which the part immediately covering the head is analogous to the serous membrane investing an organ, and the portion in which this is included represents the lining of the cavity in which the organ is contained. From this description, it will be readily understood, that the serous membranes do not open to allow a passage to the vessels or nerves which arrive at, or depart from, their respective organs, but that they are always reflected over them, accompanying them to the organ, and forming a sheath round them. This arrangement prevents the serum, which lubricates the serous cavities, from gaining admission into the neighbouring cellular substance, which it would do with great facility, particularly in dropsies, if the serous membranes, like the fibrous, were perforated for the passage of vessels and nerves.

From the general idea which we have given of these membranes, it will be easily understood that each of them is composed of two parts, distinct although continuous; the one lining the internal surface of the cavity in which it is found, the other covering the organs belonging to the cavity. Thus, there is a pleura costalis and pulmonalis, a portion of peritoneum lining the abdominal parietes, and another covering the abdomial viscera, &c.

The fimbriated end of the Fallopian tube offers the only example of a continuity between a serous and a mucous surface.

In every serous membrane there is a free surface, contiguous with itself at all points, and another adhering to the surrounding parts. The former is remarkable for its perfect smoothness and polish, which distinguishes this system and the following from all other membranes. All the organs, which have this polished surface, owe it to a serous covering: many have such a covering only on some part of their surface, and are rough elsewhere, as the bladder and liver.

The free surfaces of the serous membranes completely insulate the parts, over which they are expanded, from the surrounding organs, so as to form a kind of boundaries or barriers, if that term may be employed. Hence the great viscera, confined by their serous coverings, and suspended in the bags which they form, communicate with the adjacent parts only at the points where their vessels enter: in all other situations there is contiguity, but not continuity with the surrounding organs. This insulation of position coincides with the separate vitality of the organs. Each has its peculiar life, resulting from the particular modification of its vital forces, which establishes corresponding peculiarities in its circulation, nutrition, &c. No part feels, moves, or is nourished like another, unless it belong to the same system: every organ displays, on a small scale, the phenomena which appear on a larger plan in the animal economy: each takes from the circulating fluid the matter which suits its nature, prepares this matter, returns to the mass of the blood what is heterogeneous to it, and appropriates what can furnish it with the right nourishment: this, in fact, is digestion. Hence it is an important use of the serous membranes to contribute to this independence of the vital powers and functions of the organs. In the same way the serous coverings insulate the morbid affections of a part.

The smoothness of the free surface of the serous system facilitates the motions of the organs which it covers: the cellular substance is the principal means by which the movements of external parts are provided for, while these membranes are particularly designed for the internal organs.

This surface differs essentially from the corresponding one of mucous membranes, in the circumstance of its very frequently contracting adhesions. The pleura is hardly free from them in any subject: the peritoneum comes next, then the pericardium, the tunica vaginalis, and, lastly, the arachnoid, in which they are the most uncommon. They are seen under various forms. 1. The costal and pulmonary pleuræ may be completely united so as to form apparently but one membrane. 2. They may be joined so loosely that very slight force is sufficient to detach them: the opposed surfaces, when detached, have lost their polish and smooth surface. 3. The two pleuræ may be united by longer or shorter bands, having the same organisation, and the same highly polished surface, as the membranes which they join together. 4. The adhesion may be of a flocculent nature, and resembling cellular substance. 5. Depositions of coagulating lymph may join the two membranes: but these are foreign to the surfaces.

The

The external surfaces of serous membranes adhere in almost all cases to the surrounding organs: in a few instances these membranes are insulated on both sides. Yet, although they adhere to their respective organs, their organisation is not connected with that of these parts. They sometimes, by turns, cover and leave uncovered the organ to which they belong: the broad ligaments of the uterus serve as a serous membrane to that viscus during pregnancy. The peritoneum lining an enormous hernial sac, has previously lined the abdomen. Since then the organs and the serous membranes can exist independently of each other, there is no reciprocal connection in their organisation. The medium of union is cellular tissue, and not a vascular apparatus. The membrane may be, and generally is, affected independently of the organ, and *vice versâ*: this is seen in the intestine in peritonitis and diarrhœa. Hence we may infer, that the organisation and the life of the serous membranes are entirely independent of the organs which they surround. Yet, in some cases, they are inseparably attached to the subjacent parts, as the tunica vaginalis to the albuginea, and the arachnoid to the dura mater.

The smooth surface of every serous membrane is moistened with a fluid very similar to the serum of the blood. It is constantly poured out by the exhalants, and removed by the absorbents. It is a simple moisture in the natural state, and is dissolved in the air, and rises in the form of vapour from serous surfaces exposed in living or recently killed animals. It is more abundant in the dead subject, as it is increased by the fluids transuding through the blood-vessels after death; and its augmentation during life causes dropsies of the various cavities. In the first stage of inflammation the serous exhalants produce no fluid: as they remain thus preternaturally dry, and are very sensible, motion is highly painful. At this time adhesions are formed. If the affection continue, suppuration ensues, but the membranes are never ulcerated. Their tissue is thickened, and pus is poured out by their exhalants. This fluid varies in consistence from a milky serum to a complete and thick stratum of coagulating lymph, which adheres to the surface from which it has been exhaled.

The fluids of the serous system are plainly of an albuminous nature. One of these membranes plunged into boiling water is covered with a whitish stratum of concreted albumen. This substance predominates in the fluid of dropsies. The flocculent matters, which often float in such fluids, the new membranes, and the white substance, which sometimes gives them a milky appearance, are merely albumen in various states of consistence.

Organisation of the Serous System.—It is characterised by a whitish shining colour, and a remarkable transparency: the thickness varies, but is never considerable in the natural state. It consists of a single layer, from the surface of which cellular strata may be removed, but which can never be divided into two or more portions. No pellicle is raised from it by the action of a blister.

The organic systems are formed, 1st, of common parts, as cellular membranes, blood-vessels, exhalants, absorbents, and nerves, which form the ground-work, or as it were the skeleton of the part; 2dly, of a peculiar substance deposited in this, as, for example, gelatine and phosphat of lime in the bones, fibrine in the muscles, &c. The organs, therefore, resemble each other in their common parts, and are distinguished by their peculiar tissues. The serous system seems to possess no peculiar tissue; it contains only the common parts. Cellular in its nature it differs from that system only in its form: the cells, instead of being separate and distinct, are here approximated and condensed. The continual exhalation and absorption of lymph belong to both these tissues, and the phenomena of dropsy are common to them both: this identity of functions and diseases leads us to infer an identity of nature. Maceration in water resolves these membranes into cellular tissue; and forcible inflation under them produces a somewhat analogous effect. Cysts, hydatids, &c. are formed in both. Nothing of a fibrous nature is observed in serous membranes, nor in the cellular tissue; although fibres of some kind characterise the other organs.

These proofs of analogy, or even of identity of structure between the cellular tissue and serous membranes, are corroborated by the effects of various reagents, which are exactly similar in both cases. A serous membrane dried becomes transparent, does not turn yellow like the fibrous membranes, still remains flexible, and gradually returns to its former state when immersed in water. It putrifies much more slowly than the parts which it covers, and resists maceration for a very long time, as may be seen in the delicate membrane of the omentum. It is curled up by boiling water like the fibrous system, but furnishes much less gelatine, and does not turn yellow. The ordinary chemical agents operate in the same way on both parts.

When it putrifies in the open air, it does not turn green like the skin, but becomes dull and of a deep grey. When it sloughs during life, it is black; in the latter case it contains much blood, and hence the source of its dark colour. The peritoneum is almost the only instance in which this gangrene occurs.

Yet there are circumstances of difference that distinguish the serous and cellular systems. Their external appearance is not the same. In the cellular tissue there is nothing analogous to the slow inflammation, accompanied with the production of small tubercles, which particularly characterises serous membranes, as miliary eruptions characterise the skin, and aphthæ the mucous surfaces. The pus formed by the cellular organ is not the same as the fluid produced by serous surfaces.

The exhaling vessels which produce the fluid just described are easily demonstrated. Withdraw an intestine from the abdomen of a living animal; you see no vessels in the serous surface, but it has a rose-coloured tint from those which lie under it. If you irritate it, return it into the abdomen, and draw it out again after some hours, it exhibits a number of reddish streaks, which are the exhalant vessels; these could not be seen in the natural state from the transparency of their contents. Minute injections have a similar effect on the serous membranes, and the injected fluid is often thrown out on the surface, probably from the exhaling orifices.

A large portion of absorbents enters into the composition of serous membranes, which may probably be regarded as an intertexture of these vessels and exhalants, united by cellular tissue. The mouths of these absorbents can no more be directly demonstrated than those of the exhaling vessels; but phenomena very clearly prove their existence. They are seen in the dead subject loaded with fluids taken up from the cavities to which they belong, as in the different dropsies, or in effusions of blood. Coloured fluids thrown into the serous cavities are said to be absorbed; but Bichat says that the colouring matter is not taken up. During life they often carry off very large watery effusions in a short time.

Serous membranes contain very few blood-vessels in their natural state; so few, indeed, that Bichat almost doubts their existence. Numerous trunks run in the cellular tissue of their external surfaces, but these may be removed by dissection, without injuring the membranes. In the omentum the

the exiſtence of blood-veſſels cannot be queſtioned; and in all caſes they muſt be connected to the membranes through the medium of the exhalants.

Although the ſerous ſyſtem is diſtinguiſhed by certain general characters, the particular membranes differ conſiderably: each has its peculiar ſtructure, ſuited to its ſituation and offices. The tranſparent arachnoid, yielding to the ſmalleſt force, is ſtrongly contraſted with the denſe and ſtrong peritoneum. Different parts of the ſame membrane are differently organiſed. The omentum is not like the reſt of the peritoneum; and the two portions of the tunica vaginalis are very different. Hence we ſhall not be ſurpriſed at finding great varieties in the diſeaſes of theſe membranes. Nothing is more common than inflammation of the pleura; that of the arachnoid is rare. The ſymptoms are different in inflammation of the pericardium, tunica vaginalis, and peritoneum; the dropſies are very different, &c. Yet there is a common character in the affections, ariſing from analogy of organiſation. The large ſerous collections, and the ſlow tubercular inflammation, belong eſpecially to theſe membranes: the mode of adheſion is peculiar to them.

Properties of the Serous Syſtem.

1. *Properties ariſing from Organiſation.*—The extenſibility and contractility of tiſſue are leſs extenſive in the ſerous membranes, than we might have ſuppoſed on the firſt view of the enormous dilatations which the organs covered by them occaſionally exhibit, and of the facility with which they recover their original ſize. The folds of the membranes, which are particularly marked near organs ſuſceptible of conſiderable variety in ſize, as in the abdomen, are ſeparated as the organs enlarge, and contribute to their covering. Yet a conſiderable extenſion takes place in many caſes, in the peritoneum in aſcites, in the tunica vaginalis in hydrocele. The contractility is proportional: thoſe membranes are reſtored to their original ſtate when the diſtending fluids are removed. After very long extenſion they do not recover completely: the tunica vaginalis is flaccid when emptied, and the peritoneum in old dropſies.

2. *Vital Properties.*—Removed by their ſituation from the action of external bodies, the ſerous membranes do not enjoy, in their natural ſtate, thoſe properties which eſtabliſh relations between ſuch bodies and the living organs; they have no animal ſenſibility nor contractility. Hence they would not ſerve the office of integuments to the body, nor the purpoſe of lining the organs in the place of mucous membranes: they would give us in ſhort no other ſenſation than that of an obſcure and indiſtinct feeling. Living animals exhibit no ſigns of pain when theſe membranes are irritated. External bodies brought in contact with ſerous membranes excite inflammation in them: and this method is employed in ſurgery for producing artificial adheſions of their ſides. When inflamed, animal ſenſibility is developed in them to a very high degree; theſe are among the moſt painful affections to which the body is ſubject.

This ſyſtem does not poſſeſs the ſenſible organic contractility; but the inſenſible organic contractility, and the correſponding ſenſibility, are kept in permanent exerciſe by the exhalation and abſorption habitual to this ſyſtem, and by nutrition. The two latter properties predominate, and the morbid affections conſiſt in alterations of them. Hence are derived acute and chronic inflammation, adheſions, effuſions of various fluids, &c. It is theſe, alſo, which are called into action in ſympathies; ſo that whether they are diſeaſed idiopathically or ſympathetically, ſerous membranes exhibit always a ſeries of phenomena ariſing from an increaſed interior motion, or from a loſs of power in the exhaling and abſorbing veſſels, and in the proper tiſſue; while in the animal and organic muſcular ſyſtems, the prevailing affections, marked in the one by convulſions and paralyſis, in the other by irregular motions of irritability, do not indicate any ſuch alteration of the tiſſue of the organ. Hence the latter ſyſtems, although frequently affected during life, preſent very few morbid changes after death, while the ſerous affords a vaſt field of obſervation to the morbid anatomiſt.

Sympathies.—The ſerous ſurfaces are often influenced by the affections of other organs. This is obvious in the organic diſeaſes of the heart, lungs, liver, &c. which, although theſe parts are entirely unconnected in functions with the ſerous organs, are almoſt always accompanied, in their latter ſtages, with collections of fluid in the large cavities.

Developement of the Serous Syſtem.—All the ſerous membranes are extremely thin in the fœtus; and the fluid which lubricates them is more unctuous, ſo that it ſeems to approach in its qualities to the ſynovia. Their growth correſponds to that of the organs which they cover. We cannot obſerve any marked change in their functions at the time of birth. For a conſiderable time they are extremely thin and tranſparent, but they afterwards grow thicker, and aſſume a dull colour.

This ſyſtem remains unchanged for a long time in the adult. The different membranes in their affections follow the ſame laws as the organs which they ſurround: thus the ſerous ſurfaces of the cheſt are moſt frequently affected in young, and thoſe of the abdomen in older ſubjects.

The membranes become more denſe and firm, and adhere more ſtrongly in old perſons. Their powers become weakened, abſorption is performed more languidly, and dropſies occur.

The *ſynovial* ſyſtem preſents two principal diviſions; one belonging to the articulations, the other to the tendinous ſheaths.

Synovial Syſtem of the Articulations.—The formation of the ſynovia has been very commonly aſcribed to the maſſes of fat found in the neighbourhood of the articulations, and has been regarded as a ſpecies of ſecretion. Theſe maſſes, which have been called ſynovial glands, conſiſt apparently of a merely adipous texture, covered by the ſynovial membranes, and ſo placed as not to be ſubject to any conſiderable preſſure in the motions of the joint. It was ſaid, that the ſynovia was poured out by fringed proceſſes projecting from their ſurfaces into the cavities of the joints. The following conſiderations will convince us that the ſynovia cannot be formed from this ſource. The bodies called ſynovial glands are not found in all the joints, and they do not exiſt in the ſheaths of tendons. We can diſcover nothing in them but maſſes of fat: inflation or maceration demonſtrates the cellular tiſſue belonging to them, and ebullition removes the fat, leaving nothing but collapſed cells like common cellular ſubſtance. They contain no trace of any glandular ſtructure, nothing of that peculiar parenchyma, unknown in its nature, but remarkable in its ſtructure, which diſtinguiſhes all glandular bodies. No excretory duct can be ſhewn in any of them. They do not exhibit in any caſe ſuch diſeaſed alterations as other glands diſplay, but participate only in the general affections of the ſurrounding cellular tiſſue.

Another ſource has been aſſigned to this fluid in the tranſudation of the medullary ſubſtance of the bones through their extremities: this explanation is ſo mechanical, ſo unlike any vital proceſs, and ſo inconſiſtent with all our views of the functions of the animal economy, that it is unneceſſary to refute it formally.

We

We must then consider the synovia as produced by exhalation from the vessels of the membranes. In this point of view it may be compared to the serum of serous surfaces, to which it is analogous in its albuminous composition, in its function of lubricating the surface, on which it is deposited, in its increased deposition under certain circumstances, and in its being taken up from the cavities by absorption.

The synovia is a transparent and viscid fluid: it is tenacious, so as to be drawn out into strings when touched with the finger, and has a slippery unctuous feel, which renders it very fit for the purpose of lubricating the articular surfaces, and making them glide easily against each other in the motions of the joint. Its quantity is not uniform in all joints; in the ankle, hip, shoulder, elbow, &c. it is abundant; while its existence can hardly be observed in the sterno-clavicular, sterno-costal and costo-vertebral articulations. This difference does not arise from the smallness of the surfaces; for some small joints contain much synovia. The quantity is always the same in the same joint; it cannot be increased, like the serous fluids, by transudation after death, nor is it, like them, influenced sympathetically by affections of other organs. It never exhibits those changes in appearance, which are so frequent in the fluid of serous cavities, as the milky turbid state, the white flocculi, the false membrane of coagulating lymph.

The synovial membranes, which constantly deposit and absorb synovia, belong to the joints of the body in the same manner as the serous membranes do to the great cavities. Each of these organs is therefore to be regarded as an entire bag expanded over the parts which form the joint; that is, over the surfaces of the articular cartilages of the ligaments, and the masses of fat called synovial glands, and including the inter-articular ligaments, when such exist, in complete sheaths. The various organs composing joints owe to it their smooth, polished, and shining surface. We can conceive the possibility of removing it from them by dissection, in which case it would form a bag without any opening. All the organs, over which it is expanded, are on its external surface, as the different viscera are on the outside of their respective serous membranes.

A synovial membrane is found in all moveable articulations; indeed, its office is so essentially connected with the motion of the part, that it may be deemed a necessary constituent of these joints. A fibrous capsule belongs to very few joints: the hip and shoulder offer examples of it. These joints possess two very distinct coverings. The external is fibrous, and represents a bag open above and below: it embraces, by its two openings, the surfaces of the two bones, and is continued into their periosteum, the fibres of the two organs being interlaced. The other is the synovial membrane, lining the former, and separating from it at its attachment to the bones, to be reflected over the articular cartilages. To the former, if to any part, the term capsular ligament should be applied; it must lead to very incorrect notions to give this name to the synovial membrane, the structure and functions of which are so foreign to those of ligaments.

Other joints have no fibrous capsule: the ligamentous fibres, instead of assuming the membranous form, are collected into fasciculi. The internal layer, or that composed of the synovial membrane, exists here, as in the former joints, and has exactly the same disposition with respect to the capsule, which it forms round the joint, and its reflexion over the articular heads. In these joints, too, anatomists often call it the capsular ligament. It has the same function in both kinds of articulation; that of secreting the synovia and confining it to the surface of the joint.

Simple inspection is sufficient to prove the existence of the synovial membrane in joints, where it exists alone, that is, not covered by a fibrous capsule. It can be very easily demonstrated in certain parts of other joints, as on the ligamentum teres, the synovial gland, and the neck of the femur in the hip, as well as where it is reflected from the fibrous capsule to the cartilaginous surfaces. On the surface of the fibrous capsule, and on the articular cartilages in all joints, its adhesion is so strong, that doubts may be entertained of its existence. It sometimes appears uncovered at some interval between the fibres of a capsule; and careful dissection, with maceration, enables us to detach it. The smooth surfaces of ligaments and cartilages can be owing only to a covering of this membrane, for those parts cannot derive that property from their own structure; articulations, which have no synovial membrane, have not this smooth surface, as the symphyses of the pelvis.

When a part passes through a joint, as the tendon of the biceps at the shoulder, the synovial membrane is reflected over it, so that there is no opening for the synovia to escape through.

As the form and office of the synovial strongly resemble those of the serous membranes, the organisation is also analogous. It is chiefly cellular, as we may prove by dissection, inflation, and maceration. Its external surface is every where covered by cellular tissue, which we find gradually more and more condensed as we approach the membrane. No kind of fibre can be distinguished in it. It has a degree of transparency when dissected out of a joint. In all points of its texture, in its exhalants and absorbents, it resembles the serous membranes.

Properties.—The extensibility and contractility of tissue are seen in the distention of joints in the hydrops articuli, and their subsequent return to their original size. The membranes admit, however, only of a gradual extension, and are torn by the sudden force applied in luxations.

Organic sensibility is the only vital property which they possess in the ordinary state; no sign of pain is produced, when they are exposed and irritated in living animals. Inflammation increases this sensibility and converts it into the animal kind; most excruciating pain is experienced from inflamed joints. The exhalation and absorption constantly carried on by these membranes, prove that they possess the insensible contractility.

These membranes are not affected by diseases of other organs. In acute diseases of important viscera, while the skin, the mucous surfaces, the cellular tissues, the nerves, &c. exhibit a greater or less sympathetic disturbance, the synovial membranes are completely quiet. In this respect they resemble the bony, cartilaginous, and fibrous systems.

Developement of the Synovial System.—The membranes are proportionally large in the fœtus and child, because the articular surfaces are large; they are also very thin. There is nothing peculiar in the synovia. The membranes grow more dense, and less transparent, in the old subject, and produce less synovia: they acquire a rigidity, which is unfavourable to motion. But they do not become ossified.

Synovial membranes are sometimes accidentally developed. When the head of a bone is dislocated and not replaced, a smooth moist cyst is formed round it, by condensation of the surrounding cellular membrane, having very much of the appearance of a synovial membrane, and performing its office in facilitating the motions of the part.

Synovial System connected with the Tendons.—This entirely resembles the preceding system in its nature, and differs from it only in situation: often indeed they are confounded together: thus those, which belong to the heads of the gastrocnemius, to the extensors of the knee and to the popliteus, are continuous with the joint of the knee, the same membrane belonging both to the articulation and to the tendon. Very few of these tendinous synovial membranes are found in the trunk, almost all of them occupy the limbs, in which they favour the motions of the tendons. They are found, 1, where a tendon turns over a bone at an angle, as at the passage of the peronei behind the outer ankle, and of the obturator internus over the ischium; 2, where a tendon glides against a bony surface without making any turn, as the tendo Achillis at the os calcis, the gluteus maximus at the great trochanter, &c.; 3, where a tendon plays in a fibrous sheath, as the flexors of the toes and fingers on the phalanges.

The synovial membranes of tendons, like those of the joints, form bags without any opening, expanded on one side over the tendons, and on the other over the organs with which the organs are in contact. From this disposition, and from the nature of the fluid with which they are lubricated, they have been called bursæ mucosæ, under which name they are generally described. It follows, that every tendinous synovial membrane must possess two surfaces, a smooth one, forming the interior of the bag, which is every where free and contiguous to itself, and an adherent one attached to the surrounding parts. The smooth surface is constantly moistened with a fluid of the same nature as the synovia of the joints, formed like it by exhalation, and not, as some have represented, by reddish fatty bodies placed on the outside of the membrane, which do not exist in general, and have no glandular texture when they do exist. This fluid in general is less abundant than in the joints; but the quantity varies in the different bursæ. It is sometimes increased in quantity, forming a species of dropsy, which is called a ganglion: this kind of tumour never exists in the fingers, because the fibrous sheaths which include the synovial membranes of their flexor tendons are unyielding. Often these ganglia are completely new formations, cysts developed in the cellular tissue.

The adherent surfaces of the membranes are fixed on one side to the tendons, to which they are closely attached, but not with equal firmness in all cases; it may be detached from the obturator internus, the psoas, &c., but in general it cannot be separated. On the other side it is fixed to the periosteum, which generally assumes the structure of fibro-cartilage. To this the membrane adheres as the articular synovial membranes do to the cartilages of their respective joints; that is, we cannot detach it, and shew it separately, but infer its existence from the polished surface of the part. Sometimes it is expanded over a fibrous capsule, instead of a bone. After covering the tendon, it is continued in some cases over a portion of the muscular fibres, as in the obturator internus. Where the membranes are reflected from the tendons to the surrounding organs, they are covered in general by a considerable quantity of cellular tissue: but in the case of tendons running in fibrous sheaths, they line those sheaths.

These membranes must obviously participate in the motions executed by the tendons, to which they belong: they will be drawn backwards and forwards as the tendon itself is moved.

The very various forms, which the bags of the tendinous synovial membranes present, may be reduced to two general modifications. The one kind are rounded bags, covering only one side of the respective tendons, having no internal folds, and never surrounded by fibrous sheaths. The others, belonging particularly to the flexors of the toes and fingers, and to other tendons about the wrist and ankle, consist in the first place of a cylindrical sac lining the canal, in which the tendon runs: it is then reflected over the tendon, which it covers on all sides, composing for it a complete sheath. This kind of membrane thus represents two cylindrical canals, one lining the bone and fibrous sheath, and the other covering the tendon, continuous with each other at the two ends, where the reflexion produces two cul-de-sacs. Folds are often seen in these, passing from one part of the membrane to the other: the synovial membranes of the digital flexors exhibit them.

Their organisation is exactly analogous to that of the articular membranes. The structure is principally cellular, and distinguished by its softness: very few blood-vessels are seen, but the exhalants and absorbents prevail. The former become distended with blood under inflammation, and give to the membrane a more or less deep red tint. In this state synovia is not produced; and sometimes adhesions take place.

The vital properties, and those resulting from organisation, seem not to differ from those of the preceding system. Like it, this is never affected sympathetically: all its diseases are local.

The obvious effect of these membranes is to facilitate the motions of the tendons over the bones and other parts in contact with them, by giving to the opposed surfaces a perfect polish, and lubricating them with a slippery fluid.

They are thin and delicate in the fœtus and child, more dense and firm in the adult, and become rigid in old age: at the latter time they produce but little fluid, and are consequently dry. This state probably concurs with other causes in impairing the power of motion in the old subject.

Several of the bursæ mucosæ vary in different bodies. Sometimes this is only a mass of cellular tissue, in the place of that belonging to the gluteus maximus. These bursæ are always very dry when they exist, so that synovia can hardly be seen in them. They resemble, in that respect, the articular synovial membranes of the ribs, clavicles, &c.

Fibrous Membranes.—These comprehend the fasciæ of the limbs, &c., the periosteum and perichondrium, the dura mater, sclerotica, albuginea, the proper coverings of the kidnies, spleen, &c., the covering of the corpus cavernosum, &c.; all forming exterior investments of the organs to which they belong. These parts are not, like the stomach, intestines, lungs, bladder, &c., which are covered by serous membranes, subject to alternate enlargement and diminution: that would not suit the properties of fibrous organs. The membranes are moulded exactly to the form of the parts, and, with the exception of the dura mater, do not present the numerous folds seen in the serous membranes. Both their surfaces are adherent, in which they differ from the serous, mucous, and synovial membranes.

One of these surfaces, intimately connected to the organ, seems to send numerous processes into it. In the testes, corpus cavernosum penis, spleen, &c. are seen numerous fibres crossing in various directions, and attached to the fibrous membranes of these organs. On these, together with the membrane, the form of the part seems greatly to depend. Bony matter is thrown out in a rough and irregular form, when the periosteum no longer covers it: the figure of the testis is altered, when the albuginea is injured, &c. These fibres in the interior of the organs are not, however, of the same nature with the fibrous membranes: they cannot be deemed processes of those membranes. By boiling the corpus

pus

pus cavernosum penis, or subjecting it to any other process, the interior spongy tissue and the outer fibrous covering always remain distinct in their appearance: there is no continuation of the one into the other.

The opposite surfaces of fibrous membranes are joined to the surrounding organs with various degrees of firmness, from the loose attachment of the corpus cavernosum to the close adhesion of the dura mater. In general, the fibrous membranes and other fibrous organs have a great tendency to adhere closely to the serous and mucous organs. The connection between the dura mater and arachnoid, the tunica albuginea and vaginalis, the fibrous capsules and the synovial membranes, shews this in the serous membranes. So intimate is the connection in these cases, that it is not possible to separate the parts by dissection in the adult. When fibrous and mucous surfaces meet together in an organ, they become completely confounded: this is seen in the pituitary membrane, in the membrane of the sinuses of the nose, in the ear, &c. In all these parts, the periosteum is not separable from the mucous surface. The vas deferens, the Fallopian tube, the ureter, seem to be fibro-mucous organs.

These membranes have, in general, a very close texture, and a remarkable thickness: they consist of a single layer. The dura mater seems to form an exception to this rule, by the folds which form the falx and the tentorium cerebelli; but we cannot point out two distinct layers in the membrane, except at the sinuses. They possess more vessels than all the other divisions of the fibrous system, and are perforated by numerous apertures for the passage of these vessels, which in general pass through them, in order to arrive at the organs which they cover. These openings, each of which is larger than the branch perforating it, distinguish the fibres from the serous membranes, which are always reflected, instead of being opened, for the purpose of admitting the vascular system into their respective organs. The description of the particular membranes will come under that of the organs to which they belong. We shall except the periosteum, which ought to be considered in a general way, both because it is a covering common to the whole bony system, and because it is a kind of connecting centre to all the organs of the fibrous system.

The periosteum surrounds all the bones in every part, except where they are covered by cartilage. It is hard, strong, of a greyish colour, remarkably thick in the early years of life, and proportionally thinner in the adult. The old anatomists conceived that it was prolonged from one bone to another, over the articulation, so as to constitute a continued bag for the whole skeleton. This is an incorrect notion. The periosteum is interlaced at the joints with the ligaments, which may thus be regarded as a medium of communication between the coverings of the different bones. It is in this way only that we can regard it as continuous over the whole skeleton. It does not exist in the crowns of the teeth, nor on the bony productions rising from the head in certain animals. It is feebly united to the bone in infancy, particularly at the middle of the long bones: the adhesion becomes strong in the adult; and is extremely firm in the old subject, in which the membrane is very thin. Numerous processes extend from this membrane into the bone: the number of these is much greater at the extremities of the long bones, and on the short bones, than at the middle of long, and over the surface of broad bones; all which we should have inferred, from observing the proportion of apertures in these situations. These prolongations accompany blood-vessels, and line the canals which penetrate the bones: they do not reach the medullary cavity, but are confined to the bony tissue, establishing relations between it and the membrane from which they proceed. In consequence of this connection, the destruction of the periosteum is accompanied by the death of the corresponding part of the bone.

The relations of the periosteum to the surrounding organs are very various: in most cases the muscles lie on it, and are connected, according as they are capable of executing more or less considerable motions, by looser or closer cellular texture.

The direction of the fibres in this membrane is nearly analogous to that of the bones, particularly in the long and short ones; but it has not a radiated arrangement in the broad bones. They vary in length, and the superficial ones are the most extensive. Its vessels are derived from those of the neighbouring parts. Their ramifications form in the membrane a net-work, which injections shew very clearly, particularly in children: they are either lost in the membrane, or penetrate the tissue of the bone, or return into the neighbouring parts to form various anastomoses.

The periosteum receives the insertion of the tendons, ligaments, and aponeuroses. This attachment appears foreign to the bone in the child. If we detach the membrane, all these organs are brought away at the same time; but, as ossification extends to the internal plates of the periosteum, the fibrous organs seem identified with the bone in the adult.

In the fœtus it is soft, spongy, and containing much gelatinous fluid: it dissolves in water readily. Its fibres at this time are indistinct: they become more visible as age advances; the softness of the tissue is diminished, and its strength increased. The periosteum is extremely firm in the old subject: it resists ebullition almost as much as the ligaments. When the bones are boiled, it cracks in various parts, because its fibres are shortened and detached from the bone; but that which remains adherent is very difficultly converted into gelatine.

The functions of this membrane do not seem to be very satisfactorily ascertained. An opinion has been entertained that it serves to protect the bone from the pressure of the surrounding moveable organs, as the muscles and arteries. It has been supposed to be very much concerned in the formation of bone; but we cannot accede to this view of the matter. (See BONE.) It may form a kind of barrier, confining the progress of ossification within certain bounds. Bichat regards it as connected essentially with the functions of the fibrous organs attached to it. He considers that it is placed on the bony system, as a solid point of support, which enables it to bear the efforts of the various fibrous organs.

The *perichondrium* is a membrane surrounding the cartilages, except those belonging to the articulations, analogous in its structure and offices to the periosteum. It is thin and fibrous; less closely united to the organs, which it covers, than the periosteum, because they have fewer pores, and therefore receive fewer processes from the membrane: hence there is a less intimate connection between its life and that of the cartilage, than between that of the bone and the periosteum. Its blood-vessels are few. Bichat removed it from the thyroid cartilage of a dog, and no exfoliation followed.

For the vital properties of the fibrous membranes, the reader is referred to the article FIBROUS *System*, where the subject is considered in a general point of view.

The compound Membranes.—The serous and fibrous membranes have a great tendency to adhere together, and exhibit this character wherever they are brought into opposition, as in the case of the arachnoid and dura mater, the tunica albuginea and vaginalis, the synovial membranes and fibrous capsules.

capsules of joints, &c. The two component parts of such membranes are so closely united, that it is impossible to separate them by dissection: however, they are clearly distinguished by their texture and properties.

The serous and mucous membranes are generally separated by a muscular stratum, as in the intestinal canal and bladder; and where they are not, as in the gall-bladder, the cellular substance belonging to the mucous is too copious to admit of the close adhesion necessary to form a compound membrane.

The fibrous and mucous membranes are in many cases consolidated together, as in the ureter, vas deferens, pituitary membrane, lining of the tympanum, &c. They are connected inseparably in these situations. In all, the mucous is the most important, as it is the seat of the functions of the part: the fibrous is accessary, and furnishes additional support and strength to the mucous.

There are several membranes, which do not come under the preceding classification: such are the fibrous coat of the arterial system (see Heart); the lining both of the arteries and veins (see Heart); that which lines the medullary canal of bones, and contains the marrow (see Medullary *System*); the iris and choroid coat, and retina (see Eye); and the pia mater, see Brain.

Membrane is a term also frequently applied in the English language to the cellular substance; *cellular membrane* therefore is exactly equivalent to the latter expression. A general account of this very important animal tissue is given under the head of Cellular *Substance:* we propose to consider it in a more extensive way in the present article, and particularly to exhibit the ingenious views of Bichat, as contained in the first volume of his "Anatomie Generale."

The cellular substance, surrounding the various organs of the body, forms at the same time a connecting medium which joins them together, and an intermediate structure which insulates them. It extends into the interior of the same organs, and is essentially concerned in their structure. We should regard it, first, in relation to the particular organs; and secondly, in a general manner, independently of other parts. In the first of these divisions we have to consider the cellular organ under two points of view: 1st, as composing a covering for each part; and 2dly, as forming one of the essential bases of its structure.

I. *Of the exterior Cellular Texture of each Organ.*—Some parts are covered on one surface only, as the skin, mucous and serous membranes, arteries, veins, and absorbents; while others are surrounded on all sides.

The corion of the skin contains, as we have shewn under the article Integuments, a large quantity of cellular tissue, and anatomists have generally regarded it as formed by a condensation of this tissue. Besides this, a stratum of cellular substance, varying in quantity and density, lies under it in all parts of the body. At the median line the subcutaneous tissue is rather more dense than in other situations, and adheres more closely to the skin; this may be seen in the face, on the sternum of the linea alba, and over the spine. Bichat regards it as marking in an obscure way the symmetrical division which characterises the organs of the animal life; but we cannot insist much on it, as there are no traces in the neck. This author states that the air was confined to one side in some of his experiments on emphysema; but that it generally passed the line.

1. The subcutaneous tissue is remarkably dense under the scalp; it is loose and abundant in the face. By its laxity in the trunk it favours the motions of the large muscles in that situation. It is distributed almost uniformly in the limbs, except that it is dense in the palms and soles, where consequently the skin is more closely united to the aponeuroses, and anasarcous depositions are formed with difficulty. It is also more dense and close over the annular ligaments; and hence the constrictions which the limbs of children present in these situations, as the fat does not penetrate easily into cells so closely approximated.

The subcutaneous cellular tissue bestows on the skin its power of motion with respect to the organs that it covers; this is exemplified in the movements of the trunk and limbs, in the effects of external bodies brought in contact with the surface, in the cutaneous coverings acquired by large tumours, as herniæ, sarcocele, &c. at the expence of the surrounding parts. From the same cause arises the facility of motion in organs situated under the skin, as the muscles.

It contains a larger proportion of serous fluid than other parts of the cellular substance, and is more liable to preternatural accumulations of that fluid, probably on account of its greater laxity. If the skin and subjacent tissue be stripped from an anasarcous lower extremity, it will appear very little larger than a healthy limb treated in the same way.

2. The mucous membranes have the same relations to the cellular substance as the skin, of which they are continuations, and to which their structure bears considerable analogy: the structure occupying their surface is called by Bichat tissu soumuqueux. It is much more compact and dense than the former, and the adhesion of the mucous system to the surrounding parts is consequently much more close. Hence it is difficult to separate the mucous membranes perfectly, and impossible to produce emphysema under them artificially. Air is never seen in this tissue in the most extensive natural emphysema, nor is water ever deposited in it in the most general anasarca. Indeed the hollow organs would have their functions destroyed by the obliteration of their canals, if the submucous were liable to the same distention as the subcutaneous tissue. This firmness in the former tissue enables it to serve as a point of attachment to the muscular fibres, which belongs to the stomach, intestines, bladder, &c.

3. The adherent surfaces of serous membranes are covered by cellular tissue, called by Bichat tissu souséreux, which is in general loose and abundant. In some parts, however, the union is so close that no cellular substance can be discerned; as in the tunica vaginalis and albuginea, the arachnoid and dura mater, &c.: these constitute sero-fibrous membranes.

4. Arteries and veins are connected to the surrounding organs by a loose and easily lacerable cellular substance. (See the account of their structure in the article Heart.) The absorbing vessels are probably furnished with a corresponding covering; but their minuteness prevents us from ascertaining this point by direct investigation.

5. The various excretory tubes are surrounded by cellular tissue. All these have a mucous lining, which is covered by a dense and firm stratum of matter, differing in the different tubes, and the exact nature of which is probably not yet well understood. It seems doubtful whether we ought to assign this exterior covering to the cellular tissue. See Gland.

The organs of the body, except those which have been just mentioned, are surrounded on all sides by a more or less abundant cellular stratum, which insulates them, and interrupts those communications which would connect the vitality of one part to that of another in too intimate a manner, if their juxtaposition were immediate. The serous vapour and fat of the cells probably contribute to this insulation of vitality; but the essential difference, between the proper life of the cellular substance, and that of the organs which it incloses, renders that tissue very capable of fulfilling this office,

office, independently of the fluids which it contains. The confinement of diseases to particular organs is ascribed by Bichat to this insulation of their vitality. We meet every day with diseased organs covered by healthy serous membranes, with catarrhal mucous membranes surrounded by sound parts: the numerous cutaneous eruptions do not affect the subjacent organs, &c. On the other hand, diseases are very often communicated from one part to another. A phlegmonous inflammation involves all the surrounding parts: the rheumatic affection of a joint produces exterior swelling, and disease of the ligaments of the knee is accompanied by an analogous phenomenon. Nor are diseases alone communicated from one part to another: the effects of remedies often act in the same way, as for instance, blisters and poultices. If the cellular substance has any influence on these changes, how are we to account for results apparently so contradictory under similar circumstances? Will it not be more philosophical to confess that we are ignorant of the causes, by which the communication of diseases is influenced and modified, than to adopt, in the absence of all direct proof, a mode of explanation which so frequently fails? When Bichat tells us, in cases where disease is confined to one organ, that the cellular atmosphere, by possessing a different kind of vitality, prevents its propagation; and, in opposite instances, that this atmosphere becomes charged with emanations raised from the morbid part, or that its vital powers experience a change analogous to that which has affected the diseased organ, does this apparatus of words impart to us any further knowledge than that of the simple fact, that morbid changes sometimes are, and sometimes are not, propagated from one organ to another?

The quantity of cellular tissue surrounding any organ bears a relation to the motions which it is capable of executing; and is more abundant in proportion as these motions are more extensive. Hence it is seen in considerable quantity about the large arterial trunks, the eye, the uterus, bladder, the large joints, as the hip and shoulder. By the extension and contraction of its cells it is very capable of accommodating the motions of the organs, particularly their dilatation and contraction. Parts, which enjoy extensive power of motion, and yet have but little cellular tissue on their surface, as the viscera, and the articular ends of bones, are surrounded by serous or synovial membranes. In many instances organs with very little motion are covered by an abundance of cellular tissue: the kidney, testis, thyroid gland, and pancreas are examples.

II. *The internal Cellular System of the Organs.*—After surrounding all parts, this system enters into their substance, and forms one of its principal elements. In those apparatuses, which are an assemblage of several systems, each is united to the surrounding ones by it; as the different coats of the stomach, intestines, bladder, &c. Again, it enters largely into the composition of the organic systems: it surrounds their vascular and nervous ramifications, and unites the various homogeneous parts that compose them. Thus, says Bichat, each portion of an organ has a covering, performing the same office with respect to it, that the general covering does to the whole organ; it forms an atmosphere, limiting and protecting the vitality of each fibre, or serving, (more readily on account of the greater juxtaposition) as a means of communication from one to the other.

This interior cellular tissue is only a means of union, and preserves all its own properties; it is insensible in the nerve, incapable of contraction in the muscle, and unconnected with secretion in the glands. It is often affected alone in an organ; hence the numerous tumours in the liver, which have the glandular tissue perfectly healthy.

The texture of many organs is so close that the cellular tissue is but little apparent, and its very existence has been denied. In tendons and fibrous membranes maceration renders it discernible: ebullition has a similar effect, by dissolving the gelatine which a part may contain. In all instances, even in bones and cartilages, the production of granulations, which are essentially of a cellular nature, demonstrates the existence of this tissue. The conversion of bones into a soft and fleshy state, and the production of fungous tumours in other systems, by rendering the tissue more loose, demonstrate the cellular substances.

Of the Cellular System considered independently of the Organs.—In the interior of the cranium this tissue seems to be almost deficient. Yet the pia mater is formed by it; and a small quantity of a very fine and perfectly transparent kind is seen where the nerves quit the surface of the brain. There is no possibility of demonstrating cellular tissue in the substance of the brain, unless perhaps by its fungous tumours. Through the optic foramina and the superior orbital fissures, the cellular substance of the cranium communicates with that of the orbit; through the holes of the cribriform plate with that of the nose; through the various apertures of the basis cranii, and the numerous but minute pores about the sutures, with the corresponding external parts. It is more abundant, but still in comparatively small quantity, on the outside of the cranium, and communicates evidently with that of the face, particularly in front.

It is very abundant in all parts of the face: the orbits are filled with it; the hollows of the cheeks, bounded by the buccinator, masseter, and zygomatic muscles, contain it in large quantity, as well as all the parts about the tongue. The nose and its sinuses have a very small proportion. On its existence in greater or smaller quantity, the appearance of the countenance, with respect to fulness or sharpness, depends. The expression is regulated by the muscles. It communicates with that of the neck by its subcutaneous portion, by what accompanies the vessels, particularly in the triangular space lodging the parotid, and by the intervals of the muscles about the root of the tongue.

Very little is found in the vertebral canal, between the arachnoid and the medulla spinalis and its nerves: there is none between the arachnoid and dura mater. It is more copious on the outside of the latter, particularly towards the lower parts, where it is very loose. On the outside of the spine the muscles are very numerous and closely arranged, and the cellular tissue very sparing behind; it is copious on the front. It accompanies the carotids on the neck, the aorta and its large branches, the azygos, and the vena cava in the chest and neck. This disposition is very favourable to the formation and extension of depositions of pus.

The neck is a very muscular part, and contains much cellular tissue, besides what belongs to the spine, particularly on its sides, where the lymphatic glands are found. In this situation it communicates with that of the chest, by the superior opening of the latter cavity. It also communicates with the upper limbs above and below the clavicles.

The largest quantity of cellular tissue occupies the middle line of the chest: there is much of it in the mediastinum, about the pericardium, and the large vessels. In the parts occupied by the lungs, the quantity is considerably less. The communications between it and the abdominal cellular tissue take place, 1st, at the various openings of the diaphragm, particularly those which transmit the aorta and œsophagus, for the vena cava is too closely united to its opening to allow of such communication: 2dly, through the intervals of the diaphragmatic fibres, particularly at the triangular space left between those attached to the xiphoid cartilage.

cartilage. There are communications from within outwards at the intervals of the intercoſtal muſcles; but theſe are very trifling, and conſequently the internal affections ſeldom have any influence on the external parts.

On the outſide of the cheſt, the cellular tiſſue is abundant above; it encloſes the mammary glands, and produces the elegantly rounded forms which charm us in the female; it contributes to the bold prominence which is the attribute and character of male ſtrength. There is much of it under the pectoral muſcles, but the quantity decreaſes very ſenſibly downwards.

The abdomen contains more cellular tiſſue than the cheſt. It is accumulated in large quantity about the large arterial and venous trunks, and accompanies them to their reſpective organs. It is alſo very abundant along the back of the peritoneum, particularly about the kidney, but much more ſparing on the front and ſides of the abdominal parietes. It communicates with that of the pelvis all round the peritoneum, and with that of the lower limbs at the inguinal canal, and more particularly at the crural arch. In the latter ſituation, the pus generally deſcends in lumbar abſceſſes.

The outſide of the abdomen has the uſual ſubcutaneous ſtratum, which is continuous with that of the pelvis and lower limbs. Between the abdominal muſcles there is a moderate quantity. The outer and inner portions of cellular ſubſtance communicate through the muſcles, particularly at the poſterior and lateral regions: the fluid of lumbar abſceſſes ſometimes takes this direction and preſents in the loins.

Few parts have a more abundant diſtribution of cellular tiſſue than the pelvis; it is placed very copiouſly round the bladder, rectum, and uterus. The great dilatations of which the organs are ſuſceptible, and the unyielding nature of the parietes of the pelvis, explain this arrangement. The nature of the abſceſſes, which occur about the anus, and the diffuſion of urine from ruptures of the urethra, are modified by this ſtructure. It communicates with that of the lower limbs by the iſchiatic notch, the foramen ovale, and the arch of the pubes. The outſide of the pelvis has alſo much cellular ſubſtance: it is moſt copious in front, about the generative organs, particularly in the labia and ſcrotum, and more abundant on the ſides than behind.

Both in the upper and lower limbs the quantity of cellular tiſſue conſtantly decreaſes from above downwards. It is very conſiderable round the upper articulation of each: the hollow of the axilla is almoſt entirely filled with it; the bend of the thigh does not contain ſo much. There are large cellular intervals between the muſcles of the arm and thigh. The elbow has much leſs than the ham, the deep hollow of which holds a large quantity. In the fore-arm and leg the muſcles are more approximated, and the cellular ſtrata conſequently thinner. Towards the lower part of theſe two diviſions of the limbs, it is ſtill more diminiſhed in quantity. Yet the ſole contains much more than the palm. The difference in the extent of motion in the different parts of the limbs correſponds to this arrangement.

Concerning the general forms of the cellular tiſſue, the figure and permeability of the cells, and the ſerous fluid which lubricates them, we refer to the article CELLULAR *Subſtance*. We have only to remark here, that the capacity of the cells is extremely various. When diſtended with fat or ſerum, they are two, three, or four times as large as in the empty ſtate. Theſe variations in capacity produce the differences in the volume of the body in the ſtates of embonpoint or emaciation, in which all the other parts, as nervous, tendinous, and muſcular fibres, &c. remain unchanged, and the cellular tiſſue alone is altered.

When the cellular ſubſtance of a living animal, or of one recently killed, is expoſed to cold air, a vapour ariſes from it, as it does from ſerous ſurfaces. This moiſture ſeems juſt ſufficient, in the natural ſtate, to maintain the cells ſoft and pliant.

To the general obſervations on the fat, in the article CELLULAR *Subſtance*, we have a few remarks to add. Its proportion varies in the different organic ſyſtems. The arterial and venous tunics, the lymphatic glands, the brain and ſpinal marrow, contain none. There is always ſome in the intervals of the nervous fibres, as may be proved by drying them. Generally the muſcular fibres of the animal life contain a tolerably large proportion; but thoſe of the organic very little. Its place is ſupplied in the bones by the medullary ſtructure. The cartilaginous, fibrous, and fibro-cartilaginous ſyſtems, are almoſt entirely deſtitute of it. Sometimes it is obſervable in the glandular ſyſtem, as in the parotids, and about the pelvis of the kidney; but in other parts, as the liver, proſtate, &c. no trace is diſcernible. The ſerous and cutaneous ſyſtems are ſurrounded by much fat, but contain none in their tiſſue: the ſame obſervation is true of the mucous alſo. The epidermis and hair have none. Thus we ſee that the organic ſyſtems in general contain very little fat: the organs themſelves have but a ſmall quantity between their different parts. In general there is hardly any between the coats of the ſtomach, inteſtines, bladder, &c.; between the perioſteum and bone; the bone and cartilage, &c. It is accumulated principally in the intervals of the organs. In this point of view the cranium and face exhibit oppoſite arrangements; it is abundant in the latter, and deficient in the former, particularly on the inſide. There is a tolerable quantity in the neck. Very little exiſts about the lungs, but much round the heart: and there is a large depoſition on the outſide about the breaſts. In the abdomen, it lies principally behind, in the neighbourhood of the kidney, in the meſentery and epiploon: there is much in the pelvis about the bladder and rectum. It follows the ſame arrangement in the limbs as the cellular tiſſue, being more abundant at the upper parts, and about the large articulations, than in other ſituations.

All the fat in the child is concentrated under the ſkin: the omentum, and indeed the reſt of the abdomen, contains none, except perhaps a few flocculi about the kidney. The cheſt contains hardly any more, and the intermuſcular tiſſue is almoſt every where free from it. In the adult, the abdominal fat exceeds the proportion of the ſubcutaneous: the rounded coutours, by which all the muſcular forms are concealed in the early years, are rare at the latter period. Theſe obſervations, however, concerning the proportions of fat, as connected with different ages, admit of frequent exceptions.

The fat is ſometimes accumulated in an unnatural quantity: it conſtitutes in ſuch caſes a real diſeaſe. (See CORPULENCE.) The oppoſite circumſtances to theſe, which produce this unnatural load of fat, cauſe emaciation.

The fat is almoſt always firm in the dead body, but it approaches more nearly to the liquid ſtate during life: its condition, however, is not uniform in all parts, the ſubcutaneous being the moſt ſolid, and that of the omenta moſt fluid. It is not ſo fluid in the living body as expoſure to heat renders it after death: its conſiſtence indeed muſt depend on other cauſes than temperature, as it varies ſo much in different parts of the body under the ſame heat. It is whitiſh and very firm after death in young animals: hence there is a ſtriking contraſt between the ſolid feel of the ſkin in a young ſubject, and the yielding ſenſation which it offers in the adult. It is collected into ſmall and more or leſs rounded

 granules

granules in the fœtus; a remarkable and almost insulated globular portion, which can easily be drawn out entire, occupies the hollow between the masseter and buccinator muscles. It turns yellow as age advances, and acquires a different odour and taste: every one must have noticed the difference between that of veal and beef, and the distinction is not less strongly marked between that of a young and old person.

A yellowish, transparent, and semifluid substance, with a gelatinous aspect, is found about the hearts of those who have died from dropsy, phthisis, or other tedious debilitating diseases, and occupies the place of fat. It is also seen in other situations, but less frequently; and seems rather gelatinous than oily.

We have nothing to add to the remarks in the article CELLULAR *Substance*, concerning the mode in which the fat is formed; and we refer the reader to FAT for the history of its chemical properties.

Organisation of the Cellular Substance.—The proper tissue, which composes the basis of this system, consists of a transparent web, disposed in plates of an uniform appearance, and so thin that they may be compared to soap bubbles; and of whitish filaments crossing these in various directions, and forming with them cells. This structure may be seen by taking a portion of the cellular matter of the scrotum, extending it and observing it against the light. The filaments are approximated, and seem to touch each other when the part is left to itself; when it is distended, the intervals left between them are larger, and the intermediate laminæ more distinct. Bichat conceives that the filaments are absorbents or exhalants, or made up by the union of the laminæ, where they form cells. The plates are tolerably dense when the cellular tissue is contracted; when air is forcibly impelled among them, they are reduced into a kind of thin froth, in which we could hardly suppose that vital properties could reside.

In all parts where fat or serum is deposited, we see true cells, communicating together; and the great accumulations of such fluids are deposited in these cells. But the submucous tissue, and that which composes the outer coverings of arteries, veins, and excretory tubes, seems to be composed entirely of condensed and approximated fibres, without any plates, and consequently without any cells.

Composition of the Cellular Tissue.—Chemists have placed it in the class of white organs, or such as furnish a large quantity of gelatine. Solution of tan causes a considerable precipitate from water, in which it has boiled. Yet the effect of various agents on it is very different from what they produce on the fibrous, cutaneous, cartilaginous tissues, &c.

It is quickly dried in the air, but without assuming the yellow tint of the fibrous tissue; when plates of it are dried, it exactly resembles a serous membrane treated in the same manner. In this state it is perfectly flexible; it recovers its original appearance only in part, when immersed in water.

It yields to putrefaction less readily than most other tissues, than the glandular and muscular organs for example. This property is particularly observable in the submucous tissue, and in that which forms the outer covering of arteries and veins. The same observation may be made concerning maceration: the exterior tissue of arteries is hardly changed in three months; the subcutaneous, the intermuscular, and other parts of the system, yield more quickly. It resists longer when exposed alone, than in conjunction with parts which decay quickly; and this resistance is the more remarkable, since the nature of the tissue renders it accessible to the action of water at all points. The latter circumstance must also render it more subject to the influence of ebullition; yet it does not yield quickly, and the exterior tissue of arteries, excretory tubes, &c. resists for a long time. The phenomena produced by boiling are analogous to those observed in other organs treated in the same way. It is not changed until a froth rises to the surface; it is then reduced in size, rendered firmer and elastic, and is curled up. After a certain time, as the boiling is continued, it becomes soft again, and is broken by the slightest force. The continued action of boiling water gradually melts it.

The gastric juice acts on it less quickly than on the muscular fibres.

Thus the cellular tissue seems to combine two opposite characters, softness and pliancy; by which it facilitates the motions of organs; and considerable resistance to the operation of various agents.

This tissue is distended with air in the bodies of the drowned, so that they float: probably the air is disengaged from organs containing a great deal of blood, as the muscles, glands, &c., and not from the cellular tissue. A similar phenomenon is observed in bodies buried under the earth, out of the contact of air; but it does not often take place in those left in the open air.

The blood-vessels of the cellular tissue are not numerous in the natural state. It is whitish, when observed in a living animal: large trunks pass through it to the neighbouring parts, and send off branches, which are lost in the tissue. After some exposure the number of these vessels is increased, as the red blood gains admission into the exhalants.

Successful minute injections have a similar effect in the dead body; they make it appear like a vascular network.

The exhalants are proved by the production of apparently new vessels where the part is exposed during life, and by the effect of injections; by the natural and the morbid depositions of serum and fat into the cells, &c. These vessels are very numerous in the present system: they are subservient to its nutrition, and to the habitual exhalation, of which it is the seat.

Absorbents cannot be shewn by actual inspection, nor by injection; but their existence is proved by phenomena: 1, by the natural and constant absorption of the serum and fat; 2, by the removal of unnatural accumulations of either of these fluids; 3, by the absorption of air in emphysema, or of fluids injected into the cells, &c. This system, indeed, seems to be a principal source of the absorbing vessels, at least of such as convey lymph. Some have considered it as formed exclusively of exhalants and lymphatics. Each cell is a reservoir, placed between the exhalants which terminate in it, and the absorbents which arise from it; we see the mouths of neither of these vessels: the cells are on a small scale what the serous cavities are on a larger.

Many nerves are seen going through the cellular tissue; but we do not know that any filaments terminate in it.

Properties of the Cellular System.

1. *Properties resulting from Organisation.*—The extensibility of tissue is seen on a variety of occasions: all the motions of the body call it into exercise; the arm cannot be elevated without the cellular substance of the axilla being drawn out to twice or thrice its natural length, and the motions of the neck, the thigh, and indeed all other parts, present analogous phenomena in different degrees. Whenever any organ is drawn away from a contiguous one, the connecting tissue must be lengthened. In the distentions of the hollow viscera there is a similar process.

process. In the accumulations of ferum or fat, of which this tiffue is fo frequently the feat, in the formation of tumours of all kinds, in the diftentions of the abdomen or other cavities, the exercife of this property is clearly obferved, and indeed is abfolutely neceffary to the production of the phenomena.

The different divifions of the fyftem poffefs this property in very different degrees. The fubcutaneous, the intermufcular, and that which covers ferous membranes, enjoy it to a much greater extent than that which furrounds arteries, veins, and excretory tubes: from its indifpofition to yield in the latter cafe arifes the flow growth of aneurifms. Wherever laminæ, and confequently cells are found, the extenfibility can be brought fuddenly into action: thus emphyfema diftends the whole body to an enormous degree in a very fhort time, and fractures and contufions are followed by very rapid and confiderable tumefaction.

When the diftending force is carried beyond a certain point, the tiffue is firft rendered very thin, and then broken. No natural motion can be carried to an extent fufficient to produce this effect; the tiffue of the axilla may be diftended three times as much as it is in the elevation of the arm, without any rupture. And this effect is ftill further prevented by the kind of locomotion which it admits; when forcibly drawn in any direction, it drags the neighbouring tiffue, and thus can change its fituation in fome degree. Thus, in large fwellings of the fcrotum, the cellular fubftance of the abdomen, perineum, and thighs, is brought over the part.

Inflammation entirely deftroys this property. In the induration accompanying cancerous affections the cellular tiffue is actually rendered very brittle.

The contractility of tiffue is obferved, when the caufes of extenfion ceafe to operate; as when a limb, after being extended, is reftored to its former pofition, when fat, ferum, or tumours are removed from the cellular fubftance, &c. If a wound be carried through the fkin and cellular membrane, the edges are feparated to a certain degree. This power exifts in its greateft energy in youth, and is gradually weakened as old age advances. When a young man is emaciated, the fkin is adapted clofely to the organs, and preferves its tenfion: in an old perfon, on the contrary, the integuments are loofe and flabby, becaufe the fubjacent tiffue does not contract.

2. *Vital Properties.*—This tiffue, in its ordinary ftate, does not poffefs animal fenfibility; it may be cut, torn, or diftended with gafes without caufing any pain, unlefs the nervous filaments paffing through it fhould be accidentally irritated. In difeafe, on the contrary, the fenfibility may be exalted to fuch a pitch, as to produce the moft acute pain; for example, in phlegmonous inflammation.

The organic properties are very ftrongly marked in this fyftem. The depofition and abforption of the fat and ferum are performed under their influence. All fubftances are not in the fame relation to the abforbing power. Blood, lymph, and milk, when introduced into the cellular fubftance, are taken up like the ferum or fat. On the contrary, urine, bile, faliva, and other fluids defigned to be expelled from the body, produce inflammation, and are not abforbed. Water and air artificially introduced are removed by the abforbents. Wine and other irritating fluids excite inflammation, and are expelled with the pus formed in confequence.

The cellular organ enjoys fenfible organic contractility to a certain degree: this is evidenced in the corrugation of the fcrotum from cold. It feems to be the firft obfcure rudiment of that power, which in a higher degree belongs to the mufcular fibres.

The fympathies of the cellular with other fyftems are very numerous, but cannot eafily be appreciated, on account of its being fo widely difseminated, and concurring in the ftructure of all the organs. In acute affections of a part, as the lungs, ftomach, &c. abfceffes often take place, and the critical fuppurations feem to be a fympathetic phenomenon. Œdema often comes on fuddenly in acute difeafes. But the influence of the principal vifcera on the cellular tiffue is particularly fhewn in the alterations of their ftructure confequent on chronic difeafe. The flow affections of the heart and lungs, of the liver, ftomach, fpleen, uterus, &c. are attended in their latter ftages by a more or lefs general anafarca. It feems now to be pretty generally agreed on, that the effufion in all thefe cafes is fymptomatic, and refults from the influence of the affected organ on the cellular tiffue. The very various conditions of the cellular fubftance in the dead fubject, may be probably referred to the effect of the particular difeafe which has proved fatal.

It alfo acts upon other parts, when it is originally affected. Phlegmonous abfceffes, when large, produce various affections of the brain, heart, liver, ftomach, &c.

It is clear, from the preceding obfervations, that the vital forces exift in a very marked degree in the cellular fyftem: in this refpect it is very different from the white organs, fuch as the aponeurofes, tendons, cartilages, ligaments, &c. among which it has been ranked, and which are remarkable for the obfcurity of their vital powers, and the flownefs of their functions. Inflammation paffes through its courfe with great rapidity in this fyftem, and the fluid, which refults from it, forms in its colour, confiftence, and other properties, the ftandard by which we judge all kinds of pus. Yet that which comes from a bone, a mufcle, a mucous membrane, &c. is equally good and *laudable* pus, as what is formed in a phlegmon.

Does the cellular tiffue affume any peculiar vital modifications in the organs, of which it enters into the compofition? This is not known.

However, thefe obfervations apply to it only in the intervals of parts, abftractedly from all combination of its ftructure with them.

We muft not pafs unnoticed the very marked difference between the generally diffufed tiffue made up of laminæ and filaments, and that modification, confifting only of the filamentous part, which furrounds mucous furfaces, blood-veffels, and excretory tubes: the latter is very feldom the feat of inflammation or tumours. It very often places a boundary to the affections of the former, and thus protects the organ which it includes. The tiffue furrounding the axillary or inguinal artery is often generally inflamed or ulcerated, and the veffel remains unaffected, &c.

The cellular tiffue is diftinguifhed from all others, by its reproductive properties, by its power of becoming elongated and growing, of forming what are called granulations, when it has been cut or divided in any way. Hence are explained the formation of cicatrices, tumours, cyfts, &c. The reparation of injury, therefore, is chiefly confided to this tiffue; and it goes on nearly alike in all parts, as all contain cellular fubftance: parts which have none of this never granulate.

Bichat ftates, that the granulations are fmall cellular veficles, filled with a thick fatty (lardacée) fubftance, and not admitting diftention by inflation of the furrounding tiffue. They are developed feparately and irregularly over the wound, unite at their bafes, and thus form a kind of provifional membrane, which completely protects the fubjacent parts from the contact of air, until the completion of cicatrifation. The furface of this is tuberculated, and it differs in that refpect only from a ferous membrane. This explanation

nation of the proceſs of cicatriſation is confirmed by various conſiderations. Granulations are formed moſt readily, and wounds are healed moſt quickly, where this ſyſtem is the moſt abundant; cicatriſation proceeds ſlowly where the cellular tiſſue has been extenſively removed. Maceration reduces all granulating ſurfaces to this common baſis. The nature of granulations is every where the ſame, whatever organ, whether muſcle, cartilage, ſkin, bone, ligament, &c. may have produced them. They muſt, therefore, be produced from a tiſſue common to all organs, and this is the cellular ſubſtance.

The red aſpect of granulations has led to the opinion, that they are a vaſcular expanſion; but the appearance admits of an eaſier ſolution. The cellular membrane is crowded with exhalent and abſorbent veſſels, into which the red blood paſſes under inflammation. As the granulations are cellular, and in a ſtate of inflammation, they exhibit the redneſs of phlegmon or eryſipelas, which depends, not upon the elongation of veſſels, but ſimply on the tranſmiſſion of red blood through thoſe which ordinarily carry white. Thus, when the inflammation is paſſed, the membrane reſumes its natural colour; and granulations, after the cicatrix is formed, are colourleſs, becauſe the coloured blood has ceaſed to permeate them. How can we ſuppoſe red veſſels to be generated in ſtructures where they have no primitive exiſtence? for tendons and cartilages granulate.

The proceſs of nature is completely analogous in repairing the injuries of internal organs, as bones, cartilages, muſcles, &c., where there is no exterior wound. The ends of a broken bone become inflamed, and covered with a cellular production. Theſe granulations form a ſecretory or rather an exhalant organ, and firſt ſeparate gelatine, which gives to the callus a cartilaginous nature, and afterwards calcareous phoſphat, by which the bone is completed. In other organs the granulations ſeparate in a ſimilar way the peculiar nutritive matter of the organ; and the proceſs does not ſeem to be at all different from that of ordinary nutrition. The granulations of an external wound exhale pus, which is excreted.

As ſuppuration proceeds, the white ſubſtance in the cells of the granulations is removed, the cells are contracted, the tubercular elevations diſappear, and are replaced by a thin and ſmooth ſurface. It is thin, becauſe the thickneſs of the granulations depended on the contents of the cells, which are now empty; and it is much leſs extenſive than the original pellicle, becauſe the contraction of the cells draws together in every direction the edges of the divided part. Thus the granular productions, which ſeemed to be ſo abundantly developed as amply to repair the loſs of ſubſtance in the part, are reduced to a thin ſtratum conſtituting the cicatrix, of a reddiſh colour ſo long as the exhalants are full of blood, and afterwards whitiſh.

Fungous excreſcences from wounds, and exuberant granulations of all kinds, are overgrowths of the cellular ſubſtance, exceeding the ordinary laws of cicatriſation, which cannot be completed ſo long as they continue. The developement of the cellular ſyſtem is remarkably exhibited in tumours. The funguſes of mucous membranes, as in the antrum, the mouth and uterus, polypi, and cancers, are all the produce of cellular tiſſue: that ſyſtem forms their baſis, on which a peculiar matter is depoſited. It conſtitutes in ſhort the general baſis, or nutritive parenchyma, of all tumours; the formation of which exhibits phenomena exactly analogous to thoſe of ordinary nutrition. All the organs of the body have the ſame parenchyma of nutrition, which is vaſcular and cellular; they differ in the nutritive matters depoſited in it. In the ſame way all tumours are cellular, and their diſtinctions are drawn from the matters ſeparated by that tiſſue, which differ according to the different modifications of its vital powers, produced by the morbid alterations, of which it is the ſeat.

Cyſts have their origin in the cellular ſubſtance. Of this we have a proof in the ſtriking ſimilarity which they bear to ſerous membranes, which are eſſentially cellular. This analogy prevails throughout their conformation, ſtructure, vital properties, functions, and diſeaſes.

Developement of the Cellular Tiſſue—In the early periods of conception the fœtus is a ſoft mucous maſs, apparently homogeneous, in which the cellular tiſſue ſeems to prevail almoſt excluſively. Almoſt entirely fluid at firſt, it afterwards has the conſiſtence of jelly, and then cellular ſubſtance is viſible. The abundance of fluid is the cauſe of its peculiar appearance in the early periods: this fluid is viſcous and unctuous, and prevents us from producing artificial emphyſema. Nothing can exceed the delicacy of the plates and filaments which compoſe the cellular texture at this time.

Some time before birth, and during the years that follow it, the cellular fluid is conſtantly decreaſing; the cells become more apparent, and the maſs of the ſyſtem diminiſhed, becauſe as the organs grow, their intervals are rendered narrower. Yet it predominates over the other ſyſtems for a long time; hence the roundneſs of form, the multiplicity and facility of movements in the child. The tiſſue is ſtill extremely fine.

The vital powers of the ſyſtem are ſtrongly marked at this age; granulations are produced more readily, and paſs through their periods more rapidly than at any other time; wounds are healed more quickly, and tumours are developed, and grow in a much ſhorter time; ſerous fluid is quickly removed from the cells.

The cellular tiſſue aſſumes a more denſe and ſtrong form in the adult, and is in ſmaller quantity in proportion to the organs; hence the prominences of the latter under the integuments, the energy of muſcular forms, &c. Its quantity ſeems to vary in the different temperaments; and to be greater in the female than in the male.

It becomes ſtill more compact and hard in the old ſubject; and contains leſs fluid; hence the dryneſs and rigidity of parts in old age, and the general diminution of bulk in the body. Its vital powers are diminiſhed, and it no longer maintains the ſkin cloſe upon the ſubjacent parts, but allows it to become folded. Bichat, Traité des Membranes; and his Anatomie Générale, tom. i.

MEMBRANE, *Nictitating*. See NICTITATING, and the preceding article.

MEMBRANES, in *Midwifery* and *Anatomy*, the coverings which ſurround the fœtus while it is contained in the uterus; they are three in number, the decidua, chorion, and amnios. See EMBRYO.

MEME. *Que eſt Meme.* See QUE.

MEMECYLON, in *Botany*, a name adopted from Dioſcorides, whoſe μεμαικυλα is a ſynonym for the fruit of the *Arbutus* or Strawberry-tree, his κομαρος; and ſeems to be derived from μαω, *to deſire, or long for*, in alluſion to the tempting appearance of thoſe berries. The Latin name of the ſame fruit, *unedo*, carries the idea a ſtep further, implying that nobody would be tempted to eat more than one, becauſe the flavour is by no means anſwerable to the appearance. Linnæus in his *Flora Zeylanica*, 57, firſt applied this name to the genus which now retains it, and which is of a ſhrubby and berry-bearing nature, but does not appear to have any other pretenſions to this denomination. Mitchell choſe it, with rather more propriety, but too late, for a ſmall American plant, allied to *Arbutus*, which, as *Memecylon* was already pre-occupied, Linnæus called EPIGÆA; ſee that

that article.—Linn. Gen. 191. Schreb. 258. Willd. Sp. Pl. v. 2. 347. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 355. Juss. 321. Lamarck Dict. v. 4. 88. Illustr. t. 284. Gærtn. t. 127 and t. 179.—Clafs and order, *Octandria Monogynia*. Nat. Ord. *Onagræ*, Juff. or rather *Myrti*.

Gen. Ch. *Cal.* Perianth fuperior, of one leaf, undivided, bell-fhaped, turbinate, entire, or obfoletely four-toothed, permanent; cup-like and fometimes furrowed within. *Cor.* Petals four, ovate, acute, equal, fpreading, inferted into the rim of the calyx. *Stam.* Filaments eight, erect, awl-fhaped, dilated and abrupt at the top; anthers fimple, of two diftinct lobes, attached to the edges of the dilated top of the filament. *Pift.* Germen inferior, turbinate, containing the rudiments of many feeds; ftyle awl-fhaped; ftigma fimple. *Peric.* Berry globofe, crowned with the cylindrical calyx, of one cell. *Seeds* one, two or three, convex.

Eff. Ch. Calyx fuperior, turbinate, nearly entire. Petals four. Anthers on the edge of the dilated fummit of the filaments. Berry crowned with the cylindrical calyx.

Obf. The corolla is faid to be monopetalous in Willdenow and Hort. Kew. which is an error of the prefs in Linn. Syft. Veg. ed. 10, 12, 13 and 14, contradicting the character of four petals, rightly given at the head of the clafs.

1. M. *capitellatum.* Ceylon Memecylon. Linn. Sp. Pl. 497. Lamarck. fig. 1. (M. foliis ovatis; Linn. Zeyl. 57. Cornus fylveftris, foliis croceum colorem tingentibus, flofculis ad foliorum alas globofis; Burm. Zeyl. 76. t. 30. Walikaha; Herm. Muf. Zeyl. 4. Kasjavo-maram; Rheede Hort. Mal. v. 5. 37. t. 19.)—Leaves elliptic-ovate, obtufe, on fhort ftalks. Umbels axillary, fomewhat compound, on flender ftalks, longer than thofe of the leaves. —Native of Ceylon, Malabar and the ifland of Mauritius. It is a moderate-fized *tree*, with many oppofite *branches*, knotty or tumid under each fubdivifion. Every part is perfectly deftitute of pubefcence, which, as far as we can difcover, is the cafe with the whole genus. *Leaves* on fhort thick *footftalks*, oppofite, ovate, fomewhat elliptical, and often roundifh, blunt and generally emarginate, entire, as in the whole genus, about an inch long or more, and half as broad, coriaceous, fingle-ribbed, without veins; their upper fide dark green and fhining; under paler, yellower and opaque. *Umbels* axillary, more or lefs compound, their common ftalk flender, obfcurely quadrangular, its fubdivifions partly racemofe, but always more or lefs umbellate. *Flowers* green with a purple tinge in the petals. Tops of the *filaments* very broad. *Calyx* very flightly four-cleft, obtufe. *Style* thick, but twice the length of the calyx.

This is faid by Hermann to fupply the place of Saffron, in Ceylon, for dyeing. Linnæus confounded fo many fpecies under this one, at different times, that it is hard to fay exactly which he really meant. Our's is the plant of Burmann, and of the generality of botanifts, though not of the Linnæan herbarium. But in the prefent cafe the latter is of no authority, the fpecimen having been acquired after the publication of the *Species Plantarum*, and not even marked with any trivial name.

2. M. *ramiflorum.* Naked-flowering Memecylon. Lamarck. Dict. v. 4. 88. (M. tinctorium; Willd. Sp. Pl. v. 2. 347. Koen. MSS. Cornus zeylanica fylveftris altera, *korakaha* dicta; Burm. Zeyl. 76. t. 31. Korakaha; Herm. Muf. Zeyl. 40.)—Leaves elliptical, obtufe, on fhortifh ftalks, deciduous. Umbels from the defoliated part of the branches, aggregate, compound, ftalked. Style capillary, four times as long as the petals.—Native of Ceylon, and other parts of the Eaft Indies. Very like the laft, except that the *leaves* are rather more oblong, *flowers* much more copious, from the leaflefs part of the branches, and effentially diftinguifhed by the great length, and flendernefs, of their *ftyle.* We cannot comply with Willdenow's change of Lamarck's moft excellent name, for an unpublifhed one of Koenig's, which is at leaft as fuitable to the firft fpecies, if not to every other. We have no doubt of Burmann's fynonym, though he defcribes but four ftamens; as he commits the fame error refpecting the foregoing.

3. M. *ovatum.* Ovate Memecylon.—Leaves ovate, bluntly pointed, veiny, on longifh ftalks, deciduous. Umbels from the defoliated part of the branches, aggregate, ftalked. Style thread-fhaped, four times as long as the petals. —Native of the Eaft Indies? It lies in the Linnæan herbarium for *Santalum album;* but the fpecimen is not an original one, and the real *Santalum album* is no other than *Sirium myrtifolium* of Linnæus; fee Roxb. Coromand. v. 1. t. 2. The prefent fpecies differs widely from the laft in appearance, though nearly agreeing with it in feveral effential characters. The *footftalks* are above half an inch long; *leaves* near three inches, exactly ovate, with an elongated bluntifh point; their upper fide marked with many tranfverfe parallel veins. *Flowers* fmall, numerous, with a very long ftyle. The bottom of their *calyx*, above the *germen*, has eight elevated ribs, making as many furrows, which we find alfo in moft of the fpecies, as defcribed by Linnæus.

4. M. *acuminatum.* Pointed Memecylon.—Leaves on fhort ftalks, elliptical, pointed. Umbels axillary, ftalked, in pairs, fimple. Style about the length of the petals. We find a fpecimen of this, without name, or mention of its native country, in the herbarium of the younger Linnæus. Its *leaves* agree in fize with the laft, but are elliptical, tapering at each end, with a longifh acute point, and no perceptible veins; their *footftalks* very fhort and thick. *Umbels* fmall and fimple, axillary, and not from the naked parts of the branches, ufually in pairs, each umbel of four or five flowers. *Style* rather above half the length of the former, ftraight.

5. M. *edule.* Eatable Memecylon. Roxb. Coromand. v. 1. 59. t. 82.—Leaves on fhort ftalks, ovate, acute, veiny, deciduous. Umbels from the defoliated part of the branches, aggregate, ftalked. Style the length of the petals.—Very common in every thicket on the coaft of Coromandel, flowering in the beginning of the hot feafon. A fmall *tree*, with numerous *branches*. *Leaves* moft like thofe of the third fpecies, but lefs pointed, and on fhorter ftalks. *Flowers* purple, much like thofe of that fpecies, except that Dr. Roxburgh reprefents the *ftyle* as not longer than the *petals*. *Berries* the fize of a black currant, purple, juicy, aftringent, eaten by the natives, who call the plant *Alie*. The *calyx* is drawn with four very diftinct lobes. We have feen no fpecimen, and much fufpect this plant may be the fame with our *ovatum*, n. 3; but as we find reafon to prefume the exiftence of more fpecies than we have feen in fufficient perfection to define them, we think it beft to keep thefe feparate.

The fpecimen mentioned under the firft fpecies, as preferved in the Linnæan herbarium, very clofely refembles Roxburgh's figure, as to *leaves* and *footftalks*, but the *flowers* are much larger, fewer, on thicker fhorter ftalks, and axillary. It is marked *Tamba lifa*, which we believe is a Malay name. Our materials are fcarcely fufficient to diftinguifh this plant fpecifically from the *edule*. It is however moft indubitably different from our *ovatum* and *acuminatum*.

6. M. *grande.* Large-leaved Memecylon. Retz. Obf. fafc. 4. 26. Willd. n. 3. (Nedum Schetti; Rheede Hort. Malab. v. 2. 21. t. 15?)—Leaves feffile, ovate, long-pointed. Flowers in denfe, axillary, forked clufters.—

Sent

Sent by Mr. Christopher Smith from Malacca. The *branches* are round, knotty, smooth; purplish when young. *Leaves* nearly or quite sessile, crowded, four inches or more in length, one inch and a half wide, ovate at the base, tapering to a bluntish point, scarcely marked with any transverse veins; their substance very thick and coriaceous. *Flowers* larger than in any of the foregoing, purplish, in thick, dense, globose, axillary clusters. *Calyx* very obscurely four-toothed. Of the proportion of the *style* we cannot judge. The plant of the *Hortus Malabaricus* seems, by the description, to be this; but if so, the *flowers* are very badly drawn. We have seen no specimen from Koenig or Retzius, but we presume our plant to be the same as their's by the description.

7. M. *cordatum*. Heart-leaved Memecylon. Lamarck Dict. v. 4. 89. fig. 2. Willd. n. 4.—Leaves sessile, heart-shaped, bluntish. Umbels axillary, stalked, compound.—Brought by Commerson from the isle of Bourbon, where it is called *Bois de Mays*. There is a specimen in sir J. Banks's herbarium, gathered in the Mauritius, by Aublet, who describes it as a tall and handsome *tree*, with a grey bark. The *leaves* of Commerson's specimen before us are from one to two inches long, and one broad, obscurely veiny, more or less heart-shaped at the base. *Inflorescence* very different from the last, consisting of no great number of *flowers*, in a variously divided umbel, on a slender stalk, full half an inch long. *Calyx* much less distinctly four-cleft than in Lamarck's figure.

MEMEL, in *Geography*, a town of Prussian Lithuania, situated on the bay called "Curisch-Haff." On one side it has the Baltic; and on the other the Curisch-Haff; and it is also watered by the river Dange. Its harbour is deep, and has a good entrance, and has, not long ago, been improved by two moles, which extend above 50 rods into the Haff or bay. Memel lies under the guns of the fort, and is well inhabited, the number of houses being above 400. It has a German, Lithuanian, and Calvinist church. The burghers, who are divided into those of Altstadt, or the Old Town, and Frederickstadt, are employed in commerce, brewing, soap-boiling, agriculture, fishing, &c. Great quantities of flax, linseed, thread, and hemp, are annually exported from this town. It is well-fortified, and was formerly one of the Hanse towns; and it has now the establishments of a royal magazine, a salt-factory, and a post-office of considerable revenue; 72 miles N.N.E. of Königsberg. N. lat. 55° 50'. E. long. 21° 25'.

MEMENE, a town of the island of Ceylon, near the E. coast; 86 miles E.S.E. of Candi.

MEMINISCA, a lake of Canada. N. lat. 52° 20'. W. long. 88° 50'.

MEMMINGEN, a town of Bavaria, on the Iller; which was imperial till the year 1804, when it was transferred, among other indemnities, to the elector of Bavaria. The inhabitants are chiefly Lutherans, but the principal church is possessed by them in common with the Roman Catholics. This town carries on a good trade with Switzerland, Italy, and other adjacent countries, in Bavarian salt, home-spun linen, hops, grain, and other goods. In 1805, it was taken by the French; 22 miles S.S.E. of Ulm. N. lat. 48° 3'. E. long. 10° 7'.

MEMNON, in *Biography*, a native of Rhodes, was a general in the service of the last Persian king, Darius, whom he served, with great fidelity, against Alexander the Great. When that conqueror had landed in Asia, and was advancing up the country, Memnon advised him not to hazard a battle, but to lay waste the country before the invader. His counsel was rejected, and the battle of the Granicus, in the year 334 B.C. followed, in which Memnon, at the head of the Greek mercenaries, displayed the greatest valour. After the defeat, he obtained, by his valour, the most honourable conditions, and was almost immediately after created the high admiral of Darius, and governor of the Lower Asia. He had now the important command of the city of Halicarnassus, when it was besieged by Alexander, and employed every effort in his power to save it. The siege was continued a long time, and great numbers of the Macedonians lost their lives before the place. Memnon was generous as well as courageous, for when the fugitive Greek commanders, through hatred of Alexander, opposed the demand from the Macedonians of permission to bury their dead, he would not listen to their remonstrances, alleging that it was unworthy of a Greek to refuse the rites of burial even to an enemy. And hearing one of his soldiers abusing Alexander in gross and vulgar terms, he struck him with his javelin, saying "I hired you to fight Alexander, not to revile him." When he found the place no longer tenable, he threw a strong garrison into the citadel, and with his troops, and the inhabitants with their effects, embarked for the island of Cos. He then advised Darius to make a powerful diversion into Macedonia, as the only means of saving himself from destruction. Darius gave him full power to levy troops, and he exerted himself with so much vigour, that he reduced several of the Cyclades, and the islands of Chios and Lesbos, excepting Mitylene, the capital of the latter. While carrying on a siege against that city he died, and thus freed Alexander from the only foe of whom he stood in awe. Memnon had married Barsine, a Persian lady of high rank, who, with her children, remained at the court of Darius some time, till at length she fell under the power of the conqueror, who took her to his bed, and had a son by her. Univer. Hist.

MEMNON, a Greek historian, is thought to have flourished in the time of Augustus. He wrote a history of the affairs of Heraclea in Pontus, sixteen books of which were abridged by Photius. They came down to the death of an Heraclean ambassador to Julius Cæsar, then emperor. A Latin translation of his history was published at Oxford in 1597.

MEMNON, *Statue of*, a colossal figure of gigantic size, formed of very hard granite, which was found in a mutilated state, and lying on the earth, among the ruins of Thebes in Egypt. Diodorus Siculus (lib. i.) calls it Osimandué; Strabo says (lib. xvii.), that it was called by the Egyptians Ismandes; but writers in general give it the name of Memnon. This colossus, according to Philostratus, represented a young man in the flower of his age, whose face was turned towards the rising sun; and when the solar rays fell upon it, it was said to speak, or to utter harmonious sounds. Strabo says, that he had been witness to this pretended miracle, which can be attributed to nothing but either the quality of the stone of which it was made, or to the imposture of the priests, or rather to some secret spring, which the learned Kircher, after Pausanias, (in Attic.) alleges to have been a kind of harpsichord inclosed within the statue, whose strings being first slackened by the moisture of the night, and then distended by the heat of the sun, broke with a noise resembling that of the string of a violin when it breaks. Cambyses, who spared not the Egyptian ox Apis, having a mind to disclose this mystery, in which he suspected some trick of magic, broke the statue from the head to the middle of the body. Strabo, in his account of this statue, reports, that he and some friends, whilst they were surveying it, heard a certain sound, without being able to determine whether it came from the statue, or the base, or if it proceeded from any of the by-standers; for, he adds,

I would

I would rather believe any thing elfe, than imagine that ftones ranged in fuch and fuch a manner were capable of yielding fuch a found. Paufanias informs us, that in his travels through Egypt, he faw the remains of this ftatue, which Cambyfes had broke. The lower part of the coloffus, he fays, was ftill upon its pedeftal, but the reft of the body was thrown down to the ground, and every morning at the fun rifing yielded the found already mentioned. Pliny and Tacitus advance the fame fact, but without having been witneffes to it: and Lucian informs us, that Demetrius went on purpofe to Egypt, to fee there the pyramids, and Memnon's ftatue, from which a voice proceeded at the rifing of the fun. Of the fact that this ftatue uttered founds, when the fun fhone upon it, there can be no doubt; nor can it be difficult to account for the phenomenon. The priefts of Thebes might have carried the mechanic art to fuch a degree of perfection as to be able to fabricate a fpeaking head, the fprings of which were fo arranged, that it fhould pronounce founds at the rifing of the fun. Cambyfes deftroyed this wonderful mechanifm, by overturning the upper part of the ftatue; and all the teftimonies that are cited to the fact refer only to the trunk, which is now feen upon the pedeftal. It is natural, therefore, to attribute the found of the mutilated coloffus to the artifices of the priefts, who oppofed this pretended miracle to the rife and progrefs of Chriftianity. Lucian in particular would have been glad to have availed himfelf of a phenomenon, which he fpeaks of with raillery, in this view of it. At all events, it is very certain, that fince the commencement of the fourth century of the church, when the inhabitants of Egypt became Chriftians, no more has been faid of the vocal ftatue, firft called Memnon by Herodotus, but in the chronicle of Alexandria, and by the Egyptians themfelves, Amenophis. In reply to thofe who inquire concerning the object which the priefts had in view in framing this vocal ftatue, it has been faid that they were in the habit of confecrating their fecondary deities to the prefervation of the records of their moft important difcoveries. Amenophis was formed with the fame intention. To this purpofe the ancients and Jablonfki (De Memnon.) who has collected their teftimonies with extreme attention, affure us that the feven vowels were confecrated to the feven planets, and that the ftatue of Amenophis repeated them at a certain epocha. Lucian introduces Eucrates on the ftage, and makes him fay, "In Egypt I have heard Memnon utter, not according to cuftom, an infignificant found, but pronounce from his mouth an oracle in feven founds." This paffage, probably, is a mere pleafantry of Lucian, but it is founded on the general perfuafion, that before Cambyfes broke this coloffus, it pronounced the feven vowels. The Egyptians, as we learn from Macrobius (Somn. Scip.) regarded the fpring equinox as the era of the creation, and to this period the attention of the learned and of the people was chiefly directed. Amoun, a fymbolical divinity, was confecrated to it, and all the feftivals they celebrated in his honour, related merely to this interefting period. It was at this period the aftronomical year commenced; and from hence, according to the priefts, the feven planets renewed their courfe, which they allegorically ftyled the celeftial mufic. It was at this moment alfo that Amenophis pronounced the feven vowels which were the fymbols of the planets, and which compofed the terreftrial mufic. This famous ftatue may be called in facred language the coufin of Ofiris (Diod. Sic.) and the image of the fun, fince it imitated on earth the office which this luminary performed in the heavens. The priefts by making him repeat the feven founds, of which all languages are formed, and which wonderfully paint our thoughts, were defirous of immortalizing the moft beautiful of their difcoveries; a difcovery which, according to Plato, could only be invented by a god, or by a divine mortal. Perhaps, alfo, the fhadow of this lofty coloffus ferved to mark the inftant of the equinox. Its name at leaft compofed of "Ame Nouphi," to tell good tidings, intimates fomewhat of the kind, more efpecially when we confider that the fun, when he arrived at the equator, in his annual courfe, promifed the Egyptians a ceffation of the foutherly winds, and the approach of the inundation, which made it an object of anxious attention.

There is no lefs variety of opinion among both ancients and moderns, concerning Memnon himfelf, than in relation to his ftatue. Upon the authority of Hefiod, who faid that he was king of Thebes, the fucceeding Greek authors adopted this opinion. Paufanias, Strabo, Diodorus mention it, and alfo Pindar and Ovid. M. Le Clerc has a fingular opinion concerning this prince; he takes him for Hammon, or Ham, the fon of Noah; and Voffius afferts that he was the fame with Baaltis, a divinity of the Syrians, male and female, called by the Greeks *Aphrodité*, and reprefented under the form of a ftone. Diodorus Siculus ftates, "that this prince, the fon of Tithonus, led to Troy the Affyrian troops, under the reign of Teutamus, who was the 20th king from Ninus and Semiramis; the Affyrians at that time, *i. e.* more than a thoufand years ago, poffeffing the empire of Afia; Priam, who was tributary to the kingdom of Teutamus, having applied to him for affiftance in his preffing exigency, and having fent to him, under the conduct of Memnon, 10,000 Affyrians, and as many Perfians, with 200 chariots." We fhall clofe this article with a paffage from the learned Huetius's Treatife concerning the Terreftrial Paradife (ch. 13.) which throws more light upon the hiftory of Memnon than any thing that had been before faid of him. "Memnon," fays that learned prelate, "was the fon of Tithonus and Aurora. Tithonus was the brother of Priam king of Troy, and to him is fometimes afcribed the founding of the city Sufa, the capital of Sufiana. From the name of Memnon his fon, the citadel was denominated Memnonium, the palace and the walls Memnonian, and Sufa itfelf the city of Memnon, upon account of the veneration that was paid to him there; and in honour of him a temple was built, whither the Affyrians went and mourned for him, which is to be underftood of the people of Sufiana. This is that Memnon who came to the affiftance of the Trojans, from whom he derived his original, and who was flain by Achilles. When the Greeks feigned that he was the fon of Aurora, they would have us to underftand that he came from the eaft.—I know the hiftory of Memnon is very perplexed, and very differently related. Moft ancient authors tell us he was an Ethiopian; this error flows from their confounding Chus, which fignifies Sufiana, with Chus which fignifies the countries fituated upon the borders of the Arabic gulf, I mean Ethiopia and Arabia.—What we are in reafon to think concerning Memnon's expedition, may be gathered from Diodorus, and fome others. The kingdom of Troas was in the dependence of the empire of Affyria. Tithonus, Priam's brother, who was mafter of that kingdom, went to the court of the king of Affyria, who gave him the government of Sufiana. There he married in his old age; and becaufe his wife was from a country fituated to the eaft of Greece and Troas, the Greeks, who turned all hiftory into fiction, faid he had married the Morning. Memnon and Emathion were the iffue of this marriage: the war having after this arifen, Priam applied to Teutamus for affiftance, or at leaft to fome king of Affyria, who granted him twenty thoufand men, and two hundred chariots of war. Diodorus fays this fupply confifted of ten thoufand Ethiopians, and ten thoufand thousand Susians, returning to the vulgar error, and confounding the Chus of Ethiopia with the Chus of Susiana. To make this supply of more service, Teutamus gave the command thereof to Memnon, a young prince of the Trojan race, and who was therefore concerned for the preservation of Troy. He kept Tithonus with himself upon account of his age, which rendered him unfit for the expedition, and his prudence which qualified him for being member of his council. Memnon found resistance in his march. The Solymi, who have been since called the Pisidians, would needs dispute the passage with him; but he defeated them and all that opposed him. He cleared the passes, repaired the ways, and by reason of that long and dangerous march, had the honour to communicate his name to that high way which was denominated Memnonian. He sustained the attacks of the Greeks before Troy with great valour; but at last was slain by Achilles. Various accounts are given of the place of his burial; for not to mention Philostratus, who will have it that he had no sepulchre, but that he was transformed into that miraculous stone, Troas, Phœnicia, and Susiana contended together for him, and especially Ethiopia, though it has no other right to his burial any more than to his birth, but that which arises from the equivocation of the word Chus. But notwithstanding the obscurity that this equivocation has cast upon this history, Philostratus, George Syncellus, that is, the coadjutor to the church of Constantinople, and Suidas who had read and copied good authors, though often not very judiciously, have not been wanting to bear testimony to the truth; the first telling us that Memnon the Ethiopian, that is Amenophis, never came from Troy, and that he was wrongfully confounded with Memnon the Trojan, not comprehending how Memnon could have brought supply to the Trojans from so great a distance, nor even by what adventure Tithonus had gone and settled in Ethiopia, and came to be king thereof; the second, by distinguishing exactly Amenophis king of Thebes in Egypt, who is also stiled Memnon, from the speaking statue of Memnon the son of Tithonus, whom he ranks among the kings of Assyria; and Suidas, by asserting that that Memnon was not an Ethiopian, but a Susian. Pausanias, though of a very penetrating genius, has but half unravelled this confusion; saying that Memnon the Ethiopian came not from Ethiopia to Troy, but from Susa. Eustathius, and the scholiast on Pindar, who goes by the name of Triclinius, write that Memnon and Emathion his brother were the only white men among those Ethiopians, though Virgil and others make Memnon black. This remark confirms my opinion; for though the poets and writers of romance have taken the liberty to feign that Andromeda and Charicleus were born white among the blacks, yet this is so singular in the ordinary course of nature, that there is much more reason to believe that Memnon was white, because in fact he was not an Ethiopian."

MEMOIRS, or Memorials, a term now much in use for histories composed by persons who had some share or concern in the transactions they relate, or who were eye-witnesses of them; answering to what the Latins called *commentarii*.

The French are great dealers in this way of writing, and have an infinite number of books of memoirs, containing, for the generality, the lives, actions, intrigues, amours, &c. of the writers.

Memoirs also denote a journal of the acts and proceedings of a society; or a collection of the matters debated, transacted, &c. therein. Such are the Memoirs of the Royal Academy of Sciences, &c.

MEMORY, *μνημη*, a power or faculty of the mind, which receives, retains, and exhibits again, as occasion requires, all sorts of ideas presented to the understanding.

Of all the faculties, there is none harder to account for, or that has perplexed philosophers more, than the memory. Some will have it a mere organ, as the eye, ear, &c. Dr. Hooke, in an "Essay towards a mechanical Account of Memory," makes it to consist in a stock of ideas or images, formed occasionally by the mind, out of the fine parts of the brain, and disposed or laid by in order.

Descartes and his followers maintain, that the animal spirits, exciting a motion in the most delicate fibres of the brain, leave a kind of traces or footsteps, which occasion our *remembrance*. Hence it happens, that by passing several times over the same things, the spirits becoming accustomed to the same passages, leave them open, and so make their way without any effort or labour; and in this consists the ease wherewith we recollect such ideas. Thus wine is found to sharpen the memory, because wine puts the animal spirits in motion, and agitates the fibres of the brain more briskly.

Father Malebranche expresses his notion of memory thus: "It being granted, that all our different perceptions are owing to changes happening in the fibres of the principal part of the brain, wherein the soul more immediately resides, the nature of the memory is obvious: for as the leaves of a tree, that have been folded for some time in a certain manner, preserve a facility of disposition to be folded again in the same manner; so the fibres of the brain, having once received certain impressions by the courses of the animal spirits, and by the action of objects, preserve, for some time, a facility to receive the same disposition. Now it is in this facility that memory consists; for we think the same things, when the brain receives the same impressions.

"Farther, as the animal spirits act sometimes more briskly, and sometimes more languidly, on the substance of the brain; and as sensible objects make much deeper, and more lasting impressions, than the imagination alone; it is easy, on this scheme, to conceive why we do not remember all things alike; why a thing, for instance, seen twice, is represented more vividly to the mind than another seen but once: and why things that have been seen, are usually remembered more distinctly, than those that have been only imagined, &c.

"Old men are defective in memory, and cannot learn any thing without much difficulty, because they want animal spirits to make new traces, and because the fibres of the brain are become too hard to receive, or too moist to retain, such impressions. For the same reason, those who learn with the greatest ease forget the soonest; in regard when the fibres are soft and flexible, objects make a slight impression, which the continual course of animal spirits easily wears off. On the contrary, the fibres of those who learn slowly, being less flexible, and less subject to be shaken, the traces are more deeply engraven, and last the longer. From all which observations it follows, that the memory is absolutely dependent on the body; being impaired or strengthened, according to the changes that befal the body; a fall, the transports of a fever, &c. being frequently found to erase or blot out all the traces, to bear away all the ideas, and to cause an universal forgetfulness."

The chief difficulty that embarrasses this doctrine of memory is to conceive how such an infinite number of things, as the head is stored with, should be ranged in so much order in the memory, as that the one should not efface the other; and how, in such a prodigious assemblage of traces impressed on on the brain, the animal ſpirits ſhould awake preciſely thoſe which the mind has occaſion for.

Memory, according to Mr. Locke, is, as it were, the ſtorehouſe of our ideas. For the narrow mind of man not being capable of having many ideas under view and conſideration at once, it was neceſſary to have a repoſitory, in which to lay up thoſe ideas which it may afterwards have uſe for. But our ideas being nothing but actual perceptions in the mind, which ceaſe to be any thing when there is no perception of them; this laying up of our ideas in the repoſitory of the memory, ſignifies no more than this, that the mind has a power, in many caſes, to revive perceptions it has once had, with this additional perception annexed to them, that it has had them before. And it is by the aſſiſtance of this faculty, that we are ſaid to have all thoſe ideas in our underſtandings, which we can bring in ſight, and make the objects of our thoughts, without the help of thoſe ſenſible qualities which firſt imprinted them there.

Attention and repetition help much to the fixing of ideas in our memories: but thoſe which make the deepeſt and moſt laſting impreſſions, are thoſe which are accompanied with pleaſure and pain. Ideas but once taken in and never again repeated, are ſoon loſt; and thoſe of colours in ſuch as loſt their ſight when very young.

The memory of ſome men is tenacious even to a miracle; but yet there ſeems to be a conſtant decay of all our ideas, even of thoſe which are ſtruck deepeſt, and in minds the moſt retentive; ſo that if they be not ſometimes renewed, the print wears out, and at laſt there remains nothing to be ſeen.

Thoſe ideas that are often refreſhed by a frequent return of the objects or actions that produce them, fix themſelves beſt in the memory, and remain longeſt there: ſuch are the original qualities of bodies, *viz.* ſolidity, extenſion, figure, motion, &c. and thoſe that almoſt conſtantly affect us, as heat and cold.

In memory, the mind is oftentimes more than barely paſſive; for it often ſets itſelf to work to ſearch ſome hidden ideas; ſometimes they ſtart of their own accord; and ſometimes tempeſtuous paſſions tumble them out of their cells. This faculty other animals ſeem to have to a great degree, as well as men, as appears by birds learning of tunes, and their endeavours to hit the notes right. For it ſeems impoſſible that they ſhould endeavour to conform their voices (as it is plain they do) to notes whereof they have no idea. Eſſay concerning Hum. Und. book ii. chap. 10.

Dr. Hartley, agreeably to his mechanical theory of the human mind, defines memory to be that faculty by which traces of ſenſations and ideas recur, or are recalled, in the ſame order and proportion, accurately or nearly, as they were once preſented: and he obſerves, that memory depends entirely or chiefly on the ſtate of the brain, which is peculiarly conformable to his notion of vibrations. The rudiments of memory, he ſays, are laid in the perpetual recurrency of the ſame impreſſions, and cluſters of impreſſions: and thus he endeavours to account for the peculiar imperfections of the memory in children and aged perſons, as well as for other facts pertaining to the exerciſe of this faculty. Obſ. on Man, vol. i. p. 374, &c.

Thoſe who adopt Hartley's theory enumerate among other phenomena of memory ſuch as the following: ideas of recollection are diſtinguiſhed from ſenſations, chiefly by a difference in the vividneſs of the impreſſions, ſo that when from diſeaſe, or any cauſe, ideas become as vivid as ſenſations, they are miſtaken for ſenſations, as in phrenſy; and alſo by the aſſociates which accompany them. Ideas of memory are diſtinguiſhed from reveries, chiefly by the readineſs and ſtrength of the aſſociations by which they are cemented together; and recollected ideas are alſo diſtinguiſhed from reveries by their connection with known facts, and by various methods of reaſoning. Memory, it is alſo ſaid, depends entirely or chiefly on the ſtate of the brain. Hence diſeaſes, concuſſions of the brain, and ſpirituous liquors impair it; and it generally returns again with the return of health. Memory alſo differs in different ages, inſomuch that children ſoon learn and ſoon forget; old people learn with difficulty, and remember beſt what they learned when young; and this, it is alleged, is agreeable to the theory of vibrations. Senſations, attended with great pleaſure or pain, make a deep impreſſion on the memory, which is probably owing to the vigorous vibrations which they excite. Senſible ideas gradually decay in the memory, if not refreſhed by new ſenſations. Voluntary recollection is performed by calling up aſſociated ideas, which by degrees introduce the idea in queſtion. Some perſons of weak judgment poſſeſs retentive memories; but there are limits beyond which the two powers of receiving and of retaining ideas cannot conſiſt with each other. Memory is a faculty inceſſantly exerciſed while thought continues; nor is the mind wholly deprived of it, though it is often much impaired. The excellence of memory conſiſts partly in its ſtrength of retention, and partly in the quickneſs of recollection. All the faculties of the mind are dependent on the memory: and though ſome perſons may have ſtrong memories with weak judgment, no perſon can have a ſtrong judgment whoſe memory is remarkably defective.

It is commonly ſuppoſed, ſays profeſſor Dugald Stewart, (*ubi infra*) that genius is ſeldom united with a very tenacious memory. "So far, however," ſays this ingenious writer, "as my own obſervation has reached, I can ſcarcely recollect one perſon who poſſeſſes the former of theſe qualities, without a more than ordinary ſhare of the latter. On a ſuperficial view of the ſubject, indeed, the common opinion has ſome appearance of truth; for we are naturally led, in conſequence of the topics about which converſation is uſually employed, to eſtimate the extent of memory by the impreſſion which trivial occurrences make upon it; and theſe in general eſcape the recollection of a man of ability, not becauſe he is unable to retain them, but becauſe he does not attend to them. It is probable, likewiſe, that accidental aſſociations, founded on contiguity in time and place, may make but a ſlight impreſſion on his mind. But it does not therefore follow, that his ſtock of facts is ſmall. They are connected together in his memory by principles of aſſociation, different from thoſe which prevail in ordinary minds, and they are on that very account the more uſeful; for as the aſſociations are founded upon real connections among the ideas, (although they may be leſs conducive to the fluency, and perhaps to the wit of converſation,) they are of incomparably greater uſe in ſuggeſting facts which are to ſerve as a foundation for reaſoning or invention."—"Montaigne frequently complains in his writings of his want of memory: and he indeed gives many very extraordinary inſtances of his ignorance in ſome of the moſt ordinary topics of information. But it is obvious to any one who reads his works with attention, that this ignorance did not proceed from an original defect of memory, but from the ſingular or whimſical direction which his curioſity had taken at an early period of life."—"I can do nothing," ſays he, "without my memorandum book; and ſo great is my difficulty in remembering proper names, that I am forced to

call

call my domestic servants by their offices. I am ignorant of the greater part of our coins in use: of the difference of one grain from another, both in the earth and in the granary: what use leaven is of in making bread, and why wine must stand some time in the vat before it ferments."—" Yet the same author appears evidently, from his writings, to have had his memory stored with an infinite variety of apophthegms and of historical passages, which had struck his imagination: and to have been familiarly acquainted, not only with the names, but with the absurd and exploded opinions of the ancient philosophers." The foregoing observations serve to account, in part, for the origin of the common opinion, that genius and memory are seldom united in great degrees in the same person; and it also appears, that some of the facts, on which that opinion is founded, do not justify such a conclusion. There are, however, other circumstances, that seem rather to indicate an inconsistency between extensive memory and original genius. "The species of memory which excites the greatest degree of admiration in the ordinary intercourse of society, is a memory for detached and insulated facts; and it is certain that those men who are possessed of it, are very seldom distinguished by the higher gifts of the mind, and such a species of memory is unfavourable to philosophical arrangement; because it in part supplies the place of arrangement." Dr. Pemberton informs us, that sir Isaac Newton was often at a loss when the conversation turned on his own discoveries: they probably made but a slight impression on his mind, and a consciousness of his inventive powers prevented him from taking much pains to treasure them up in his memory. He nevertheless, as Dr. Pemberton says, perfectly understood his own writings, though his memory was much decayed in the last years of his life. (See Preface to Pemberton's View of Newton's Philosophy.) "A man of original genius," says professor Stewart, "who is fond of exercising his reasoning powers anew on every point as it occurs to him, and who cannot submit to rehearse the ideas of others, or to repeat by rote the conclusions which he has deduced from previous reflexion, often appears to superficial observers to fall below the level of ordinary understandings; while another, destitute both of quickness and invention, is admired for that promptitude in his decisions, which arises from the inferiority of his intellectual abilities." Here we cannot forbear citing one of the aphorisms of lord Bacon: "Reading makes a full man, writing a correct man, and speaking a ready man." See also on this subject Watts's Improvement of the Mind, chap. xvii. or Works, vol. v. p. 275, &c.

Memory is a source of refined and permanent pleasure: painful recollections gradually subside within the limits of pleasure: and if time sufficient be allowed, by the power of association, all pain will be ultimately absorbed, and the pleasures of memory will be pure and unmixed with misery. See Rogers's Pleasures of Memory.

Memory, according to Dr. Reid, is an original faculty given us by the author of our being, of which we can give no account, but that we are so made. I believe most firmly, says this author, what I distinctly remember; but I can give no reason of this belief. It is the inspiration of the Almighty that gives me this understanding. Memory, he says, is always accompanied with the belief of that which we remember; and this belief we account real knowledge, no less certain than if it was grounded on demonstration. The testimony of witnesses, in causes of life and death, depends upon it, and all the knowledge of mankind, with regard to past events, is built on this foundation. Reid's Essays on the Intellectual Powers of Man, Ess. iii. ch. 1, 2. 7.

The word memory, says professor Dugald Stewart, is not employed uniformly in the same sense: it is sometimes employed to express the capacity of retaining knowledge, and sometimes the power of recalling it to our thoughts, when we have occasion to apply it to use. When we speak of a retentive memory, we use it in the former sense; when of a ready memory, in the latter. The various particulars which compose our stock of knowledge sometimes recur to us spontaneously, or at least without any interference on our part; in other cases, they are recalled by an effort of our will. The former operation of the mind is denoted by Memory; the latter, though sometimes called by the same name, is more properly distinguished by the word Recollection. The operations of memory relate either to things and their relations, or to events. In the former case, thoughts which have been previously in the mind may recur to us, without suggesting the idea of the past, or of any modification of time whatever, as when I repeat over a poem which I have got by heart, or when I think of the features of an absent friend. In these cases, the operations of memory do not necessarily involve the idea of the past. But when I think of events, I not only recal to the mind the former objects of its thoughts, but I refer the event to a particular point of time; so that of every such act of memory, the idea of the past is a necessary concomitant. If it be inquired, to what it is owing that the memory retains some things in preference to others? our author replies, that this may be ascribed to two principles of our nature, upon which memory is dependent, and with which it is very intimately connected; these are *attention* and the *association* of ideas. Without attention, even the objects of our perceptions make no impression on the memory. (See Bacon, Nov. Org. lib. ii. aphor. 6.) This attention, though it be a voluntary act, requires experience to have it always under command. In the case of objects to which we have been taught to attend at an early period of life, or which are calculated to rouse the curiosity, or to affect any of our passions, the attention fixes itself upon them, as it were, spontaneously, and without any effort on our part, of which we are conscious. On the other hand, if an object does not interest some principle of our nature, we may examine it again and again, with a wish to treasure up the knowledge of it in the mind, without our being able to command that degree of attention which may lead us to recognise it the next time we see it. By this kind of reasoning we can account for a well-known fact, that objects are easily remembered which affect any of the passions. The passion assists the memory, not in consequence of any immediate connection between them, but as it presents, during the time it continues, a steady and exclusive object to the attention.

Our ingenious author proceeds to state the connection between memory and the association of ideas. This, he says, is so striking, as to have induced some to suppose, that the whole of its phenomena might be resolved into this principle. This the professor does not allow. "The association of ideas connects our thoughts with each other, so as to present them to the mind in a certain order; but it presupposes the existence of these thoughts in the mind; or, in other words, it presupposes a faculty of retaining the knowledge which we acquire. It involves also a power of recognizing, as former objects of attention, the thoughts that from time to time occur to us; a power which is not implied in that law of our nature, which is called the association of ideas."—"On the other hand, it is evident that, without the associating principle, the power of retaining our thoughts, and of recognizing them when they occur to us, would have been

been of little uſe; for the moſt important articles of our knowledge might have remained latent in the mind, even when thoſe occaſions preſented themſelves to which they are immediately applicable. In conſequence of this law of our nature, not only are all our various ideas made to paſs from time to time in review before us, and to offer themſelves to our choice as ſubjects of meditation; but when an occaſion occurs which calls for the aid of our paſt experience, the occaſion itſelf recalls to us all the information upon the ſubject which that experience has accumulated." Our author obſerves, "that the various theories which have attempted to account for memory by traces or impreſſions in the ſenſorium, are obviouſly too unphiloſophical to deſerve a particular refutation." He adds, after ſome other appropriate remarks on this ſubject, "that the immediate dependence of this faculty on the ſtate of the body, which is more remarkable than that of any other faculty whatever, (as appears from the effects produced on it by old age, diſeaſe, and intoxication,) is apt to ſtrike thoſe who have not been much converſant with theſe inquiries, as beſtowing ſome plauſibility on the theory which attempts to explain its phenomena on mechanical principles." Accordingly, it is recommended to medical writers to be at more pains than they have been at hitherto, in order to aſcertain the various effects which are produced on the memory by diſeaſe and old age; effects which are widely diverſified in different caſes. "In ſome it would ſeem that the memory is impaired, in conſequence of a diminution of the power of attention; in others, that the power of recollection is diſturbed, in conſequence of a derangement of that part of the conſtitution on which the aſſociation of ideas depends. The decay of memory, which is the common effect of age, ſeems to ariſe from the former of theſe cauſes."—"As far as the decay of memory, which old age brings along with it, is a neceſſary conſequence of a phyſical change in the conſtitution, or a neceſſary conſequence of a diminution of ſenſibility, it is the part of a wiſe man to ſubmit cheerfully to the lot of his nature. But it is not unreaſonable to think, that ſomething may be done by our own efforts, to obviate the inconveniences which commonly reſult from it. If individuals, who, in the early part of life, have weak memories, are ſometimes able to remedy this defect, by a greater attention to arrangement in their tranſactions, and to claſſification among their ideas, than is neceſſary to the bulk of mankind, might it not be poſſible, in the ſame way, to ward off, at leaſt to a certain degree, the encroachments which time makes on this faculty? The few old men, who continue in the active ſcenes of life to the laſt moment, it has been often remarked, complain, in general, much leſs of a want of recollection than their contemporaries. This is undoubtedly owing partly to the effect which the purſuits of buſineſs muſt neceſſarily have in keeping alive the power of attention. But it is probably owing alſo to new habits of arrangement, which the mind gradually and inſenſibly forms from the experience of its growing infirmities."

The learned profeſſor devotes a ſection of his excellent work to the illuſtration of the varieties of memory in different individuals. "As the great purpoſe," he ſays, "to which this faculty is ſubſervient, is to enable us to collect, and to retain, for the future regulation of our conduct, the reſults of our paſt experience; it is evident that the degree of perfection which it attains in the caſe of different perſons, muſt vary; firſt, with the facility of making the original acquiſition; ſecondly, with the permanence of the acquiſition; and, thirdly, with the quickneſs or readineſs with which the individual is able, on particular occaſions, to apply it to uſe. The qualities of a good memory are, therefore, in the firſt place, to be ſuſceptible; ſecondly, to be retentive; and, thirdly, to be ready." Theſe three qualities are rarely united in the ſame perſon.

Our author has advanced ſome very ingenious and judicious obſervations on the difference between a *caſual* and a *philoſophical* memory. The bulk of mankind aſſociate their ideas chiefly according to their moſt obvious relations, thoſe, for example, of reſemblance and analogy; and, above all, according to the caſual relations ariſing from contiguity in time and place; whereas, in the mind of a philoſopher, ideas are aſſociated according to thoſe relations which are brought to light in conſequence of particular efforts of attention, with the relations of cauſe and effect, or of premiſes and concluſion. The advantage is greatly in favour of the philoſopher; the arrangement he uſes ſtrengthens his memory, aſſiſts his invention, enables him to reaſon ſynthetically, and to correct his intellectual defects; but this kind of memory is not favourable to converſation. The man of caſual memory is open to every impreſſion, and readily accommodates his ideas to any circumſtance which may occur. But the philoſopher who thinks cloſely and reaſons ſyſtematically, is deficient in eaſe and quickneſs, and is in danger of becoming tedious by long diſcourſes. And as nothing appears weaker or more abſurd than a theory partially ſtated, it frequently happens that men of ingenuity, by attempting it, ſink in the vulgar apprehenſion, below the level of ordinary underſtandings. Profeſſor Stewart, after pointing out in various particulars the difference between philoſophical and caſual memory, obſerves, that they conſtitute the moſt remarkable of all the varieties which the minds of different individuals, conſidered in reſpect of this faculty, preſent to our notice. He afterwards enumerates, in detail, and with appropriate illuſtration, ſeveral other varieties of a leſs ſtriking nature. Stewart's Elements of the Philoſophy of the Human Mind, chap. vi. § 1, 2, 3.

For the difference between memory and imagination; ſee IMAGINATION.

Ariſtotle diſtinguiſhes between memory and reminiſcence. Memory is a kind of habit which is not always in exerciſe with regard to things we remember, but is ready to ſuggeſt them when there is occaſion. The moſt perfect degree of this habit is, when the thing preſents itſelf to our remembrance ſpontaneouſly, and without labour, as often as there is occaſion. A ſecond degree is, when the thing is forgot for a longer or ſhorter time, even when there is occaſion to remember it, yet at laſt ſome incident brings it to mind without any ſearch. A third degree is, when we caſt about and ſearch for what we would remember, and ſo at laſt find it out. It is this laſt which Ariſtotle calls reminiſcence, as diſtinguiſhed from memory Reminiſcence, therefore, includes a will to recollect ſomething paſt, and a ſearch after it. Ariſtotle ſays, that brutes have not reminiſcence, which Dr. Reid thinks to be probable, but, ſays he, they have memory. Thus, a dog knows his maſter after long abſence. A horſe will trace back a road he has once gone as accurately as a man. Reid, *ubi ſupra*. See the preceding part of this article.

Hiſtory furniſhes us with ſeveral ſurpriſing inſtances of the retentive powers of the faculty of memory. Seneca ſays of himſelf, that, by the mere effort of his natural memory, he was able to repeat two thouſand words upon once hearing them, each in its order; though they had no dependence or connection on each other. After which he mentions a friend of his, Portius Latro, who retained in his memory all the declamations he had ever ſpoken, and never found

found his memory fail him, even in a ſingle word. He alſo mentions Cyneas, ambaſſador to the Romans from king Pyrrhus, who, in one day, had ſo well learnt the names of his ſpectators, that the next he ſaluted the whole ſenate, and all the populace aſſembled, each by his name. Pliny ſays, that Cyrus knew every ſoldier in his army by name; and L. Scipio, all the people of Rome. Charmipas, or rather Carneades, when required, it is ſaid, would repeat any volume found in the libraries as readily as if he were reading. Dr. Wallis tells us, that without the aſſiſtance of pen and ink, or any thing equivalent, he was able in the dark, by mere force of memory, to perform arithmetical operations, as multiplication, diviſion, extraction of roots, &c. to forty places. Particularly, that, in February 1671-2, at the requeſt of a foreigner (by night in bed) he propoſed to himſelf a number of fifty-three places, and found its ſquare root to twenty-ſeven places; and without ever writing down the number, dictated it from his memory, at his next viſit, twenty days afterwards.

The perfection of memory conſiſts in two things; readily to admit the impreſſions or images of things; and to preſerve them from oblivion, that the underſtanding may have recourſe to them, and employ them for ſuch purpoſes, as reaſon ſhall direct. In order to aſſiſt and improve this faculty, every kind of intemperance and exceſs muſt be carefully avoided; and when we would commit any thing to memory, our firſt concern ſhould be to underſtand it thoroughly; we ſhould commit things to memory in a methodical and regular manner; writing down any thing is likewiſe a great advantage towards remembering it; a frequent review and careful repetition of the things that are learned will help to fix them in the memory, and likewiſe an abridgment of them in a narrow compaſs; converſation upon them with intelligent companions will alſo be found uſeful; care ſhould likewiſe be taken not to overburden the memory: ſuch ſeaſons ſhould be made choice of as are moſt proper for the exerciſe of this faculty, ſuch are the evening and morning; and the moſt effectual way of gaining a good memory, is its conſtant and moderate exerciſe. Ward's Or. vol. ii. ſect. 51. Rollin's Belles Lettres p. 208—216, ſixth ed. Watts's Improvement of the Mind, ubi ſupra. Stewart's Elem. of the Philoſophy of the Human Mind, ch. vi. ſect. 3, 4, 5.

Memory, *Local*, or *Artificial*, is an art, or invention, by means of which the memory is ſuppoſed to be aided, ſtrengthened, and enlarged.

This art ſeems to conſiſt in nothing elſe but a certain method of coupling or aſſociating the ideas of things to be remembered, with the ideas of other things, already diſpoſed orderly in the mind, or that are before the eyes. It is of an old ſtanding, having been practiſed by many of the ancient rhetoricians, under the denomination of "topical memory;" ſome of whom are ſaid to have made uſe of paintings, images, and emblems, on this occaſion; though others contented themſelves with the parts, members, ornaments, furniture, and other circumſtances of the place where they were to ſpeak. Muretus tells us that a young man of Corſica pretending to do wonders this way, Muretus put him to the trial; and upon dictating to him two or three thouſand words, ſome Greek, ſome Latin, ſome Barbarous; all without any relation to each other, and the greateſt part without any meaning at all; the artiſt immediately, and without any heſitation, or the leaſt ſtumbling or diſplacing, repeated them all, from firſt to laſt, in the ſame order wherein they had been dictated; and this done, beginning where he ended, he repeated them all backwards, from laſt to firſt. Adding, that this was but a ſlight eſſay of his memory; and that he would undertake to repeat thirty-ſix thouſand words in the ſame manner.

The truth is, this art ſeems better calculated for retaining things without any coherence or dependence on one another, as mere words or ſounds, &c. than for things where reaſon or judgment are any way required.

Raim. Lully took ſo much pains with it, that it now goes by his name, being called *Lully's art*.

Many have been the attempts, in all ages, to aſſiſt the memory. Some have had recourſe to medicine, ſuch as Horſtius, Marſilius Ficinus, Johnſton and others. That good health, a good digeſtion, and a mind free from care, are helps in this reſpect, is an old obſervation. That attention, application, frequent recapitulation, are neceſſary, is known to every one. But whether, beſides natural health and parts, and the exerciſe of our faculties, art may not give a farther aſſiſtance to memory, has been a queſtion. Simonides is ſaid to have been the firſt who found out the art of memory. His method was by a choice of *places* and *images*, as a repoſitory of ideas; ſuch, for inſtance, as a large houſe divided into ſeveral apartments, rooms, cloſets, &c. All theſe, and their order, were to be rendered extremely familiar to the imagination and memory. Then, whatever was to be remembered, was by ſome ſymbolical repreſentation or another, as an anchor for navigation, to be connected with ſome part of the houſe, or other artificial repoſitory, in a regular manner. Cicero and Quintilian give us ſome account of this method, and ſpeak of it with reſpect. As far as it was the object of this ſpecies of artificial memory to aſſiſt an orator in recollecting the plan and arrangement of his diſcourſe, the accounts which are given of it by the ancient rhetoricians are abundantly ſatisfactory. It appears, however, that its uſe was more extenſive; and that it was ſo contrived, as to facilitate the recollection of a premeditated compoſition. In what manner this was done, it is not eaſy to conjecture from the imperfect explanations of the art, which have been tranſmitted to modern times. The reader may conſult Cicero de Orat. lib. ii. cap. 87, 88. Rhetor. ad Herennium, lib. iii. cap. 16, &c. Quintil. Inſt. Orat. lib. xi. cap. 2.

Several moderns have attempted improvements of artificial memory. There was a collection of various treatiſes of this kind publiſhed at Leipzig; this, and Bruxius's Simonides Redivivus, are commended by Morhof. Paſchius gives us ſome account alſo of ſeveral authors who have treated of this art. It is certainly of uſe in hiſtory and chronology. The chief artifice, in this reſpect, is to form an artificial word, the letters of which ſhall ſignify numbers. Hence a date or era may more eaſily be recapitulated and remembered than without ſuch a contrivance. This invention is mentioned as a ſecret known to few, by Paſchius. It has been proſecuted in England, by Dr. Grey, in his well-known work, entitled "Memoria Technica," by means of which a great maſs of hiſtorical, chronological, and geographical knowledge is compriſed in a ſet of verſes, which the ſtudent is ſuppoſed to make familiar to himſelf as ſchool-boys do the rules of grammar.

The method is this: to remember any thing in hiſtory, chronology, geography, &c. a word is formed, the beginning of which being the firſt ſyllable or ſyllables of the thing to be remembered, does, by frequent repetition, of courſe draw after it the latter parts, which is ſo contrived as to give the anſwer. Thus, in hiſtory, the deluge happened in the year before Chriſt 2348. This may be ſignified by the word Dél *étok*; Del ſtanding for deluge, and *etok* for 2348.

How

How these words came to signify these things, or contribute to the remembering them, is now to be shewn.

The first thing to be done is to learn exactly the following series of vowels and consonants, which are to represent the numerical figures, so as to be able at pleasure to form a technical word, which shall stand for any number, or to resolve a word already formed into the number it stands for:

a	*e*	*i*	*o*	*u*	*au*	*oi*	*ei*	*ou*	*y*
1	2	3	4	5	6	7	8	9	0
b	*d*	*t*	*f*	*l*	*s*	*p*	*k*	*n*	*z*

Here *a* and *b* stand for 1, *e* and *d* for 2, *i* and *t* for 3, and so on. These letters are assigned arbitrarily to the respective figures, and may very easily be remembered. The first five vowels in order naturally represent 1, 2, 3, 4, 5. The diphthong *au*, being composed of *a*, 1, and *u*, 5, stands for 6; *oi* for 7, being composed of *o*, 4 and *i*, 3; *ou* for 9, being composed of *o*, 4 and *u*, 5; the diphthong *ei* will easily be remembered for 8 (eight), being the initials of the word. In like manner for the consonants, where the initials could conveniently be retained, they are made use of to signify the number, as *t* for 3, *f* for four, *s* for six, and *n* for 9. The rest were assigned without any particular reason, unless that possibly *p* may be more easily remembered for 7, or *septem*, *k* for 8, or *οκτω*, *d* for 2, or *duo*; *b* for 1, as being the first consonant, and *l* for 5, being the Roman letter for 50, than any others that could have been put in their places. It is farther to be observed, that *z* and *y* being made use of to represent the cypher, where many cyphers meet together, as 1000, 1000000, &c. instead of a repetition of *azyzyzy*, &c. let *g* stand for 100, *th* for a thousand, and *m* for a million. Thus *ag* will be 100, *ig* 300; *oug* 900, &c. *ath* 1000, *am* 1000000, *loum* 59000000, &c. Fractions may be set down in the following manner: let *r* signify the line separating the numerator and denominator, the first coming *before* the other *after* it; as *iro* $\frac{3}{4}$, *urp*, $\frac{5}{7}$, *pourag* $\frac{79}{100}$, &c. When the numerator is 1 or unit, it need not be expressed, but begin the fraction with *r*; as *re* $\frac{1}{2}$, *ri* $\frac{1}{3}$, *ro* $\frac{1}{4}$, &c. So in decimals, *rag* $\frac{1}{100}$, *rath* $\frac{1}{1000}$.

This is the principal part of the method, which consists in expressing numbers by artificial words. The application to history and chronology is also performed by artificial words. This part of the art consists in making such a change in the ending of the name of a place, person, planet, coin, &c. without altering the beginning of it, as shall readily suggest the thing sought, at the same time that the beginning of the word, being preserved, shall be a leading or prompting syllable to the ending of it so changed. Thus in order to remember the years in which Cyrus, Alexander, and Julius Cæsar, founded their respective monarchies, the following words may be formed; for Cyrus, Cyr*uts*; for Alexander, Alex*ita*; for Julius Cæsar, Juli*os*. *Uts* signifies, according to the powers assigned to the letters before mentioned, 536; *ita* is 331, and *os* is 46. Hence it will be easy to remember, that the empire of Cyrus was founded 536 years before Christ, that of Alexander 331, and that of Julius Cæsar, 46.

For the farther application of this method, we refer to the ingenious author's own account. We shall only add, that technical verses contribute much to the assistance of the memory, both as they generally contain a great deal in a little compass, and also because, being once learned, they are seldom or never forgot. The author before quoted has given us several specimens of such verses in history, chronology, geography, and astronomy, as also the Jewish, Grecian, and Roman coins, weights and measures, &c. He advises his reader to form the words and verses for his own use himself; as he perhaps will better remember them than those formed by the author

Having given an account very much in detail of the most approved artifices that have been contrived for assisting the memory, our limits will not allow our specifying any of those modern methods for this purpose that have engaged popular attention; probably without much claim to originality, and which, as long as they are not explicitly divulged, may be more lucrative to those who teach than improving to those who are at the pains and expence of acquiring them. Every attempt, however, to improve this important faculty merits encouragement. See MNEMONIC *Tables*.

Concerning the utility of the system above stated, the ingenuity of which has been acknowledged, opposite opinions have been entertained. The prevailing opinion is, as professor Stewart conceives, against it; although it has been mentioned in terms of high approbation by some writers of eminence. Dr. Priestley, whose judgment in matters of this nature commands respect, has said of it (Lectures on History, p. 157), that "it is a method so easily learned, and which may be of so much use in recollecting dates when other methods are not at hand, that he thinks all persons of a liberal education inexcusable, who will not take the small degree of pains that is necessary to make themselves masters of it; or who think any thing mean, or unworthy of their notice, which is so useful and convenient." The learned professor, of whose observations we have so often availed ourselves, very justly remarks, that "in judging of the utility of this, or of any other contrivance of the same kind, to a particular person, a great deal must depend on the species of memory which he has received from nature, or has acquired in the course of his early education. Some men have an extraordinary facility in acquiring and retaining the most barbarous and the most insignificant verses; which another person would find as difficult to remember, as the geographical and chronological details of which it is the object of this art to relieve the memory. Allowing, therefore, the general utility of the art, no one method, perhaps, is entitled to an exclusive preference; as one contrivance may be best suited to the faculties of one person, and a very different one to those of another."—"One important objection applies to all of them, that they accustom the mind to associate ideas by accidental and arbitrary connections; and, therefore, how much soever they may contribute, in the course of conversation, to an ostentatious display of acquired knowledge, they are, perhaps, of little real service to us, when we are seriously engaged in the pursuit of truth. I own too, (says the professor,) I am very doubtful with respect to the utility of a great part of that information which they are commonly employed to impress upon the memory, and on which the generality of learned men are disposed to value themselves. It certainly is of no use, but in so far as it is subservient to the gratification of their vanity; and the acquisition of it consumes a great deal of time and attention, which might have been employed in extending the boundaries of human knowledge. To those, however, who are of a different opinion, such contrivances as Grey's may be extremely useful; and to all men they may be of service, in fixing in the memory those insulated and uninteresting particulars, which it is either necessary for them to be acquainted with, from their situation; or which custom has rendered, in the common opinion, essential branches of a liberal education."

As to Simonides's method, Quintilian says he will not deny it to be of some use; for instance, in repeating a multitude of of words in the order they occur, and in things of this nature; but he thinks it of less use in getting by heart a continued oration, and in this respect rather an incumbrance. He himself advises, if the speech to be remembered be long, to get it by heart in parts, and those not very small. The partition ought chiefly to be made according to the different topics. He thinks it best to get things by heart tacitly, and if, the better to fix the attention, the words be pronounced, yet it should be in a low voice. Apt divisions help the memory greatly. But after all, the great art of memory is exercise; to get many things by heart, and daily, if possible. Nothing increases more by use, or suffers more by neglect, than the memory. At whatever age a man aims at the improvement of this faculty, he should patiently submit to the uneasy labour of repeating what he has read or written. Here, as in other cases, where habits are to be acquired, exercise should be increased by degrees. Quint. Inst. Orat. lib. xi. cap. 2. p. 989.

Lord Bacon enumerates several helps to memory, as order, artificial place, verse, whatever brings an intellectual thing to strike the senses, and those things which make an impression by means of a strong passion, as fear, surprize, &c. Those things also sink deepest, and dwell longest in the memory, which are impressed upon a clear mind unprejudiced either before or after the impression, as the things we learn in childhood, or think of just before going to sleep; as likewise the first time things are taken notice of.

A multitude of circumstances also, or, as it were, handles or holds to be taken, help the memory; as the making many breaks in writing, reading or repeating aloud; but as to this last, see Quintilian's opinion before mentioned. Those things which are expected, and raise the attention, stick better than such as pass slightly over the mind; whence if a man reads any writing twenty times over, he will not remember it so well, as if he read it but ten times with trying between whiles to repeat it, and consulting the copy where his memory failed. Bacon's Works abr. vol. ii. p. 475. See also vol. i. p. 135, 136. vol. iii. p. 176, and the article MNEMONIC *Tables*.

MEMORY, *Weakness* or *Loss of*, in *Medicine*, technically called *amnesia*, is a disease which appears to depend upon two opposite conditions of the brain; namely, upon a plethora or oppressed state of that organ, and upon an extreme debility of its vessels and languor of the circulation. Hence it arises from two different sets of causes, and is to be cured by two opposite modes of treatment. The first mentioned species of the disease is connected with the lethargic state preceding apoplectic attacks, or with the paralytic condition that often succeeds them: it arises also from local injury to the brain, occasioned by wounds and blows, which produce concussion or pressure upon the brain. The plan of treatment directed for these morbid states, and consisting chiefly of local evacuations, with low diet, will be necessary for the relief of these varieties of *amnesia*. But the second species, connected with a feeble circulation in the head, such as is said to arise from excessive indulgence of the venereal appetite, or to follow the continued use of spirituous liquors, where there is no plethora, requires the use of tonics and of opium; the exciting causes being also avoided. (See Sauvages Nosol. Method. Spec. 1. Amnesia à Venere. Spec. 7. A. à temulentia.) Where the disease results from old age, however, or from any organic changes, which may have taken place in the brain itself, a cure cannot of course be expected from any expedient.

MEMORY, *Time of*, in *Law*, has been long ago ascertained by the law to commence from the beginning of the reign of Richard I. (2 Inst. 238, 239.) This rule was adopted, when by the statute of Westm. 1. (3 Edw. I. c. 39.) the reign of Richard I. was made the time of limitation in a writ of right. But since by the statute 32 Hen. VIII. c. 2. this period (in a writ of right) hath been very rationally reduced to sixty years, it seems unaccountable that the date of legal prescription or memory should still continue to be reckoned from an era so very antiquated. See Litt. § 170. 34 Hen. VI. 37. 2 Roll. Abr. 269. pl. 16. See MODUS.

MEMORY *Rocks*, in *Geography*, a reef of rocks among the Bahama islands. N. lat. 27° 3'. W. long. 79° 30'.

MEMPHIS, in *Ancient Geography*, a large and populous city of Egypt, on the left side of the Nile. Concerning the epocha of its foundation and also of its destruction, as well as its precise situation, writers are not agreed. According to Diodorus Siculus it was seven leagues in circumference, and it contained magnificent temples and palaces. As to its position, Dr. Shaw says, that opposite to Cairo, on the banks of the Nile, which looks towards Libya, is the village of Gisa, where the ancient Memphis stood, the ruins of which are now covered and buried with earth. The authors of the Universal History adopt the opinion of Dr. Shaw, and represent Memphis as situated on the scite now occupied by Gisa. According to Herodotus, Memphis was situated on the narrowest spot in Egypt, on the western bank of the Nile; a lake formed by the waters of the river surrounding it to the north and the west. But Strabo is more circumstantial in his details; and he says, that at 40 stadia, or 1¼ league from Memphis, rises a stony hill, where a great number of pyramids are built. This situation, it is said, does not correspond with that of Gisa, which is three leagues from the nearest pyramids, and six from those of Saccara. (See GIZÉ.) Pliny (N. H. l. vi.) says, that the three great pyramids, which are seen by navigators from all parts, are situated on a barren and stony hill, between Memphis and the Delta, one league from the Nile, two from Memphis, and near the village of Busiris. Diodorus also places the pyramids 15 miles from Memphis. From these authorities we may infer, that as the pyramids are between Memphis and the Delta, and it is certain that Gisa or Gizé is between the pyramids and the Delta, Memphis could not have been situated on the spot where Gisa stands; or, in other words, Memphis, by Pliny's description, is two leagues to the southward of the pyramids, and Gisa being three leagues from them to the northward, it could not have been built on the ground occupied by Memphis. Moreover, the village of Busiris still exists under the name of Busir, at a small distance from the pyramids; they are still a league from the river, and the small town of "Menph," formerly Memphis, is about two leagues to the southward of these monuments.

The foundation of this city is ascribed by Herodotus to Menes; and by Diodorus to Uchoreus, the eighth descendant of Osymandias. Some have proposed to reconcile these two accounts by attributing the commencement of the city to Menes, and its completion and aggrandizement to Uchoreus, who made it a royal city. The occasion of its having been erected is thus stated by Savary. After a king of Egypt had turned the course of the Nile, which lost itself in the sands of Libya, and the Delta was formed out of the mud deposited by its waters, canals were cut to drain the Lower Egypt. The monarchs who till that time had fixed their residence at Thebes, were desirous of coming nearer the mouth of the river, to enjoy a more temperate air, and to be more ready to defend the entrance of their empire. Accordingly they founded the city of Memphis, and strove to make it a rival worthy of the ancient capital. They adorned it,

 as

as Strabo (lib. xvii.) informs us, with ſeveral temples, amongſt which that of Vulcan attracted the attention of travellers, by the grandeur of the edifice and the richneſs of its ornaments. Another temple, no leſs an object of wonder, was dedicated to Serapis, the principal approach to which was adorned by prodigious ſphinxes. Here was alſo a temple of Venus, which ſome have ſuppoſed to be the moon. In order to prevent the diſaſter which was likely to be occaſioned by drifts of ſand, the inundations of the river, and the attacks of an enemy, a long and lofty dyke was conſtructed towards the ſouth; and on the weſt, it was defended by the king's palaces and a fortreſs erected on the mountain. On the eaſt it was bounded by the Nile. Towards the north were lakes terminated by the plain of Mummies, and by the cauſeway which leads from Buſiris to the great pyramids. Thus ſituated, Memphis commanded the valley of Egypt, and communicated by canals with lake Mœris, and lake Mareotis. The citizen who inhabited it might travel from his own houſe all over Egypt in a boat; ſo that it became the centre of wealth, of commerce, and of the arts. The new capital, thus circumſtanced, ſunk Thebes and her 100 gates into oblivion; and the glory of Memphis laſted for many ages. It maintained its ſplendour till Cambyſes laid waſte Egypt at the head of a formidable army. This ferocious conqueror deſtroyed, as far as he was able, her temples and her famous buildings; and, above all, he ſtrove to extinguiſh the torch of the ſciences, which the Egyptians, ſurrounded by waves and deſerts, had lighted in their fertile valley. Memphis, however, retained ſo many traces of her magnificence as to be ſtill the firſt city in the world. For upwards of 200 years ſhe laboured to throw off the Perſian yoke. Alexander, to whom ſhe ſurrendered, amply revenged the outrages ſhe had ſuſtained. This conqueror, abandoning himſelf to a guilty delirium, removed, as Quintus Curtius informs us, within the walls of Perſepolis, the horrors Cambyſes had committed at Thebes and Memphis. In proceſs of time a city was founded which bore his name; and it was embelliſhed by the Ptolemies, his ſucceſſors. Alexandria became another Rome: the arts and ſciences acquired reputation in this place: commerce alſo attracted hither wealth from various regions. Hence it happened, that Memphis was gradually depopulated by the migration of her inhabitants to the new and more favoured city. Under Auguſtus, however, it was ſtill a great city, populous and full of ſtrangers; though it then held the rank of only the ſecond city of Egypt. Six hundred years after, it became the firſt conqueſt of the Arabs, who laid ſiege to its walls. The ſiege was long and bloody; but it was carried at length by ſtorm, as Abulfeda informs us. Menf (Memphis), ſays this writer, is the ancient Maſr of Egypt. It is ſituated on the weſtern bank of the Nile. Amrou, ſon of El Aas, having taken it by ſtorm, raſed it to the ground, and went to build the town of Foſtat by order of Omar, ſon of Kettah, on the oppoſite ſide. At Menf are remarkable ruins, the remains of its ancient ſplendour, &c. Menf, he adds, is diſtant a ſhort day's journey from Grand Cairo. The village of Menf, the ſad remains of an immenſe city, is ſix leagues from Grand Cairo, on the weſtern bank of the Nile. The lakes mentioned by Herodotus and Strabo have not entirely diſappeared; one of them is near Saccara, with a wood of Acacia ſituated weſtward of Menf; the other is preciſely north of it. (Savary's Letters on Egypt, vol. i.) Memphis gave name to a nome or canton of Egypt, ſituated on the weſt of the Nile, and called "Memphitis Nomos."

MEMPHITES, or *Lapis Memphiticus*, a ſort of ſtone mentioned by Dioſcorides, Pliny, and other natural hiſtorians, ſuppoſed to be found in Egypt, not far from the city of Cairo, the ancient Memphis, whence its name.

The property it is famed for is, that being pulverized and ſmeared on any part of the body to be cut off, it deadens it ſo, as that the patient ſhall receive no pain, they ſay, from the operation.

MEMPHREMAGOG, in *Geography*, a lake which lies chiefly in the province of Canada, 40 miles in length from north to ſouth, and two or three wide from eaſt to weſt. The north line of Vermont ſtate paſſes over the ſouth part of the lake, in N. lat. 45°. This lake, which communicates by the river St. Francis with the river St. Laurence, is the reſervoir of three conſiderable ſtreams, *viz.* Black, Bolton, and Clyde rivers, which riſe in Vermont. The ſoil on its banks is rich, and the country round it is level.

MEMRAMCOOK RIVER, a river of America, which has been recommended as the moſt proper boundary between the province of North Brunſwick and Nova Scotia. It lies a little to the eaſtward of Petitcodick, and purſues a north-eaſterly direction.

MEMRUMUS, in *Mythology*, a Phœnician deity, ſprung from the race of giants, and the brother of Hypſaranius. The latter dwelt at Tyre, and invented the art of building cottages of reeds and ruſhes, and the papyrus; and his brother, with whom he quarrelled, taught men to clothe themſelves with the ſkins of beaſts. When an impetuous fire kindled a foreſt near Tyre, he took a tree, cut off its branches, and having launched it in the ſea, made uſe of it for a ſhip. He alſo paid religious homage to two ſtones, which he had conſecrated to the wind and fire, and poured out libations to them of the blood of certain animals. This, ſays Banier, is the ſecond example of a worſhip paid to created beings; the ſun having been the firſt object of idolatry. After the death of theſe two brothers, their children, ſays Sanchoniathon, conſecrated to them mis-ſhapen pieces of wood and ſtone, which they adored, and inſtituted anniverſary feſtivals to their honour. This is the firſt time we find religious worſhip performed to dead men.

MEN—*Midſhipmen, Moot, Port, Queſt, Sides, Twelve, Veſtry* MEN. See the adjectives.

MEN, an abbreviation of the Italian adverb, *meno*, frequently uſed, in muſic, to announce a diminution; as *men forte*, leſs loud, &c.

MEN *of May*, in *Geography*, rocks near the north coaſt of Scotland; 5 miles E. from Dunnat Head. N. lat. 58° 3′. W. long. 3° 3′.

MENA, JUAN DE, in *Biography*, a Caſtilian poet of great celebrity, was born at Cordova about the year 1411. It was not till the age of twenty-three that he diſcovered any propenſity towards literature; but then he made up for the time which he conſidered as having been loſt, and betook himſelf moſt paſſionately to his ſtudies, which he purſued firſt at Cordova, then at Salamanca, and afterwards at Rome. By his poetical talents he ſoon attracted a conſiderable degree of notice, and was patronized by ſeveral conſiderable perſons, and by Juan II. This king, though far from reſpectable as to character or talents, was a lover of learning, and an encourager of it, and appointed Juan de Mena his chronicler, communicated to him materials for the hiſtory of his reign, and took delight in beholding the progreſs of his works. The hiſtory was never finiſhed by de Mena; and he is chiefly known as a poet. The longeſt and moſt elaborate of his poems is entitled "El Labyrintho," commonly known by the title of "Las Trezientas," becauſe it conſiſts of three hundred ſtanzas. Mr. Southey, in the General Biography, has given a pretty full account of the plan and contents of this poem. It is ſaid that the king ordered

dered him to add fixty-five ftanzas to his poem, for this *wife* reafon, that there might be juft as many as there are days in the year. Of thefe, twenty-four are printed at the end of the poem. They contain fome execrable flattery of Juan, and an orthodox addrefs to the deity; the reft is declamation againft the factious nobles. Juan de Mena was probably not the author of thefe. He has been greatly praifed in this country, and has been faid to unite the merits of Dante and Petrarca; but, according to Mr. Southey, the merits of Juan are exclufively what he may poffefs for his language: there is no glimpfe of imagination, and fcarcely a trace of feeling. De Mena was author of two other poems, entitled "La Coronacion," and "Tractado de Vicios y Virtudes." This laft he left unfinifhed. There are many editions of thefe poems; the moft complete are thofe of Seville in 1528, and of Antwerp in 1552. In the royal library at Madrid there is an unfinifhed abridgment of the Iliad, made by this author at the king's command. He died in 1456 at Tordelaguna, and was buried in the parochial church of that town. Gen. Biog.

Mena, in *Geography*, a town of Mexico, in the province of Nicaragua, on a river which runs into the lake of Nicaragua; 30 miles N.W. of St. Carlos.

Mena, in *Hindoo Mythology*, is the fpoufe of Himalaya, and mother of Parvati, in one of her terreftrial incarnations. The legend connected with this poetical fiction is very wild and fanciful. Himalaya, or the manfion of fnow, is the Hindoo claffical name of that vaft chain of mountains that bounds India to the north, and embraces it with its eaftern and weftern arms, both extending to the ocean: one named, in Sanfcrit, Chandra-Sekra, or moon-crowned; and the other, which ftretches weftward to the mouths of the Indus, was called by the ancients Montes Parveti. The mountain Himalaya, being perfonified, is reprefented as a powerful monarch, bearing the moon as his crown, and being the fource of all the good derivable from the many rivers that iffue from him. Thefe mountains were the refort of the god Siva; and his celeftial confort having no children by him, became regenerated in the daughter of Himalaya and Mena, and was named Parveti, or mountain-born. In this incarnation, fhe, according to fome legends, bore him two fons: Ganefa, the wifeft of deities, the god of prudence and policy, always invoked at the beginning of every literary work; and Kartikya, commander of the celeftial armies. (See Kartikya, Siva, and Parvati.) The name Himalaya is ufually altered by European writers to Himmaleh; the range of mountains is otherwife called Hindookho. See thefe articles. See alfo Mera.

MENACES, in *Law*. See Threats.

MENACHA, in *Geography*, a town of Arabia, in Yemen; 36 miles W.S.W. of Sanaa.

MENACHANITE, or Menakanite. See Titanium.

MENADON Bay, or *Panadon*, in *Geography*, a bay which lies two leagues from Port Balena, or Port Nove, on the coaft of Cape Breton ifland, at the fouth part of the gulf of St. Laurence, having the ifland of Scatair, formerly called Little Cape Breton, oppofite to it.

MENAGE, Gilles, in *Biography*, a diftinguifhed man of letters, was born at Angers in the year 1613, of which city his father was a king's advocate. Having completed his ftudies, he was admitted to the bar at Angers in 1632. He remained here but a fhort time, but went to Paris in the fame year, where he purfued the legal profeffion, till he became difgufted with the chicanery connected with it, and adopted the ecclefiaftical character, and thence gave himfelf up entirely to literary purfuits. He was foon diftinguifhed among his contemporaries as a man of wit and erudition; but by the ufual freedom of his remarks on different characters with whom he affociated, he was perpetually involved in quarrels. For fome years he was an inmate in the houfe of cardinal de Retz; and when he quitted it, he took apartments in the cloifter of Notre Dame, where he held weekly affemblies of the learned, to which he gave the title "Mercuriales." Menage was in eafy circumftances. He had fold a fmall paternal eftate for a life-annuity, enjoyed a confiderable rent-charge upon two abbies, and obtained a royal penfion, which, however, was paid but a fhort time. By thefe means he was enabled to cultivate literature in the way moft agreeable to him, and to print fome of his works at his own expence, which the bookfellers would probably not have chofen to undertake. By a witty fatire, entitled "Requête des Dictionnaires," he had precluded himfelf from an admiffion into the French academy, though it was afterwards a great object of his ambition. In the former part of his life he was diftinguifhed by a prodigious memory; but in advanced age he experienced almoft a total failure of that important faculty. Fortunately this defect was not permanent: he recovered it again, and recorded the grateful feelings of his heart in a Latin hymn to "Mnemofyne." He died at Paris in 1692, at the age of feventy-nine. His principal works are, 1. "Dictionnaire Etymologique, ou Origines de la Langue Françoife," firft printed in 1650, and reprinted in 1750, with corrections and additions by M. Jault, in two volumes, folio: it is regarded as a work of much real value, though in the firft editions there are numerous errors and abfurd etymologies. 2. "Origines de la Langue Italienne:" in this he was affifted by feveral members of the academy of Della Crufca, of which he was an affociate. 3. "Mifcellanea," in quarto, being a collection of pieces in profe and verfe, and in different languages. He alfo publifhed an edition of Diogenes Laertius, with notes and illuftrations; "Juris Civilis Amœnitates;" "Notes on the Poems of Malherbe;" "Hiftoire de Sable;" "Hiftoria Mulierum Philofophorum," and feveral other pieces. Menage was an entertaining companion, by the variety of his knowledge, and the happy manner which he had of communicating it; but he was apt to be overbearing and opiniative. After his death, a "Menagiana" was compiled from notes of his converfation, anecdotes, remarks, &c. which has been feveral times reprinted. The laft edition was publifhed in 1715 by M. de la Monnoye, in four volumes, 12mo. Moreri.

In his admirable work, entitled "Dictionnaire Etymologique de la Langue Françoife," and in his "Origine della Lingua Italiana," curious inquirers after the mufical language of the middle ages will find more information than in any other Lexicons or philofophical works with which we are acquainted, except in the Gloffarium of Ducange.

Menage, *Fr.*, denotes a collection of animals; whence we have derived the word *menagery*.

Menage, in *Geography*, an ifland in the river Senegal.

MENAGIO, a town of Italy, in the department of the Lario; 15 miles N.N.E. of Como.

MENAI, a channel between the ifland of Anglefey and the county of Caernarvon.

MENAIS, in *Botany*, perhaps from μενω, *to ftand undaunted againft the attacks of an enemy*, becaufe this fhrub is, as its fpecific name *topiaria* expreffes, able to bear clipping, and platting into bowers. No explanation of the name having been given, we offer the beft that occurs to us. Linn. Gen. 95. Schreb. 130. Willd. Sp. Pl. v. 1. 997. Loefl. It. 306. Juff. 128. Lamarck Dict. v. 4. 90.—Clafs and order, *Pentandria Monogynia*. Nat. Ord. *Afperifoliæ*, Linn. *Borragineæ*, Juff.

Gen. Ch. *Cal.* Perianth inferior, of three lax, concave, fmall, ſmall, pointed, ſtriated, permanent leaves. *Cor.* of one petal, ſalver-ſhaped; tube cylindrical, longer than the calyx; limb ſpreading, in five deep rounded ſegments. *Stam.* Filaments five, very ſhort; anthers awl-ſhaped, in the mouth of the corolla. *Piſt.* Germen ſuperior, roundiſh, depreſſed; ſtyle thread-ſhaped, erect, the length of the tube; ſtigmas two, oblong, acute. *Peric.* Berry globoſe, of four cells. *Seeds* ſolitary, nearly ovate, acute at one end.

Eſſ. Ch. Corolla ſalver-ſhaped. Calyx of three leaves. Berry of four cells. Seeds ſolitary.

1. M. *topiaria.* Bower Menais. Linn. Sp. Pl. 251.—Native of South America. A *ſhrub*, with round, ſomewhat hairy *ſtems*. *Leaves* alternate, ovate, undivided, rough. We have ſeen no figure nor ſpecimen of this plant. Linnæus mentions Aymen as the author of the genus. Juſſieu ſuſpects it not to be different from *Ehretia*, to which we have chiefly to object the three-leaved calyx. See Ehretia.

MENAKA, the name of a ſemi-divine female, in the Puranic romances of the Hindoos, frequently alluded to in their writings and converſation, proverbially, as highly beautiful and faſcinating. When the evil counſellor Indra, (ſee Indra,) jealous of the growing ſanctity of the aſcetic Viſwamitra (which ſee), reſolved to counteract his meritorious penance, he thought female blandiſhment the readieſt mode of debauching the ſaint; and ſelected Menaka, as a promiſing inſtrument through whom to effect his unholy purpoſe. The moral legend is thus alluded to in the 50th ſection of the firſt book of the Ramayana. (See that article.) "When the ſanctified aſcetic Viſwamitra, who had for thouſands of years been engaged in the moſt rigid mortifications, beheld Menaka the Apſara, ſent by Indra to debauch him, bathing, of ſurpriſing form, unparalleled in beauty, in appearance reſembling Sri (ſee Sri), her clothes wetted by the ſtream, exhibiting her faſcinating ſymmetry of frame; he, ſubdued by the arrows of Kandarpa (ſee Kandarpa), approached her; and five times five years, ſpent in dalliance with this ſeducing female, paſſed away like a moment. What!—exclaimed at length the reflecting ſage,—my wiſdom, my auſterities, my firm reſolution, all deſtroyed at once by a woman! Seduced by the crime in which Indra delights, am I ſtripped of the advantages ariſing from all my auſterities!" In this manner we occaſionally find ſound morality inculcated by the wild fables of the Hindoos. If we object to the warmth of language ſometimes obſervable in ſuch writings, we ſhould recollect that in fairneſs we ought not to eſtimate them by any ſtandard of European criticiſm; but ſhould advert to the uſages of the people, the times, and the countries, for whom and wherein they were promulgated.

MENALD Deer, a ſpecies of the common fallow-deer, beautifully variegated.

MENAMAN, in *Geography*, a town of Aſiatic Turkey, in Natolia, ſituated on the north coaſt of the gulf of Smyrna; 6 miles N.W. of Smyrna.

MENANDER, in *Biography*, the moſt celebrated of the Greek comic poets, was born at Athens in the year 342 B.C. He is conſidered as the perſon who introduced the new comedy, which refined upon the groſſneſs and licence of the old, and baniſhed living characters from the ſtage. He is repreſented as poſſeſſing every part of a perfect dramatic writer, *viz.* elegance of language, force and delicacy of ſentiment, and the true and humorous delineation of character. He was ſo much the poet of nature, that the grammarian Ariſtophanes once exclaimed, "O Menander and Nature, which of you copied from the workmanſhip of the other!" Quintilian praiſes him for the ſtrength and conſiſtency diſplayed in the characters of his dramas. Ovid predicts that the fame of Menander would be immortal. His fame extended as far as the Greek language; and we are informed by the elder Pliny, that the kings of Egypt and Macedonia gave him preſſing invitations to their courts, and even offered fleets for his ſafe conveyance. He preferred, however, a life of freedom in his native city; yet he could not be accounted a moral philoſopher. By Plutarch he is called "the chief prieſt of Love;" and Suidas gives him the character of one "mad after women." Phædrus paints him as paying his compliments to Demetrius Phalereus at Athens, perfumed all over, with a flowing garment, and advancing with an affected and languid ſtep. He compoſed 108 comedies, eight of which obtained the theatrical prize. It is extraordinary that, of an author ſo much eſteemed as Menander was, nothing has come down to our time except ſome fragments, chiefly of the ſentimental kind, and generally of a gloomy and querulous tenour, which perhaps were characteriſtic only of the perſons into whoſe mouth they were put: and what remains of him does not mark ſo ſtrongly his own peculiar genius, as the taſte of thoſe ſelectors who have choſen his words to illuſtrate their own ideas. Thus, to the melancholy ſelector we owe the ſurvival of the ſad and peeviſh complaints on the many ſorrows to which fleſh is the natural heir. On the other hand, the ſtrikingly moral paſſages with which his works abounded alone caught the attention of the fathers of the primitive church, who found in the Greek comedian a ſtrain of piety ſo nearly approaching to their own faith and feelings, that all ideas of a preponderance of ſatire over moral precept muſt yield to evidence ſo irreſiſtible as the approbation of Clemens Alexandrinus and Euſebius. It is from theſe two ſources alone, the writings of the melancholy and pious man, that we are furniſhed with our ſpecimens of Menander. Happy had it been for us and the world, had the gay and the witty finiſhed the portrait of the bard, by tranſmitting to after-ages examples that would have enabled us to meaſure him by the ſtandards of humour, ſprightlineſs, and fancy. The ſuperiority of the Grecian dramatiſt was felt and acknowledged by Roman imitators; and Cicero frequently reprobates the prevailing partiality of his countrymen for ſuch foreign authors. Menander was drowned in the harbour of Piræus, in the year B.C. 293, at a period of his life when he had done enough to obtain immortality, and while the powers of his mind were unimpaired by age, and his genius ſufficiently ardent to do ſtill more. He is ſaid to have thrown himſelf into the ſea in a fit of jealouſy, occaſioned by his unfortunate competition with Philemon. He was vanquiſhed, as Aulus Gellius aſſerts, by the ſuperior intereſt rather than talents of his ſucceſsful rival; and the ſame writer relates, that, meeting him ſhortly after the conteſt had been decided, he aſked him, "If he did not bluſh at gaining the prize againſt him?" The fragments of Menander have been ſeveral times reprinted. The moſt complete edition is that of Le Clerc in 1709. To this, on account of many miſtakes in proſody, Bentley, in 1713, gave his "Emendationes in Menandri et Philemonis Reliquias." Monthly Mag.

MENANDRIANS, in *Eccleſiaſtical Hiſtory*, the moſt ancient branch of Gnoſtics; thus called from Menander their chief, ſaid by ſome, without ſufficient foundation, to have been a diſciple of Simon Magus, and himſelf a reputed magician.

He taught, that no perſon could be ſaved, unleſs he were baptiſed in his name: and he conferred a particular ſort of baptiſm, which would render thoſe who received it immortal in the next world; exhibiting himſelf to the world, with the phrenſy of a lunatic more than the founder of a ſect, as a promiſed ſaviour. For it appears by the teſtimonies of Irenæus, Juſtin, and Tertullian, that he pretended to be one of the

the Æons fent from the pleroma, or ecclefiaftical regions, to fuccour the fouls that lay groaning under bodily oppreffion and fervitude; and to maintain them againft the violence and ftratagems of the dæmons that hold the reins of empire in this fublunary world. As this doctrine was built upon the fame foundation with that of Simon Magus, the ancient writers looked upon him as the inftructor of Menander. See SIMONIANS.

MENAN-FAN, in *Geography*, a town of Siam; 6 miles N. of Porfelon

MENANGEABOW, a kingdom of Sumatra, being the principal fovereignty of the ifland, which formerly comprehended the whole, and ftill receives a fhadow of homage from the moft powerful of the other kingdoms, that have fprung up from its ruins. This kingdom is the principal feat of empire of the Malays, and of the whole ifland. It lies near the centre, extending partly to the northward, but chiefly to the fouthward of the equinoctial, about 60 or 100 miles. The country is, generally fpeaking, a large plain, bounded by hills, clear of woods, and, comparatively, well cultivated. It has an eafy communication with both fides of the ifland, lying nearer to the weftern coaft, but having the advantage, to the eaft, of the large rivers Racan, Indergeree, Siak, Jambee, and even Palembang, with which it is faid to have connection by means of a large lake, that gives fource to the two laft, as well as to the river of Cattown on the oppofite fide. Colonies of Malays from Menangeabow are fettled on feveral branches of Jambee river, or rather thofe fmall rivers which run into it. Here they collect large quantities of gold. The name of Menangeabow is faid to be derived from the words "menang," to win, and "carbow," a buffalo; from a ftory, which bears a very fabulous air, of a famous engagement on that fpot between the buffalos and tigers, in which the former are reported to have gained a complete victory. The actual power and refources of the fultan are, at this day, fcarcely fuperior to thofe of a common raja; yet he ftill afferts all his ancient rights and prerogatives, which are not difputed, as long as he refrains from attempting to carry them into force. His character is held in a facred light, and the obfcurity and air of myftery which furround his court, together with the influence of the Mahometan priefts, who regard him as the head of their religion, keep up this veneration. This empire is allowed to be very ancient; though when the Europeans firft made difcoveries in thefe parts, it was in its decline. Like the other people of Sumatra, thofe of Menangeabow are entirely without records or annals. They are expert at writing in the Arabic character; but their literature amounts to nothing more than tranfcripts of the Koran, and "cabar," or hiftoric tales, refembling our old romances, but having lefs ingenuity. They are famous for compofing fongs, called "pantoon," which fpread throughout the ifland. The arts, in general, are carried among them to a greater degree of perfection than by the other natives of Sumatra. The Malays are the fole fabricators of the gold and filver *filagree;* which fee. Menangeabow has alfo been celebrated for its confiderable traffic in gold, lying in the midft of the mines, where it is chiefly produced. Much cloth is wrought in, and exported from it. Here alfo have been manufactured, from the earlieft times, arms for their own ufe, and for the fupply of the northern inhabitants of the ifland, who are the moft warlike. Their guns are thofe pieces called matchlocks, nor is the improvement of fprings and flints yet adopted by them; their barrels are well tempered, and of the jufteft bore. Powder is made by them in great quantity, but it is defective in ftrength. Befides guns, they have other arms, which are, for the moft part, weapons of a make between that of a fcimitar and a knife. Their crufes are a fpecies of dagger of a particular conftruction, and are worn by all defcriptions of people. They have other implements of warfare, called "Ranjows," which are fharp-pointed ftakes of bamboo, of different lengths, ftuck into the ground, in order to penetrate the naked feet or body of an enemy. They are made ufe of in cafes of flight, to annoy and retard the purfuers, and planted in the path-ways, or among the long grafs, by the vanquifhed party as they run. They are alfo difpofed in the approaches to fortified doofoons. Their wars are generally carried on rather in the way of ambufcade, and furprife of ftraggling parties, than open combat. The foldiers have no pay, but the plunder is thrown into a common fund, and divided.

The people of Menangeabow are all Mahometans, and in that refpect diftinguifhed from the other inland inhabitants of the ifland. This country is looked upon as the fupreme feat of that religion; and next to a voyage to Mecca, which fome Sumatrans have undertaken, to have been at Menangeabow ftamps a man learned and of fuperior fanctity. With the change of their religion, the people of this country altered their language, laws, cuftoms, and manners. This was effected by the fettlement of the Malays among them.

By late accounts it appears, that the kingdom of Menangeabow, even in its limited ftate, is rent into various fovereignties. Marfden's Sumatra.

MENAPII, in *Ancient Geography*, a people who, in the time of Cæfar, inhabited the banks of the Lower Rhine. They were bounded on the N. and E. by the Mofa, and on the W. by the Scaldis. Their country correfponded to Brabant.

MENARD, LEON, in *Biography*, an hiftorical writer, was born at Tarafcon in 1706. It is imagined he was educated for the legal profeffion, though he certainly did not purfue it to any great extent, but devoted moft of his time and talents to the ftudy of hiftory and antiquities. He obtained a place in the Academy of Infcriptions and Belles Lettres, and from that time paffed his life chiefly at Paris, where he died in indigent circumftances in 1767. His principal works are, "A Hiftory of the Bifhops of Nifmes," in two vols. 12mo.: "L'Hiftoire civile ecclefiaftique et litteraire de la Ville de Nifmes," which confifted of feven volumes 4to., and was the product of many laborious years. In depth of refearch, and abundance of curious matter, this is faid to be furpaffed by few topographical works. As a relaxation from more ferious labours, he compofed a romance, entitled "Les Amours de Califthene et d'Ariftoclie:" the fcene is laid in Ancient Greece, and it confifts in the delineation of Grecian manners, which fubject is exprefsly treated on in another work of our author, entitled "Mœurs et Ufages des Grecs," which was very much read, and proved honourable to his induftry and learning. He next carried his refearches into French hiftory, and publifhed, as the refult of his labours, a collection of "Pieces fugitives pour fervir a l'Hiftoire de la France," in three vols 4to. Another, and probably his laft publication, was entitled "A Refutation of the Arguments of Voltaire againft the Authenticity of the Political Teftament of Cardinal Richelieu." Gen. Biog.

MENARUOLO, in *Geography*, a town of Italy; 17 miles N.W. of Verona.

MENAS, ST., an ifland in the Grecian Archipelago, about fix miles in circumference. N. lat. 37° 33'. E. long. 26° 30'.

MENASSEH, BEN ISRAEL, in *Biography*, a celebrated rabbi, who flourifhed in the feventeenth century, was a native

tive of Spain, and born very early in that century. His father, after having been cruelly tortured by the Spanish Inquisition, and stripped of his property, escaped into Holland with his wife and sons, of whom Ben Israel, the subject of this article, was one. Here he was placed under a learned preceptor, Isaac Usieli, and pursued his studies with such diligence and success, that at the age of eighteen he was so deeply skilled in Hebrew and theology, that he was judged fully qualified to succeed his tutor as preacher and expounder of the Talmud in the synagogue of Amsterdam, a post which he occupied with high reputation for many years. He was not quite twenty-eight years of age, when he published in the Spanish language the first part of his work entitled "Conciliador:" of which was published a Latin version, in the following year, by Dionysius Vossius, entitled "Conciliator, sive de Convenientia Locorum S. Scripturæ, quæ pugnare inter se videntur, Opus ex Vetustis et Recentioribus omnibus Rabbinis magna Industria ac Fide congestum." This work shews that its author had a profound and intimate acquaintance with the Old Testament writings, and it procured for him the esteem and admiration of all the learned, as well Christians as Jews. It was recommended to the notice of biblical scholars by the learned Grotius.

Notwithstanding the learning and diligence of our rabbi, he found that the expences of a large and growing family could not be defrayed by the salary attached to his appointment, and engaged in the mercantile line of business; and he also set up a printing-press in his own house, at which he printed three editions of the Hebrew bible, and a number of other books. Under the protectorate of Cromwell, he came over to England, in order to solicit leave for the settlement of the Jews in this country. Here he met with a favourable reception from the protector and his parliament, and succeeded in obtaining greater and more important privileges for his nation than they had ever enjoyed before in this country, and in 1656 published an "Apology for the Jews," in the English language. This piece was afterwards published in the second volume of the collection of scarce and curious tracts entitled "The Phœnix," &c. Menasseh died at Amsterdam about the year 1659, and left a son, who inherited his printing-press, busily employed in printing some of his father's works. The rabbi was respected and esteemed as well for his moral virtues as for his great learning, and had been long in habits of correspondence and intercourse with some of the most learned men of his time, among whom were the Vossii, Episcopius, and Grotius. The following are his principal works independently of that already noticed: 1. An Edition of the Hebrew Bible, two vols. 4to.: 2. The Talmud corrected, with Notes: 3. De Resurrectione Mortuorum: and 4. Spes Israelis, dedicated to the parliament of England in the year 1650; it was originally published in Spanish, and afterwards translated into the Hebrew, German, and English, one object of which is to prove that the ten tribes are settled in America. He was author likewise of numerous other pieces. Moreri. Universal History.

MENAT, in *Geography*, a town of France, in the department of Puy-de-Dôme, and chief place of a canton, in the district of Riom; 24 miles N.N.W. of Riom. The place contains 1748, and the canton 10,014 inhabitants, on a territory of 180 kiliometres, in 11 communes.

MENCKE, Lewis Otho, in *Biography*, was born in 1644, at Oldenburg, in Westphalia, of which city his father was a senator, and also in trade. After studying at and visiting several of the universities in Germany and Holland, he was appointed professor of moral philosophy at Leipsic in 1668, He was, in the course of an active and well spent life, five times rector of the university, and occupied his post as professor till his death, in 1707. He was editor of several learned works, and was the planner of the periodical work called the Leipzig Journal, but better known by the name "Acta Eruditorum," of which, with the assistance of other learned men, he published thirty volumes. Moreri.

Mencke, John Burchard, son of the preceding, was born at Leipsic in 1674, and in 1699 we find him appointed to the professorship of history, an office in which he acquired a high reputation by his lectures. He was also historiographer and aulic counsellor to Frederic Augustus of Saxony, king of Poland; a member of the Academy of Berlin, and of the Royal Society of London. He died at Leipsic in 1732, leaving behind him several very learned and useful publications on historical and philosophical subjects. One of the most remarkable of these consisted of two Latin declamations, "De Charlataneria Eruditorum," which were translated into various languages. He had a large share in, and was the original projector of a German "Dictionary of Learned Men," but his chief undertaking was a collection of the German historians, under the title of "Scriptores rerum Germanicarum, speciatim Saxonicarum," in three volumes folio. He published an enlarged edition of Lenglet's "Methode pour etudier l'Histoire avec un Catalogue des principaux Historiens," and after the death of his father, he continued the Leipsic journal to thirty-three volumes more. Moreri.

MEND, in *Geography*, a town of Persia, in the province of Mekran, at the union of the Mekshid and the Nehenk, which hence take the name of Mend, and run into the Indian sea. The town is distant 40 miles S.W. from Kidge. N. lat. 25° 50′. E. long. 63° 30′.

MENDÆANS, in *Ecclesiastical History*. See Hemerobaptists.

MENDAMA, in *Geography*, a town of the island of Ceylon; 18 miles N. of Candi.

MENDAVIA, a town of Spain, in Navarre; 8 miles E.S.E. of Viana.

MENDE, a town of France, and principal place of a district, in the department of the Lozére; situated on an eminence, near the Lot; before the revolution the see of a bishop; 49 miles W. of Privas. The place contains 5014, and the canton 10,610 inhabitants, on a territory of 305 kiliometres, in ten communes. N. lat. 44° 31′. E. long. 3° 34′.

MENDELI, a fortressed town of the Arabian Irak, on the frontiers of Persia; 50 miles N.E. of Bagdad. N. lat. 33° 54′. E. long. 45°.

MENDELSOHN, Moses, in *Biography*, a Jewish philosopher, and elegant writer in the last century, was born at Dessau, in Anhalt, in the year 1729. His father was a schoolmaster, and undertook the education of his son. He was brought up to business, but devoted every hour he could claim as his own to literature, in which he greatly excelled, and obtained as a scholar a distinguished reputation; but it was, unfortunately, at the expence of his health. He was also destined to a state of extreme penury: at the age of fourteen, he travelled on foot to Berlin, where he lived in indigence and obscurity, and frequently in want of the necessaries of life. At length he got employment from a rabbi as a transcriber of MSS., who, at the same time that he afforded him the means of subsistence, liberally initiated him into the mysteries of the theology, the jurisprudence, and scholastic philosophy of the Jews. The study of philosophy and general literature became from this time his favourite pursuit, but the fervours of application to learning were by degrees alleviated and animated by the consolations

tions of literary friendship. He formed a strict intimacy with Israel Moses, a Polish Jew, who, without any advantages of education, had become an able, though self-taught, mathematician and naturalist. He very readily undertook the office of instructor of Mendelsohn, in subjects of which he was before ignorant, and taught him the Elements of Euclid from his own Hebrew version. "The singular spectacle of the two youthful rabbies, circumstanced as they were, sitting in the corner of retired streets, the one with a Hebrew Euclid, instructing the other, who was hereafter to be classed among the most eminent literati of his country, may instruct the young and the indigent, that the cold touch of poverty can never palsy the sublime efforts of resolute genius." The intercourse between these young men was not of long duration, owing to the calumnies propagated against Israel Moses, which occasioned his expulsion from the communion of the orthodox; in consequence of this, he became the victim of a gloomy melancholy and despondence, which terminated in a premature death. His loss, which was a grievous affliction to Mendelsohn, was in some measure supplied by Dr. Kisch, a Jewish physician, by whose assistance he was enabled to attain a competent knowledge of the Latin language. In 1748 he became acquainted with another literary Jew, *viz.* Dr. Solomon Gumperts, by whose encouragement and assistance he attained a general knowledge of the living and modern languages, and particularly the English, by which he was enabled to read the great work of our immortal Locke in his own idiom, which he had before studied through the medium of the Latin language. About the same period he enrolled the celebrated Lessing among his friends, to whom he was likewise indebted for assistance in his literary pursuits. The scholar amply repaid the efforts of his instructor, and soon became his rival and his associate, and after his death the defender of his reputation, even at the expence of his own life: for when Lessing was charged with Atheism by M. Jacobi, a German writer, he roused all his powers in his justification, and entered so vehemently into the controversy, as to exhaust an already feeble and delicate frame: his whole nervous system became so completely deranged, that severe study, for a short time only, produced fainting fits. To avoid these, when he found them approaching, Mendelsohn would instantly abandon what he was about, and banish all thought from his mind. Being asked how he contrived to exist without thinking, and exercising the powers of reflection, he replied, "I retire to the window and count the tiles upon the roof of my neighbour's house." He died at the age of fifty-seven, highly respected and beloved by a numerous acquaintance, and by persons of very different opinions. When his remains were consigned to the grave, he received those honours from his nation which are commonly paid to their chief rabbies. As an author, the first piece was published in 1755, entitled "Jerusalem," in which he maintains that the Jews have a revealed law, but not a revealed religion, but that the religion of the Jewish nation is that of nature. His work entitled "Phœdon, a Dialogue on the Immortality of the Soul," in the manner of Plato, gained him much honour: in this he presents the reader with all the arguments of modern philosophy, stated with great force and perspicuity, and recommended by the charms of elegant writing. From the reputation which he obtained by this masterly performance, he was entitled by various periodical writers the "Jewish Socrates." It was translated into French in 1773, and into the English in 1789. Among his other works, which are all creditable to his talents, he wrote "Philosophical Pieces;" "A Commentary on Part of the Old Testament;" "Letters on the Sensation of the Beautiful." Gen. Biog.

MENDEN, in *Geography*, a town of Westphalia; 42 miles N E. of Cologne.

MENDES, or MYNDES, a town of Asiatic Turkey, in Natolia, in a bay of the Archipelago; anciently called "Myndus;" 20 miles S. of Milets. N. lat. 33° 5'. E. long. 27° 10'.

MENDES, in *Ancient Geography*, a town of Egypt, near the mouth of one of the eastern branches of the Nile, between Sebennytus to the west, and Tanés to the east. The arm of the Nile on which it was seated was denominated the *Mendesian*. This ancient city was famous for its temples, and the indecency of the worship paid there to the ram. When the sacred animal dies, the Mendesian province solemnizes his death by a general mourning. Herodotus, lib. ii. *Euterpe*.

MENDES, in *Mythology*, an Egyptian deity, who was worshipped as the emblem of the sun. The Egyptians having discovered that they owed the fertility of their country to the influence of the sun, worshipped him under the name of Mendes, which signifies "very fruitful." Accordingly they consecrated the goat to him, as the most prolific of all animals. This animal was fed in the temple of Mendes, as the living image of the God whom he represented. The Greeks gave to Mendes the name of *Pan*; which see.

MENDESCAO, in *Geography*, a town of Naples, in Calabria Citra; 3 miles W. of Cosenza.

MENDEZ, MOSES, in *Biography*, an English poet and dramatic writer, who flourished in the last century, and died about the year 1758. He was of Jewish extraction, though he had abandoned the religion of his fathers. He was author of several poems in Dodsley's Collections.

MENDHAM, in *Geography*, a township of America, in Morris county, New Jersey; six miles W. of Morristown.

MENDICANTI, the title of one of the music schools at Venice for girls, known by the name of conservatorios. The maestro di capella of the hospital de Mendicanti, in 1770, was the worthy Bertoni, by whose favour we were admitted into the interior of this admirable seminary, to an extra concert of two hours, by the best vocal and instrumental performers of this hospital: it was really curious to *see*, as well as to *hear* every part of this excellent concert, performed by females, violins, tenors, bases, harpsichord, French horns, and even double bases; and there was a prioress, a person in years, who presided: the first violin was very well played by Antonia Cubli, of Greek extraction; the harpsichord sometimes by Francesca Rossi, maestra del coro, and sometimes by others: these young persons frequently change instruments. The singing was truly excellent in different styles; and the whole was very judiciously mixed; no two airs of a sort followed each other, and there seemed to be great decorum and good discipline observed in every particular; for these admirable performers, who are of different ages, all behaved with great propriety, and seemed to be well educated. It was here that the two celebrated female performers, the Archiapate, afterwards signora Guglielmi, and signora Maddalena Lombardini, afterwards madame Sirman, who received such great and just applause in England, had their musical instructions.

MENDICANTS, BEGGARS, a term applied to several orders of religious, who live on alms and go a begging from door to door.

The religious society distinguished by this appellation surpassed all the rest in the purity of its manners, the extent of its fame, the number of its privileges, and the multitude of its members. Its order was first established in the 13th century, and the members of it, by the tenor of

their

their inſtitution, were to remain entirely deſtitute of all fixed revenues and poſſeſſions; though in proceſs of time their number became a heavy tax upon the people. Innocent III. was the firſt of the popes who perceived the neceſſity of inſtituting ſuch an order, and accordingly he gave ſuch monaſtic ſocieties, as made a profeſſion of poverty, the moſt diſtinguiſhing marks of his protection and favour. They were alſo encouraged and patronized by the ſucceeding pontiffs, when experience had demonſtrated their public and extenſive uſefulneſs. But when it became generally known, that they had ſuch a peculiar place in the eſteem and protection of the rulers of the church, their number grew to ſuch an enormous and unwieldy multitude, and ſwarmed ſo prodigiouſly in all the European provinces, that they became a burthen, not only to the people, but to the church itſelf. The great inconvenience that aroſe from the exceſſive multiplication of the Mendicant orders was remedied by Gregory X. in a general council, which he aſſembled at Lyons, in 1272. For here all the religious orders, that had ſprung up after the council held at Rome, in 1215, under the pontificate of Innocent III. were ſuppreſſed; and the extravagant multitude of Mendicants, as Gregory called them, was reduced to a ſmaller number, and confined to the four following ſocieties or denominations, *viz.* the Dominicans, the Franciſcans, the Carmelites, and the Auguſtins, or the hermits of St. Auguſtin.

As the pontiffs allowed theſe four Mendicant orders the liberty of travelling wherever they thought proper, of converſing with perſons of every rank, of inſtructing the youth and multitude wherever they went; and as theſe monks exhibited, in their outward appearance and manner of life, more ſtriking marks of gravity and holineſs than were obſervable in the other monaſtic ſocieties, they aroſe all at once to the very ſummit of fame, and were regarded with the utmoſt eſteem and veneration through all the countries of Europe. The enthuſiaſtic attachment to theſe ſanctimonious beggars went ſo far, that, as we learn from the moſt authentic records, ſeveral cities were divided, or cantoned, into four parts, with a view to theſe four orders; the firſt part being aſſigned to the Dominicans, the ſecond to the Franciſcans, the third to the Carmelites, and the fourth to the Auguſtinians. The people were unwilling to receive the ſacrament from any other hands than thoſe of the Mendicants, to whoſe churches they crowded to perform their devotions, while living, and were extremely deſirous to depoſit there alſo their remains, after death; nor did the influence and credit of the Mendicants end here; for we find in the hiſtory of this, and of the ſucceeding ages, that they were employed, not only in ſpiritual matters, but alſo in temporal and political affairs of the greateſt conſequence, in compoſing the differences of princes, concluding treaties of peace, concerting alliances, preſiding in cabinet councils, governing courts, levying taxes, and other occupations, not only remote from, but abſolutely inconſiſtent with, the monaſtic character and profeſſion. However, the power of the Dominicans and Franciſcans greatly ſurpaſſed that of the other two orders; inſomuch that theſe two orders were, before the Reformation, what the Jeſuits have been ſince that happy and glorious period, the very ſoul of the hierarchy, the engines of the ſtate, the ſecret ſprings of all the motions of the one and the other, and the authors and directors of every great and important event, both in the religious and political world. By very quick progreſſion their pride and confidence arrived at ſuch a pitch, that they had the preſumption to declare publicly, that they had a divine impulſe and commiſſion to illuſtrate and maintain the religion of Jeſus; they treated with the utmoſt inſolence and contempt all the different orders of the prieſthood; they affirmed, without a bluſh, that the true method of obtaining ſalvation was revealed to them alone; proclaimed, with oſtentation, the ſuperior efficacy and virtue of their indulgences; and vaunted, beyond meaſure, their intereſt at the court of heaven, and their familiar connections with the Supreme Being, the Virgin Mary, and the ſaints in glory. By theſe impious wiles, they ſo deluded and captivated the miſerable and blinded multitude, that they would not entruſt any other but the Mendicants with the care of their ſouls. They retained their credit and influence to ſuch a degree, towards the cloſe of the 14th century, that great numbers of both ſexes, ſome in health, others in a ſtate of infirmity, and others at the point of death, earneſtly deſired to be admitted into the Mendicant order, which they looked upon as a ſure and infallible method of rendering heaven propitious. Many made it an eſſential part of their laſt wills, that their bodies after death ſhould be wrapped in old ragged Dominican or Franciſcan habits, and interred among the Mendicants. For ſuch were the barbarous ſuperſtition and wretched ignorance of this age, that people univerſally believed, they ſhould readily obtain mercy from Chriſt, at the day of judgment, if they appeared before his tribunal aſſociated with the Mendicant friars.

About this time, however, they fell under an univerſal odium; but being reſolutely protected againſt all oppoſition, whether open or ſecret, by the popes, who regarded them as their beſt friends, and moſt effectual ſupports, they ſuffered little or nothing from the efforts of their numerous adverſaries. In the 15th century, beſides their arrogance, which was exceſſive, a quarrelſome and litigious ſpirit prevailed among them, and drew upon them juſtly the diſpleaſure and indignation of many. By affording refuge, at this time, to the Beguins in their order, they became offenſive to the biſhops, and were hereby involved in difficulties and perplexities of various kinds. They loſt their credit in the 16th century by their ruſtic impudence, their ridiculous ſuperſtitions, their ignorance, cruelty, and brutiſh manners. They diſcovered the moſt barbarous averſion to the arts and ſciences, and expreſſed a like abhorrence of certain eminent and learned men, who endeavoured to open the paths of ſcience to the purſuits of the ſtudious youth, recommended the culture of the mind, and attacked the barbariſm of the age in their writings and diſcourſe. Their general character, together with other circumſtances, concurred to render a reformation deſirable, and to accompliſh this happy event. Moſheim's Eccl. Hiſt. vol. iii. paſſim.

Among the number of Mendicants are alſo ranked the Capuchins, Recollects, Minims, and others, who are branches or derivations from the former.

MENDING, in *Agriculture*, a term uſed to ſignify the improving of land by means of manure.

MENDIP Hills, in *Geography*, a range of hills, in the county of Somerſet, near the city of Wells; celebrated for mines of lead and coals.

MENDLING, a town of Auſtria, on a river of the ſame name, which runs into the Salza, near Keifling, in Stiria; the town is 15 miles diſtant S.S.E. from Bavarian Waidhoven.

MENDOCINO, Cape, a cape of North America, on the coaſt of New Albion; off the cape lie ſome rocky iſlets and ſunken rocks, about a league from the ſhore. This cape is rendered remarkable by being the higheſt on the ſea-ſhore of this part of New Albion. The mountains behind it are elevated and break into ſeparate hills, riſing abruptly

abruptly and divided by many deep chasms. On both the hills and chasms are some few dwarf trees. The general surface exhibits vegetables of a dull green colour, interspersed with perpendicular strata of red earth or clay. N. lat. 40° 19'. E. long. 135° 53'.

MENDOLCIA, a town of Naples, in Calabria Citra; three miles W. of Bova.

MENDON, a post-town of America, in Worcester county, Massachusetts; 37 miles S.W. of Boston. The township, called "Quanshipauga" by the Indians, was incorporated in 1667, and contains two congregational parishes, a society of Friends, and 1628 inhabitants. On the S. it is bounded by the state of Rhode island; and it is watered by the Charles and Mills rivers, and other streams, which turn several mills.

MENDOW, a town of Hindoostan, in Guzerat; 33 miles E. of Amedabad.

MENDOZA, Don Inigo Lopez de, Senor de Hita y Buytrago, first marques de Santillana, and Conde del Real de Manzanares, in *Biography*, was born in August 1398; he married in 1418 Dona Catalina de Figueroa, and died in 1458. During the reign of Juan II. his courage was conspicuous, and his prudence still more so, as he aggrandized himself without injuring his reputation. He is mentioned not only as a contributor to the literature of his own country, but as an early patron of it. His works are as follow: 1. Maxims of morality in verse, written by desire of Juan II. for the instruction of his son Henrique. This book has passed through ten editions at least, and is still reckoned one of the rarest in that language. 2. Proverbs which old women repeat by the fire-side: this is supposed to be the oldest collection of proverbs in any modern language. 3. A letter addressed to D. Pedro, son of the Infante D. Pedro of Portugal. This letter, which the marques sent with a collection of his own poems, is regarded as one of the most valuable documents for the literary history of Spain, as containing an account of all the Spanish poets, whose works the writer had either seen or heard of. Besides these, many of the marques' poems are in the "Cancionero General," and others in MSS.: among them is a poem upon the "Creation," consisting of 333 stanzas, in the same metre as the "Trezientas" of Mena, which see. He first introduced the sonnet into Spanish poetry.

Mendoza, D. Diego Hurtado de, son of Lopez de Mendoza, first marques de Mondejar, was born at Granada about 1503, and there, during his childhood, he acquired a practical knowledge of Arabic, which he continued to cultivate through life. He studied the Greek language very successfully at Salamanca, and was a soldier in the Italian wars. While engaged in the military service, he spent every winter, while the troops were inactive and in quarters, at Rome, or Padua, or some other Italian university, where he could enjoy and profit by the society of learned men. He was employed as ambassador by Charles V. in the most important transaction of his whole reign, at the council of Trent, at Venice, and at the papal court. At Venice he exerted himself to recover Greek MSS. He obtained many of the writings of St. Basil the Great, and of Gregory Nazianzen, the works of Cyril of Alexandria, and the more valuable remains of Archimedes, of Hero and of Appian: all these, with copies also of cardinal Besarion's and of other collections, he left to the Escurial library. Don Diego was superseded at Rome in 1551 to satisfy the papal court. He continued some years one of Philip's counsellors, but was at length banished from his court. He retired to Granada, and there upon the spot composed his history of the war against the Moriscoes: here he amused himself with literature during the remainder of his life. In 1574 he obtained leave to return to Madrid, and died in a few days after his arrival. None of his works were published during his lifetime. In 1610 a volume of his poems was collected by J. D. Hidalgo, the king's chaplain, who suppressed the comic and satiric pieces, which were numerous. His history of the Moriscoes was published the same year by Luis Tribaldos; part of the third book having been lost, was supplied by the count de Portalegre, D. Joam de Silva. It has been reprinted several times, and is reckoned the very best specimen of historical composition in the Spanish language. The story of Lazarillo de Tormes, which has been translated into almost every European tongue, is attributed to this author as a youthful work, written at Salamanca. Others impute it to Juan de Ortega. Gen. Biog.

Mendoza, Peter Gonzalez de, a Spanish cardinal, and archbishop of Toledo, was born in 1428. He acquired his high preferments in the church by his talents as a statesman. Pope Sixtus IV. made him cardinal. He died in 1495: as a literary man he is said to have translated the Iliad and Æneid, also Sallust, into the Spanish. Another person of the same name, an Augustine friar, was sent by the king of Spain as ambassador to the emperor of China in 1584. After obtaining several instances of preferment, he was appointed, in 1608, bishop of Popayan in the West Indies. He is known as an author by a history of China, written in the Spanish language. Moreri.

Mendoza, in *Geography*, a jurisdiction of Chili, in South America, subject to the vice-royalty of Buenos Ayres. It has a town of the same name, which lies on the E. side of the Cordilleras, about 50 leagues from Santiago. It is situated on a plain, adorned with gardens, and supplied with water by means of canals. The town contains about 100 families, half Spaniards and half Indians, together with a college founded by the Jesuits, a parochial church, and three convents. This jurisdiction comprehends also the towns of St. Juan de la Frontera, on the E. of the Cordilleras, and about 30 leagues N. of Mendoza, and St. Louis de Loyola, about 50 miles E. of Mendoza; the latter is small, but has a parish church, a Dominican convent, and a college founded by the Jesuits. S. lat. 33° 25'. W. long. 69° 47'.

Mendoza, a river which rises in the Cordilleras of the Andes; over which is a natural bridge of rocks, from the vaults of which hang icicles, formed of the water as it drops from the rocks. The bridge is broad enough to admit of three or four carts abreast. Near it is another bridge, called the bridge of the Incas, betwixt two rocks, and elevated a great height from the river.

MENDRA, a small island in the Indian sea, near the coast of Africa. S. lat. 2° 15'.

MENDRAH, a town of Fezzan, in a district or province of the same name, nearly S. from Mourzouk, and distant from it about 60 miles. Although much of the land is a continued level of hard and barren soil, the quantity of "Troua," a species of fossil alkali that floats on the surface, or settles on the banks of its numerous smoaking lakes, has given it a higher importance than that of the most fertile districts. Of this valuable produce, great quantities are annually brought by the merchants of Fezzan to Tripoli, from whence it is shipped for Turkey and Tunis, and the dominions of the emperor of Morocco. The people of the latter employ it as an ingredient in the dye of the leather, for which they are famous, and in that of the woollen caps that are worn by the Arabs and the Moors as the basis

of

of their turbans. Proceedings of the African Association, &c. 1790.

MENDRISIO, or MENDRIS, a small well-built market-town of Italy, in the department of the Verbano, late the capital of a small bailiwick of the same name, lying between the lakes of Como and Lugano, which is extremely fertile, and contains 19 parishes, and about 16,000 inhabitants. The town is about 26 miles N.N.W. of Milan, and 7 miles from Como. N. lat. 45° 45′. E. long. 9° 0′.

MENDURAGU, a town of Russia, in the government of Viburg, on the borders of Finland; 48 miles W.N.W. of Velmanstrand.

MENEDEMUS, in *Biography*, a Greek philosopher, who flourished towards the close of the fourth century before Christ, was a native of Eretria, in the island of Eubœa. He was of the ELIAC *School* (which see), which he afterwards transferred to his native city, and gave it the name of *Eretrian*. Menedemus, though nobly descended, was obliged, through poverty, to submit to a mechanical employment, either as tent-maker or mason. He formed an early intimacy with Asclepiades, who was a fellow-labourer with him in his humble occupation. Having minds more adapted to study than manual labour, they resolved to devote themselves to the pursuit of philosophy. For this purpose, they left their native country, and went to Athens, where Plato presided in the academy. (See ASCLEPIADES.) In his own school at Eretria he neglected those forms which were commonly observed in places of this kind, and allowed his hearers and disciples to attend him in whatever posture they pleased, standing, walking, or sitting. At first Menedemus was received by the Eretrians with great contempt; and, on account of the vehemence with which he disputed, obtained the appellations of "Cur" and "Madman." But he afterwards rose into high esteem, and was entrusted with a public office, to which was annexed an annual stipend of 200 talents. He discharged the trust with fidelity and reputation, but accepted only of a fourth part of the salary attached to the appointment. He was sent upon several embassies to Ptolemy, Lysander, and Demetrius, and rendered his countrymen essential services, by obtaining a diminution of their tribute, and rescuing them from other burdens. Antigonus entertained a personal respect for him, and professed himself one of his disciples. His intimacy with this prince created a suspicion among his countrymen, that he had a secret intention to betray their city into his hands. To save himself he fled to Antigonus, and soon after died, in the eighty-fourth year of his age. It is thought he precipitated his end by abstaining from food for several days, being oppressed with grief, as well on account of the ingratitude of his countrymen, as on his disappointment in not being able to prevail on Antigonus to restore the lost liberties of his country. Menedemus possessed great talents as a philosopher and disputant. He declared his opinions with freedom, inveighed with severity against the vices of others, and, by the purity of his own manners, commanded universal respect. He observed the strictest moderation in the manner of his living. His entertainments, which were frequented by many philosophers and men of distinction, were simple and frugal, consisting chiefly of vegetables. Enfield's Hist. vol. i.

MENEDEMUS, a Cynic philosopher, was a native of Lampsacus, who lived during the reign of Antigonus, king of Macedon. At this period, the peculiarities of the Cynic sect had been carried to an absurd and ridiculous extreme. In Menedemus, the spirit of the sect was degenerated to downright madness: at first, its members being no more than severe public monitors, commanded attention and respect, but their freedom in censuring had degenerated into scurrility, and the conduct of Menedemus surpassed, in folly and extravagance, every thing that had gone before him. He appeared in public dressed in a black cloak, with an Arcadian cap upon his head, on which were drawn the figures of the twelve signs of the zodiac, with tragic buskins on his legs, with a long beard, and with an ashen staff in his hand, exclaiming, that he was a spirit returned from the infernal regions to admonish and reform the world. Enfield's Hist. Phil.

MENEHOULD, ST., in *Geography*, a town of France, and principal place of a district, in the department of the Marne. The place contains 3394, and the canton 12,820 inhabitants, on a territory of 437½ kiliometres, in 30 communes. The town is situated in a morass between two rocks, on the highest of which is a castle; 22 miles E.N.E. of Chalons. N. lat. 49° 5′. E. long. 4° 55′.

MENEJRE, a town of Arabia, in Yemen; 34 miles S.E. of Loheia.

MENELAUS, in *Biography*, king of Sparta, famous in ancient history for the share which he took in the Trojan war, was son of Atreus, king of Argos, and brother of Agamemnon. He married Helen, the daughter of Tyndarus, king of Sparta, and in her right succeeded to the crown of that country. According to the best account of the origin of the Trojan war, Paris, son of Priam, induced by the fame of Helen's beauty, paid a visit to the court of Menelaus, where he was most hospitably received. During his stay, Menelaus was obliged to take a voyage to Crete, and Paris made use of this opportunity to carry off Helen, together with all the treasure and rich moveables he could lay his hands upon. This injury was made a common cause by the petty kings of Greece, who, with a powerful army under the command of Agamemnon, laid siege to Troy. Menelaus was present as a leader of the confederates. In the tenth year of the Trojan war, Helen obtained the forgiveness and favour of Menelaus, by introducing him with Ulysses, the night that the city was reduced to ashes, into the chamber of Deiphobus, whom she had married after the death of Paris. This perfidious conduct totally reconciled her to her first husband, and she returned with him to Sparta, where Telemachus is represented in the Odyssey as finding them living in peace and prosperity. Menelaus is said to have been succeeded in this kingdom by two illegitimate sons, who were expelled by Orestes, son of Agamemnon. The palace which Menelaus once inhabited was entire in the days of Pausanias, as well as the temple which had been raised to his memory by the people of Sparta. Homer. Univer. Hist.

MENELAUS, a celebrated mathematician, who flourished under the reign of the emperor Trajan, was of Grecian extraction, but a native of Alexandria. He is called by Ptolemy a geometrician, as having made astronomical observations at Rome in the year 98 of the Christian era. He is supposed to have been the Menelaus referred to by Plutarch in his dialogue "De Facie quæ in orbe Lunæ apparet." He was author of three books "On Spherics," which have come down to the present times through the medium of the Arabic language. A Latin version of this work was published at Paris by father Mersenne, in 1664, with corrections, restorations, and additional illustrative propositions. Gen. Biog.

MENELAUS, called also *Menelaites*, in *Ancient Geography*, a town of Egypt, and capital of a nome called *Menlaites* by Pliny. According to Strabo, Menelaus is not far from the nome of Nitria.—Also, a town of Africa, in Marmarica,

rica, placed by Ptolemy in the interior of the country between Leucæ and Gaphara.

Menelaus, in *Geography*, a town of Africa, in Barca; 105 miles E.S.E. of Cureu. N. lat. 32° 10′. E. long. 23° 10′.

MENENIUS, in *Biography*. See Agrippa.

MENERANDRE, in *Geography*, a river on the S. coast of Madagascar, which runs into the sea, S. lat. 25° 5′. E. long. 42° 24′.

MENERBES, a town of France, in the department of the Mouths of the Rhone; 9 miles S.W. of Apt.

MENEROLA, a town of Genoa; 5 miles S.W. of Spezza.

MENES, in *Biography*, the founder of the Egyptian empire, was born at This, a town of Thebais, in Upper Egypt. He is supposed to have reigned 117 years after the birth of Phaleg, son of Heber, which was the year of the dispersion of the people throughout the earth. He built the town of Memphis, and in the prosecution of his work stopped the course of the Nile near it, by constructing a causeway several miles broad, and caused it to run through the mountains. By his ability and popularity he was deified after his death. He had three sons, who ruled after him, *viz*. Athotis, who ruled at This and Thebes; Curudes, who founded the kingdom of Heliopolis, afterwards the kingdom of Diospoli; and Necherophes, who reigned at Memphis.

MENESTREL, a musician, whose name and employment have been recorded by Pithou in his "History of the second Race of Kings of France," who tells us, that it was during the reign of Pepin that the chapel royal was established at Paris, under a music-master named Menestrel; which, perhaps, may have been the origin of the name of Menestrel, or Minstrel, being given, in after times, to musicians in general. Pepin died in 768.

Menestrels were the singers, and *Menetriers* the instrumental performers in France, who, in the time of king Robert, formed themselves into a society of musicians, in imitation of the ancient bards; they composed and executed the music to the poetry of the *trouvers*, *troubadours*, or *romancers*, who composed poems in rhyme. Others were called *jongleurs*, and *chantores* or *menestrels*.

In a tarif of St. Louis to regulate the toll at the entrance into Paris, it is said that the jongleurs should be excused paying the toll, upon condition that they sung a song, (hence, perhaps, the proverb of paying for any thing with a *song*), or made their monkies dance, (whence, probably, the French have derived another proverb, "payer en monnoie de singe.")

MENESTRIER, John Baptist le, in *Biography*, an able antiquary, was born at Dijon in 1564. He obtained some considerable offices at court, but is particularly known by a work entitled "Medailles, Monnoies, et Monumens antiques d'Imperatrices Romaines." This was published in 1625: the author died in 1634, and in 1642 a posthumous work was given to the world by his friends, under the title of "Medailles illustres des anciens Empereurs et Imperatrices de Rome." Neither of these works is in much esteem by modern medallists.

Among the curious works of this ingenious Jesuit, his treatises on representations in music, and on ballets, or stage-dances, ancient and modern, should be consulted by those who read, as well as those who write histories of music and dancing: as the information they contain is original, and such as no other books can supply.

John Baptist le Menestrier, the learned antiquary of Dijon, who died in 1634, was an ancestor of the ecclesiastic, and had the same singular passion for science and curious inquiries. He wrote on medals, coins, ancient monuments, on the Roman empresses, &c. Being buried in the church of St. Medard, in Dijon, the following extraordinary epitaph was formerly legible on his tomb-stone:

"Cy git Jean le Menestrier,
L'an de sa vie soisante-dix
Il mit le pied dans l'estrier,
Pour s'en aller en Paradis."

"Here John le Menestrier was put,
At threescore years and ten, precise;
Who then in stirrup placed his foot,
To go full speed to Paradise."

Menestrier, Claude le, also of Dijon, and a contemporary of the preceding, was likewise attached to the study of antiquity, and became keeper of the Barberini Museum. He is author of "Symbolica Dianæ Ephesiæ Statua explicata," 4to. published in 1657. Moreri.

Menestrier, Claude Francis, a Jesuit known by his works on heraldry, &c. was born at Lyons in 1631. He entered, at an early age, into the society of the Jesuits, where he acquired a great knowledge of the ancient languages, and of literature in general. As he advanced in life, he devoted himself chiefly to the study of history, with all that relates to family distinctions, and the monuments of antiquity. He travelled into most of the countries of Europe, and by the knowledge which he acquired, he was enabled to make a figure in theological disputations, and in pulpit oratory. He was, however, particularly famous for his talents in planning and arranging all kinds of festive exhibitions, sacred and profane, from the entry of a prince to the canonisation of a saint. In his designs, devices, and inscriptions, his invention was inexhaustible. He had a great acuteness in decyphering old and mutilated inscriptions, blazoning coats-of-arms, explaining paintings and sculptures, and in all operations of antiquarian science. He died in 1705, at the age of seventy-four. The principal works of this author were, 1. "Histoire Civile ou Consulaire de la Ville de Lyon;" "Eloge Historique de la même Ville;" "L'Histoire du Regne de Louis le Grand par les Medailles, Emblemes, Devises, &c.;" "Methode du Blason;" "La Philosophie des Images:" besides these, however, he wrote a number of smaller pieces on similar topics. Moreri.

MENETOU-Salon, in *Geography*, a town of France, in the department of the Cher, and chief place of a canton, in the district of Bourges; 9 miles N. of Bourges. The place contains 3277, and the canton 10,873 inhabitants, on a territory of 367½ kiliometres, in 11 communes.

MENETOUS, a town of France, in the department of the Loir and Cher, and chief place of a canton, in the district of Romorantin; 8 miles S.E. of Romorantin. The place contains 824, and the canton 4794 inhabitants, on a territory of 240 kiliometres, in 10 communes.

MENEZES, in *Biography*. This is the name of the Condes de la Ericeira, a noble house in Portugal, in which the love of literature, united with considerable talents, continued to be hereditary for many generations. In the General Biography, the most celebrated persons are mentioned, with their principal works, in one article. To this we shall be indebted for the following account. The first of the family distinguished for literary talents was Don Diego, who, in 1628, published "Vida de D. Henriquede Menezes Governandor de la India," 4to. Madrid. The second distinguished person was Don Fernando, whose chief publications were,

were, 1. "Historiarum Lusitanarum libri decem ab anno 1640, usque ad annum 1656." 2. "Historia de Tangere," folio, Lisboa, 1732. 3. "Vida de el Rey D. Joam I." His brother, son-in-law, and heir, Don Luiz, published a still more valuable work than any of the foregoing, under the title of "Historia de Portugal Restaurado." The wife of Don Luiz kept up the credit and fame of the family as an author, and it has been said of her, that "she wrote not with the quill of an eagle, for of such there are many;—but with the quill of a Phœnix, of which there is but one." This lady, as we have hinted, belonged to the family by blood, as well as marriage, having married her father's brother. Don Francisco Xavier, the son of this marriage, left behind him forty-four works, of which the most known and celebrated is the "Henriqueida, Poema Heroico, em doze Cantos," 1741. The Conde, Don Henrique, founder of the royal house of Portugal, is the hero of the piece. It appears that the author of this work, at the age of eight, was member of one academy, which seems by its title to have been designed for extemporary speaking; and, when a little older, was admitted into another, of which, at twenty, he was president. This, says his biographer, was the age of academies in Portugal: he was secretary and protector of the Portuguese, and censor and director of the royal one; a member of the Arcadians of Rome, and of our own Royal Society. He had as correspondents the most learned men in the different nations of Europe. He says in his preface, that the knowledge which he has of Greek is not sufficient for him to understand Homer well, a proof how little that language was cultivated in his country, when the most learned man in it would make such a declaration: in other respects, this preface discovers a range of poetical reading which few have equalled, and none, perhaps, exceeded. The poem itself is not worse than its French name-sake, though its faults are of a different character. He was blind when he wrote it, and died before it was published. This truly estimable man was the munificent patron of letters. He increased the family library with 600 MSS., and 20,000 volumes.

"This vein was not yet exhausted; Don Luiz, the fifth Conde, wrote commentaries of his own administration in India, corrections, and a supplement to Bluteau's Portuguese dictionary, and also to Moreri. He completed the catalogue of the library which his predecessor had begun: it was one of the noblest which any private family ever collected together, but it has been dispersed, and I (Mr. Southey), who write, have purchased some volumes from its wreck at the stalls in London. Portuguese literature is deeply indebted to this noble house. Individuals have succeeded better, but no family has ever done so much." Gen. Biog.

MENF, in *Geography*. See MEMPHIS.

MENFRICI, a town of Sicily, in the valley of Mazara, containing about 2700 inhabitants; 9 miles N.W. of Sacca.

MENFUS KEDDUS, a town of Abyssinia; 60 miles S.S.E. of Siré.

MENGEN, a town of Wurtemberg, insulated in the county of Scheer; 33 miles S.W. of Ulm. N. lat. 48° 3′. E. long. 9° 23′.

MENGENGUT, a town of Prussia, in the province of Oberland; 12 miles E. of Osterrod.

MENGERINGHAUSEN, a town of Germany, in the county of Waldeck; 24 miles W.N.W. of Cassel.

MENGERSDORF, a town of Germany, in the principality of Culmbach; 13 miles S. of Culmbach.

MENGERS-KIRCHEN, a town of Germany, in the county of Nassau-Dillenburg; 7 miles S.W. of Dillenburg.

MENGESTA SEMAIAT, a town of Abyssinia; 165 miles S. of Gondar.

MENGOLI, PETER, in *Biography*, was an able Italian mathematican in the 17th century, concerning the place and time of whose birth there is no trace. He studied mathematics under Cavalieri, to whom the Italians ascribe the invention of the first principles of the infinitesimal calculus. Mengoli was appointed professor of "Mechanics," in the college of nobles at Bologna, and acquired high reputation by the success with which he filled that post. His principal works are, "Geometriæ Speciosæ Elementa;" "Novæ Quadraturæ Arithmeticæ, seu de additione Fractionum;" "Via regia ad Mathematicas ornata;" "Refrazzione e paralasse Solare;" "Speculationi de Musica;" "Arithmeticæ rationalis Elementa;" "Arithmetica realis." Moreri.

His "Speculationi di Musica," a desultory and fanciful work, was published at Bologna, 1670. An account of this treatise was given in the Phil. Tranf. vol. viii. N° c. p. 6194. seemingly by Birchensha, who, at the close of the article, has not forgotten himself, or his own interest. The speculations contained in Mengoli's work are some of them specious and ingenious; but the philosophy of sound has been so much more scientifically and clearly treated since its publication, that the difficulty of finding the book is no great impediment to the advancement of music. He was still living in 1678.

MENGRAVILLA, in *Geography*, a town of Spain, in Old Castile, famous for its mines of salt: near Avila.

MENGS, ANTHONY RAPHAEL, in *Biography*, was born on the 12th of March, 1728, at Aussig, in Bohemia. His father, whose name was Ismael, was a miniature and enamel painter, and dedicated his son to the art from his birth: hence he had him christened after the names of *Anthony Allegri da Correggio*, and *Raphael d'Urbino*. His first studies were of course under the eye of his father, who from his earliest childhood obliged him to labour with his pencil; and as soon as possible gave him information of geometry and chemistry, in which sciences he became the most intelligent artist in Europe. Seeing that his son pursued his studies with a reflective mind, Ismael justly concluded, that it would be right at once to introduce him to the fountain head of the art, and lay before him the purest models for his study; and, therefore, at the early age of 12, he took him to Rome, and there introduced him to the works of M. Angelo, Raphael, &c. &c. Young Mengs was so far advanced in the art as to be capable of relishing the superior productions now laid open before him; prints and drawings from which he had long been accustomed to copy: and was eagerly desirous of persevering in the laudable desire of imitating them. At first, his father confined him to drawing in crayons from the Laocoon, the Torso, and the works of M. Angelo; and afterwards from those of Raphael. This most excellent system of education he himself thwarted, by enacting too much and too minute an imitation, and too long confinement to that alone; at a time when, if the vivid fancy of youth had been permitted to indulge itself, Mengs might have imbibed the spirit which animates, which governs the compositions of those great labours which were before him, instead of dwelling on the surface, and forgetting the object of the whole; which is, or should always be, the prime end in view in all studies made upon the works of others. That he was capable of all this fully appears by what he did, particularly by his future reasonings (which are published) upon the works of the principal painters; and that he did not do it effectually, equally appears by his paintings; which possess more of the character of the lines and composition observable in the works of Raphael, who was his favourite, than his just perception of of point and interest in a story, and the true pathos with which he selected incidents, and gave expression and grace to his figures.

It was only for three years that his father, who was extremely tyrannical and arbitrary, allowed him to stay at Rome, at the end of which time, probably being anxious to turn his son's talents to account, he obliged him to return with him to Dresden, where all this excellent preparation was debased, by our artist being employed to paint portraits in crayons; by which, however, he became known to, and employed by, the king of Poland, who made him his cabinet painter, gave him a house and a pension, without any other obligation, than to give him the preference of those works he might perform, and for which he would pay the full price.

With this good fortune he returned to Rome to prosecute his studies; at first copying, but at length beginning to compose his own pictures. About this time he married a young lady of a respectable family, Margarita Guazzi, and was in hopes of being permitted finally and fully to establish himself in Rome; but his father, at the end of four years, again, in 1749, forced him to return to Dresden, and in pursuance of his arbitrary feeling quarrelled with him, seized his whole property, and turned him out of doors.

His talents were now his only safeguard and support, and, to the honour of the king, proved truly so. His majesty patronized him, gave him a house and a carriage, appointed him his first painter, and doubled his pension, without any obligation, and permitted him again to visit Rome.

His first work there was a copy of the school of Athens by Raphael, for the earl of Northumberland, which is now at Northumberland House. The failure of affairs at the court of Saxony and Poland, which happened soon after, caused a stoppage of his pension, threw Mengs upon the world, and induced him to accept many commissions for pictures; the principal one of which, a fresco ceiling in the church of the Augustines, dedicated to St. Eusebius, acquired him great reputation, and some employment of the like nature in the villa Albani; where he painted in fresco Apollo, and the Muses on Parnassus.

Some pictures which Mengs had executed acquired him the favourable regard of the king of Naples, who, upon becoming king of Spain under the title of Charles III., sent for him to Madrid, offering him a ship of war to convey him, a salary of 2000 doubloons, a house, a carriage, and to defray all the expences attending his professional labours. This munificent offer was readily accepted, and Mengs arrived in Spain in October 1761. The king received him with great kindness, and continued the same attention to him all the while he remained in that country, which was several years. He executed a great number of pictures both in fresco and in oil, which were highly admired and applauded by the court, but were criticised by some, as being too cold aud phlegmatic in their style and expression.

Excess of study, and disgust at the harsh conduct of some of his contemporaries, affected his health; and being deprived of the benefit of domestic enjoyment, having sent his family to Rome, he fell into despondency, and a decline approaching, his life was despaired of, when he obtained permission to return to Rome, still enjoying his pension as first painter to the king.

His health and spirits were soon re-established in his favourite residence, and he was employed by Clement XIV. to paint in the Vatican; particularly in the cabinet where the ancient papirii were preserved. He prolonged his stay in Italy as long as he could, though advised by his friend the chevalier d'Azara, the Spanish minister at Rome, that his return to Spain was looked for by the king, by whose command he was at last obliged to go there again. He took part of his family with him, and remained there two years and a little more, painting many things; and again becoming exhausted and ill, too ill to prosecute his labours, his majesty left him at full liberty to return, with his pension of 3000 scudi, and 1000 more to divide in dowers among his daughters.

He had not been long in Rome when he lost his wife, which severe affliction entirely changed his mind and manners, and rendered him morose and unhappy, a scourge to himself and those around him. His old disease returned upon him, and in a short time afterwards he paid the debt of nature, having only attained the age of 51.

If the fame and qualifications of Mengs had not been so extravagantly exalted by his friend and commentator Azara, and by Winkelmann, it is most likely his memory would have been in more esteem with the world than it now is. But when they resorted, in speaking of his talents, to such a degree of absurdity, as to place him above all competitors, either ancient or modern; to speak of him as the man for whom it was reserved to unite all the excellencies of art, criticism is excited, and a more scrupulous and less prejudiced examination induced, which bestows upon our artist a far less exalted rank among those great men with whom he has been compared, and even to whom he has been preferred, than his partial and prejudiced friends allotted to him. He certainly was the most ingenious professor they were acquainted with. His long and laborious researches into the more obscure matters relating to art, and his careful and even enthusiastic examination of the works of the ancients, and consequent knowledge of them, rendered him in their eyes, who do not appear to have had so much taste as enthusiasm, a kind of demi-god. But it is not researches and knowledge of this nature which make the artist; they will indeed assist him with principles and materials, they will present compositions, and fill vacant spaces upon a canvas, or on a wall, with something agreeable to, or imposing upon, the eye; but if the soul be wanting, if the true perception of that which alone stimulates the feeling heart and understanding mind, impress not its energy upon the observer, the artist is but a mechanic, whose studies happen to have fallen into a more side-long track than those of the generality; or at most he may be saluted with the title of the man of science, never in comparison with the truly great artists will he merit their distinguishing appellation.

These remarks are justly applicable to Mengs, who, though a very ingenious and extraordinary man, is but a tame and rather uninteresting artist. Mr. Cumberland, in his memoirs of painters in Spain, has given a very excellent and just critique upon his merits, which we will here transcribe. He was excited to it by a remark of Mengs upon the discourses of sir J. Reynolds, in which that artist observes, that "those discourses would lead youth into error, because they abandon them to superficial principles, the only ones known to the author." After some little petulancy exhibited in the former part of his answer to this remark, Mr. Cumberland says, "that Mengs was an artist that had seen much and invented little; that he dispenses neither life nor death to his figures, excites no terror, rouses no passions, and risks no flights; that, by studying to avoid particular defects, he incurs general ones, and paints with tameness and servility; that the contracted scale and idea of miniature painting to which he was brought up, is to be traced in all or most of his compositions, in which a finished delicacy of pencil exhibits

hibits the hand of the artist, but gives no emanation of the soul of a master; if it is beauty, it does not warm; if it is sorrow, it excites no pity." The picture of our Saviour's appearing to Mary Magdalen in the garden, known by the name of *The Noli me tangere*, which is in the chapel of All Souls' college, Oxford, will enable our readers to judge how far these remarks are founded in truth.

As a critic, Mengs has a more fair claim to attention. He certainly entertained sublime ideas of the capabilities of art, and therefore inspires them in the minds of his readers. There is, however, too great a mixture of metaphysics and subtle disquisition in his writings, to be generally useful. His explanations of beauty and taste are extremely vague. The former is built entirely upon the Platonic system of the beauty of goodness. On this, however, he proposes material selection from various objects of the same kind, to produce the beautiful of each species, and this choice he completely confounds with taste. Notwithstanding these defects, his writings convey much useful matter, and present many important points, for the consideration of an artist; as they embrace all the essential principles of the art of painting. They were published after the death of Mengs, by his friend the chevalier d'Azara; who also mentions that all the technical parts of Winkelmann's history of the arts are written by Mengs.

MENHAIA, in *Geography*, a town of Fez, in the province of Chaus, inhabited by Arabs.

MENHUSS, a town of Africa, in the country of Barca; 160 miles S.W. of Tolomata.

MENIAL SERVANTS. See SERVANTS.

MENIAN COLUMN. See COLUMN.

MENIE', in *Geography*. See MINIET.

MENIF, or MENUF, a town of Egypt, and chief place of a district; 28 miles N. of Cairo.

MENIGOUTTE, a town of France, in the department of the Two Sevres, and chief place of a canton, in the district of Parthenay; 11 miles S.S.E. of Parthenay. The place contains 880, and the canton 7101 inhabitants, on a territory of 240 kiliometres, in 10 communes.

MENIL, a town of the Arabian Irak, on the Tigris; 110 miles S.E. of Bagdad.

MENILITE; *Menilit*, Wern.; *Leber-Opal*, Karst.; *Quarz-résinite menilite*, Haüy.

The colour of this fossil, on the planes of fracture, is between chesnut and liver-brown, passing into hair-brown, and into greyish-yellow; externally the brown variety possesses a blueish tarnish, owing to closely adhering particles of the matrix in which it is found.

It occurs in knob-shaped or tuberose imbedded masses, and in amorphous tuberculated pieces, with rough dull surface.

Internally it is glistening, passing into shining; lustre sometimes resinous.

Longitudinal fracture coarse splintery, passing into flat conchoidal; transversal fracture flat conchoidal, more or less in a parallel direction; fragments indeterminately angular and sharp-edged, translucent on the edges. It yields a greyish-white streak.

Not very hard; hardness that of the semiopal; brittle, easily frangible. Spec. grav. 2.185, Klapr.; 2.162, Jordan.

It is infusible before the blowpipe, but becomes of a lighter colour, opaque, and flawed. With borax it fuses slowly, and with some ebullition. According to Klaproth's analysis of the menilite, a hundred parts are composed of

Silica - - -	85.50
Argil - - -	1.00
Lime - - -	0.50
Oxyd of iron - -	0.50
Water and carbonaceous matter	11.00
	98.50

It is found near Paris, the darker variety at Menil-Montant, the lighter or greyish at Argenteuil; at both places under a thick bed of clay, in a particular kind of slate, called *Klebschiefer* by Werner, or *adhesive slate*. According to Haüy it also occurs on the banks of the Maas. A blackish-green fossil, agreeing in most of its characters with menilite, and likewise in being found imbedded in adhesive slate, is met with at Zamuto, in the district of Semplin, in Hungary.

This fossil was first referred by Werner to the semiopal; and Karsten still enumerates it as a particular subspecies of opal, under the name of liver-opal, derived from its colour.

MENIMAN, in *Geography*, a town of Asiatic Turkey, in Natolia, from which Smyrna draws its chief supply of fruits and provisions.

MENIN, a town of France, in the department of the Lys, and chief place of a canton, in the district of Courtray. This town consists of little more than one street, with one parish church, situated on the Lys; and yet it has been the subject of many contests and vicissitudes during various wars. The place contains 4911, and the canton 17,769 inhabitants, on a territory of 100 kiliometres, in seven communes. N. lat. 50° 48'. E. long. 3° 5'.

MENING, in *Botany*, a name given by the people of Guinea to a plant of the *resinous* or *palma Christi* kind, which they use in medicine: they dry and powder the leaves, and then give them to be snuffed up the nostrils, to cure all sorts of stuffings or stoppages in the head. Its leaves resemble those of the finch and ivy, and are hairy; whence Petiver has named it *ricinus Guineensis hæderæ quinquefolia Virginianæ facie foliis hirsutis*. It is not known to grow any where in America. Philos. Trans. N° 232.

MENINGE, in *Ancient Geography*, an island of Africa. Plutarch, in Mario, says that Marius landed on the island of Meninge, and that from thence he passed to Carthage. This island is called by Ptolemy Lothophagites, in which were two towns, *viz*. Gerrapolis and Meninge.

MENINGEA ARTERIA, in *Anatomy*, a branch of the internal maxillary artery distributed upon the dura mater. See ARTERY.

MENINGES, from μηνιγξ, *a membrane*; a term sometimes employed in speaking of the membranes of the brain.

MENINGOPHYLAX, from μηνιγξ, *a membrane*, and φυλασσω, *to guard*, an instrument in use amongst the ancient surgeons for protecting the dura mater and brain from injury, in their mode of trepanning. It was somewhat like the lenticular, only its blade was completely round, without any edge, and it ended, like this other instrument, in a lentiform cup.

MENINSKI, or MENIN, FRANCIS, in *Biography*, a considerable oriental scholar, was born at Lorraine in 1623. Of the early part of his life we have no account, but he studied at Rome, and being particularly attached to the acquisition of the Eastern languages, when about the age of thirty he accompanied the Polish ambassador to Constantinople, and there applied so assiduously to the study of the Turkish tongue, that in a very short time he was made first interpreter to the Polish embassy at the Porte; and afterwards

was

was raifed to the office of ambaffador plenipotentiary to that court. Hence he was naturalized in Poland, and added the termination *ſki* to the family name of *Menin*. In 1661 he accepted the poft of interpreter of the Oriental languages at the court of Vienna, and accompanied the imperial ambaffador to the Porte. In 1669 he vifited the holy fepulchre at Jerufalem, and was created a knight of that order. His fervices were fo much approved, that on his return to Vienna he was appointed one of the emperor's council of war, as well as firft interpreter. He died in 1698. As an author, the great work of Meninfki was his "Thefaurus Linguarum Orientalium," publifhed at Vienna in 1680, in four volumes folio. Of thefe the fourth was entirely deftroyed by the falling of a bomb upon the author's houfe during the fiege of Vienna by the Turks, which obliged him to recompofe it. The other volumes were greatly injured at the fame time, which rendered the work extremely fcarce and dear. A new edition of it with improvements was begun at Vienna in the year 1780. The Turkifh, Perfian, and Arabian grammars contained in the "Thefaurus," were republifhed in two volumes quarto, 1756.

MENIPEAN, *Satira* MENIPEA, a kind of fatire confifting of profe and verfe intermixed.

It is thus called from Menippus, a Cynic philofopher, who delighted in compofing fatirical letters, &c. In imitation of him, Varro alfo wrote fatires under the title of "Satiræ Menippæ;" whence this fort of compofition is alfo denominated *Varronian fatire*.

Among the moderns, there is a famous piece under this title, firft publifhed in 1594, againft the chiefs of the league, called alfo the "Catholicon" of Spain. It is efteemed a mafter-piece for the time.

MENISCIUM, in *Botany*, fo called by Schreber, the author of the genus, from μηνισκος, *a crefcent*, in allufion to the fhape of the fructification. Schreb. Gen. 757. Swartz. Syn. Fil. 19. Sprengel Crypt. 93. t. 3. f. 20. Cavan. Leccion. 548. Mart. Mill. Dict. v. 3. Lamarck Dict. v. 4. 93. Clafs and order, *Cryptogamia Filices*. Nat. Ord. *Filices*, Linn. Juff.

Gen. Ch. *Capfules* annulated, in fmall, fingle, curved lines, nearly parallel to each other, and fituated tranfverfely, in regular feries, betwixt the veins of the *frond*. *Involucrum* none.

Eff. Ch. Fructification in a feries of fmall, tranfverfe, crefcent-fhaped lines, between the veins of the frond. Involucrum none.

1. M. *triphyllum*. Swartz. n. 1. Sprengel as above.—Frond three-leaved. Native of China and the Eaft Indies. Sprengel reprefents the *frond* as about five inches long, fmooth, confifting of one large, terminal, oblong, pointed, entire *leaflet*, and a pair of much fmaller, oppofite, feffile ones, a little below it. Each of the leaflets is furnifhed with a midrib, and numerous tranfverfe, oblique, parallel veins, connected by fine, regular, decuffating lines of fructification.

2. M. *reticulatum*. Sw. n. 2. (Polypodium reticulatum; Linn. Sp. Pl. 1549. Afplenium forbifolium; Jacq. Coll. v. 2. 106. t. 3. f. 2. Filix latifolia non ramofa, nigris tuberculis pulverulenta; Plum. Amer. 6. t. 9. Lingua cervina, nigris tuberculis pulverulenta; Plum. Fil. 92. t. 110.)—Frond pinnate; leaflets undivided.—Native of the Weft Indies. We have it from St. Kitt's. Plumier found it very abundantly in afcending the mountain called *de la Calebaffe*, in Martinico. This is a very large and handfome *fern*, about four feet high; the *ftalks* fmooth and fhining, dark brown, or black. *Leaflets* numerous, about a fpan long, and above an inch wide, almoft feffile, alternate, broadeft near the bafe, tapering to a fharp narrow point; the margin flightly crenate, or wavy. The whole under-fide is covered with *fructification*, in curved *lines*, more anfwering to the form of a crefcent than thofe of the former fpecies. Sprengel cenfures Linnæus without reafon for making this fern a *Polypodium*; for the latter, having never feen a fpecimen in fructification, neceffarily trufted to Plumier, whofe figures, lefs faithful than ufual, as well as his definition, abundantly juftify Linnæus.

3. M. *proliferum*. Sw. n. 3. (Hemionitis prolifera; Retz. Obf. fafc. 6. 38.)—Frond pinnate; leaflets lanceolate, crenate, with axillary fmaller leaflets. Sent by Koenig from the Eaft Indies. It is defcribed as a large decumbent *fern*, with alternate, feffile, lanceolate, crenate *leaflets*, about half a foot long, abrupt at their bafe. From thefe are produced, at their origin, other axillary *fronds* or *branches*, a foot and half long, often in pairs, whofe *leaflets* are exactly like the former, but much fmaller, and the *ftalk* has a knot at the part whence they originate. *Fructification* in decuffating irregular *lines*, fo as fometimes to give the character of a *Polypodium*, fometimes of an *Acroftichum*.

4. M. *criftatum*. Lamarck Dict. v. 4. 94.—"Frond pinnate; leaflets nearly oppofite, lanceolate, pointed; the lower ones pinnatifid, with obtufe finely toothed fegments."—Native of Martinico. *Fronds* about a foot and a half high, or more, with numerous falcate *leaflets*, of a delicate texture, about four inches long, and near an inch broad. The margin is cut throughout into rounded lobes or fegments, finely toothed at their edge. *Fructification* copious, in curved lines.

Swartz enumerates this among his doubtful fpecies; we do not diftinctly fee for what reafon.

5. M. *ferratum*. Cavan. Leccion. 548.—"Frond pinnate; leaflets alternate, lanceolate, ferrated."—Native of the Havannah. *Fronds* above two feet high, fhining. *Leaflets* five inches long, the lower ones an inch broad; all fharp-pointed, finely toothed. *Fructification* in curved parallel *lines*.

This alfo is reckoned by Swartz among the fpecies which merit further inquiry; as well as a *Menifcium* from Cayenne, of which nothing is given but the generic character by Richard in the *Actes de la Société d'Hift. Nat. de Paris*, v. 1. 114.

Although *Menifcium* is, as yet, known to confift of but few fpecies, it has all the characters of a very natural genus, nearly refembling *Hemionitis* indeed in character, but diffimilar in habit.

MENISCUS, in *Optics*, a glafs or lens, concave on one fide, and convex on the other; fometimes alfo called *lunula*. See LENS, and OPTIC *Glafs*.

In a menifcus, if the diameter of the convexity be equal to that of the concavity, a ray, falling parallel to the axis, will continue parallel thereto after refraction.

Such a menifcus, therefore, will neither collect nor difperfe the rays; and is therefore of no ufe in dioptrics.

To find the focus of a menifcus, the rule is, as the difference of the femidiameters of the convexity and concavity is to the femidiameter of the convexity, fo is the diameter of the concavity to the diftance of the focus from the menifcus. Hence, if the femidiameter of the concavity be triple the femidiameter of the convexity, the diftance of the focus from the menifcus will be equal to the femidiameter; and therefore the menifcus will be equivalent to a lens equally convex on either fide.

Again, if the femidiameter of the concavity be double that of the convexity, the diftance of the focus will be equal

 to

to the diameter; and therefore the meniscus will be equivalent to a plano-convex lens.

If the semidiameter of the concavity be quintuple that of the convexity, the meniscus will be equivalent to a sphere. The semidiameter, therefore, of the convexity being given, that of the concavity required to remove the focus to any given distance from the meniscus, is easily found.

MENISPERMA, in *Botany*, the seventy-seventh natural order in Jussieu's system, the seventeenth of his thirteenth class, named from the principal genus belonging to it; see the next article. For the characters of the class, see GERANIA. The order is defined as follows:

Calyx of a definite number of leaves. *Petals* of a definite number, opposite to the calyx; with an equal number of scales, in some of the genera, at the inside of the petals and opposite to them. *Stamens* of a definite number, equal to that of the petals, and opposite to them. *Germens* several, with as many styles and stigmas. *Fruits* as many, either pulpy or capsular, kidney-shaped, each containing one seed, of their own shape; many of them however are frequently abortive, one only coming to perfection. *Embryo* flat, small, with thin lobes, situated at the top of the fleshy albumen, which is much more incurved than itself. *Stem* shrubby, mostly sarmentose. *Leaves* alternate, simple, without stipulas. *Flowers* axillary or terminal, often in aggregate spikes or clusters, each collection attended by a single bractea; they often become dioecious by imperfection of the respective organs of impregnation.

The genera enumerated by Jussieu are *Cissampelos; Menispermum; Leaba* of Forskall, perhaps not different from it; *Epibaterium* of Forster; and *Abuta* of Aublet.

The opposite situation, with respect to each other, of the calyx, petals, and stamens, brings this order near that of the *Berberides;* but the germen of the latter is simple, with many seeds, their albumen straight, surrounding the whole embryo, which is longer than in the *Menisperma*, and their anthers are differently formed, being very peculiar, and opening by revolute valves, in the *Berberides*. Their habits moreover are very unlike.

MENISPERMUM received its name, composed of μηνη, *the moon*, and σπερμα, *seed*, from Tournefort, in the Memoires de l'Acad. des Sciences for 1705; in allusion to the crescent-like form of the seed. Linn. Gen. 530. Schreb. 700. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 1. v. 3. 411. Juss. 285. Michaux Boreal-Amer. v. 2. 241. Lamarck Dict. v. 4. 94. Illustr. t. 824. Gærtn. t. 46. and t. 70. Class and order, *Dioecia Dodecandria*. Nat. Ord. *Sarmentaceæ*, Linn. *Menisperma*, Juss.

Gen. Ch. Male, *Cal.* Perianth of two short linear leaves. *Cor.* Outer petals four, ovate, spreading, equal; inner eight, smaller, inversely heart-shaped, concave, four of them in an inner row and broader. *Stam.* Filaments 16, cylindrical, rather longer than the corolla; anthers terminal, very short, bluntly four-lobed.

Female, *Cal.* and *Cor.* as in the male. *Stam.* Filaments eight, like the male, but with pellucid abortive anthers. *Pist.* Germens two or three, superior, stalked, ovate, incurved, approaching each other; styles solitary, very short, recurved; stigmas cloven, obtuse. *Peric.* Berries two or three, roundish-kidney-shaped, of one cell. *Seeds* solitary, large, kidney-shaped.

Obs. By the accounts of authors, the number of the different parts of fructification either differs in different species, or varies in the same. The above characters are taken from *M. canadense*.

Ess. Ch. Male, Outer petals four, inner eight. Stamens sixteen.

Female. Petals as in the male. Eight imperfect stamens. Berries two or three, single-seeded.

A genus of twining, perennial, often shrubby, plants, altogether strangers to Europe, but found in North America, Arabia and Japan, as well as in the East and West Indies. The *roots* of some are large and solid, worthy of inquiry as to their medicinal powers. *Leaves* alternate, stalked, simple, generally undivided, entire, and more or less downy, of a heart-shaped or ovate figure, without *stipulas*. *Flowers* small, racemose, axillary, inconspicuous, of a green, whitish, yellowish, or lurid hue. *Berries* dark, the size of small peas, in some cases narcotic. The species are not very correctly understood, and it is probable many more exist than botanists have ascertained. The fourteenth edition of Syst. Veg. enumerates eleven. The volume of Willdenow which comprehends this genus is not yet come to our hands. We shall therefore only mention some of the most remarkable species.

M. *canadense*. Canadian Moon-seed. Linn. Sp. Pl. 1468. Mill. Illustr. t. 93. (Hedera monophylla, convolvuli foliis, virginiana; Pluk. Phyt. t. 36. f. 2)—Leaves peltate, heart-shaped, rounded and angular. Clusters compound, drooping.—Native of North America—"from Canada to Carolina." *Michaux*. *Stem* somewhat shrubby, twining contrary to the sun's course, (*Miller*,) round, smooth, leafy, slightly branched. *Leaves* on long stalks, generally broader than long, peltate a little way from the base, either simply cordate and undivided, or more or less deeply lobed, the lobes either rounded or angular; the upper side dark green, nearly smooth; under glaucous, a little hairy at the ribs and numerous veins. *Panicles* in pairs, shorter than the leaves, drooping. *Flowers* greenish-white. *Berries*, according to Clayton, black.—This plant is preserved in some botanic gardens, but has little beauty to recommend it to general favour.

M. *virginicum*. Virginian Moon-seed. Linn. Sp. Pl. 1468. (M. folio hederaceo; Dill. Elth. v. 2 223. t. 178. f. 219.) Upper leaves ovate, undivided; lower three-lobed and wavy. Clusters simple, solitary, erect.—Native of Virginia. Linnæus appears not to have known this species. The specimen in his herbarium, from whence the specific character was taken, is only the foregoing. Dillenius has well figured and described the real *virginicum*, as having *leaves* much resembling ivy, the upper ones being ovate and undivided; the lower lobed and angular. The latter especially are somewhat downy. None of them are peltate. The *flowers* are whitish, in upright, simple, much smaller clusters. *Berries* black. Michaux does not mention this in his *Flora*. It is said to be cultivated in the Cambridge garden, flowering in July.

M. *carolinum*. Carolina Moon-seed. Linn. Sp. Pl. 1468. Michaux Boreal-Amer. v. 2. 242.—Leaves heart-shaped, downy beneath. Clusters cymose.—Native of Carolina, *Linn.* also of Georgia and Florida. *Michaux*. This has the *leaves* heart-shaped, undivided, roughish above, soft and downy beneath. *Clusters* nearly as long as the leaves, cymose, hairy, of numerous small *flowers*. Michaux says the *berries* are red; otherwise we should have a suspicion that his plant was the *virginicum*.

M. *Cocculus*. Indian-berry Moon-seed. Linn. Sp. Pl. 1468. (Cocculæ officinarum; Bauh. Pin. 511. Cocci; Ger. em. 1548. Tuba baccifera; Rumph. Amb. v. 5. 35. t. 22.)—Leaves heart-shaped, pointed, somewhat downy beneath. Clusters compound, from the naked woody stem. Berries nearly globular. Native of Ceylon and Malabar. This has a very woody, branched and twisted *stem*, from whence the *flowers* proceed, in compound *clusters*. The

branches

Branches are leafy. *Leaves* large, a span long, heart-shaped, pointed; dark green above; downy beneath; on long twisted *footstalks*. *Berries* purplish-black, as big as a black currant; but they come to us dried, and of a much smaller size. They are used in India for catching fish, which they intoxicate if thrown into the water. Their use for this purpose is, we believe, prohibited in England; nor is it easy to account for the copious importation of these berries as an article of trade, unless they serve to adulterate fermented liquors, as is often reported. (See COCCULUS and CISSAMPELOS.) We apprehend that Poiret, quoted in the last article, has confounded two very distinct plants. We have from the East Indies, by the name of *Menispermum orbiculatum*, as well as from the Mauritius, specimens which answer exactly to his description of the female *Cissampelos Cocculus*; but their axillary simple *clusters*, and large heart-shaped *bracteas*, to say nothing of their rounder *leaves*, mark them as sufficiently distinct from the above shrub of Rumphius. Perhaps the berries of several Indian plants, of this family, may have the same intoxicating quality, and be used indiscriminately.

MENISPERMUM, in *Gardening*, contains plants of the hardy climbing kind, of which the species cultivated are, the Canadian moon-seed (M. canadense); the Virginian moon-seed (M. virginicum); and the Carolina moon-seed (M. carolinum.)

Method of Culture.—The two first sorts are easily propagated by laying down the branches in the autumn season, and when the layers have made good roots, in the following autumn they may be separated and planted out where they are to remain. As their branches are weak and slender, they require support; and when planted near trees thrive better than in an open situation.

And the third sort may be increased by parting the roots, and planting them out in the spring, a little before the plants begin to shoot, in warm situations where the soil is light, as in strong retentive land the roots are apt to rot. When planted close to a wall exposed to the south or west, their stalks may be fastened against the wall to prevent their trailing upon the ground; in which situations the plants frequently flower. They should have a little shelter in severe frost, in order to preserve their stalks.

All these plants afford ornament and variety in the shrubberies and other parts of pleasure grounds.

MENITZ, in *Geography*, a town of Moravia, in the circle of Brunn; nine miles S.S.E. of Brunn.

MENKIN, a town of Asiatic Turkey, in Natolia; 36 miles N.E. of Boli.

MENMEN, a town of Asiatic Turkey, in Natolia; 18 miles N.W. of Smyrna.

MENNO, in *Biography*. See the following article.

MENNONITES, in *Ecclesiastical History*, a sect in the United Provinces, in most respects the same with those in other places called Anabaptists.

They had their rise in 1536, when Menno Simon, a native of Friesland, who had been a Romish priest, and a notorious profligate, resigned his rank and office in the Romish church, and publicly embraced the communion of the Anabaptists.

Menno was born at Witmarsum, a village in the neighbourhood of Bolswert, in Friesland, in the year 1505, and died in 1561, in the duchy of Holstein, at the country seat of a certain nobleman, not far from the city of Oldesloe, who, moved with compassion by a view of the perils to which Menno was exposed, and the snares that were daily laid for his ruin, took him, with certain of his associates, into his protection, and gave him an asylum. The writings of Menno, which are almost all composed in the Dutch language, were published in folio, at Amsterdam, in the year 1651. About the year 1537, Menno was earnestly solicited by many of the sect with which he connected himself, to assume, among them, the rank and functions of a public teacher; and as he looked upon the persons who made this proposal, to be exempt from the fanatical phrenzy of their brethren at Munster (though, according to other accounts, they were originally of the same stamp, only rendered somewhat wiser by their sufferings), he yielded to their intreaties. From this period to the end of his life he travelled from one country to another, with his wife and children, exercising his ministry, under pressures and calamities of various kinds, that succeeded each other without interruption, and constantly exposed to the danger of falling a victim to the severity of the laws. East and West Friesland, together with the province of Groningen, were first visited by this zealous apostle of the Anabaptists; from thence he directed his course into Holland, Guelderland, Brabant, and Westphalia, continued it through the German provinces that lie on the coasts of the Baltic sea, and penetrated so far as Livonia. In all these places his ministerial labours were attended with remarkable success, and added to his sect a prodigious number of followers. Hence he is deservedly considered as the common chief of almost all the Anabaptists, and the parent of the sect that still subsists under that denomination. Menno was a man of genius, and directed by a very sound judgment; he possessed a natural and persuasive eloquence, and such a degree of learning as made him pass for an oracle in the estimation of the multitude. He appears, moreover, to have been a man of probity, of a meek and tractable spirit, gentle in his manners, pliable and obsequious in his commerce with persons of all ranks and characters, and extremely zealous in promoting practical religion and virtue, which he recommended by his example, as well as by his precepts. The plan of doctrine and discipline drawn up by Menno was of a much more mild and moderate nature than that of the furious and fanatical Anabaptists, whose tumultuous proceedings have been recited under that article, but somewhat more severe, though more clear and consistent than the doctrine of the wiser branches of that sect, who aimed at nothing more than the restoration of the Christian church to its primitive purity. Accordingly, he condemned the plan of ecclesiastical discipline, that was founded on the prospect of a new kingdom, to be miraculously established by Jesus Christ on the ruins of civil government and the destruction of human rulers, and which had been the fatal and pestilential source of such dreadful commotions, such execrable rebellions, and such enormous crimes. He declared, publicly, his dislike of that doctrine which pointed out the approach of a marvellous reformation in the church by the means of a new and extraordinary effusion of the Holy Spirit. He expressed his abhorrence of the licentious tenets which several of the Anabaptists had maintained, with respect to the lawfulness of polygamy and divorce, and, finally, considered as unworthy of toleration, those fanatics who were of opinion that the Holy Ghost continued to descend into the minds of many chosen believers, in as extraordinary a manner as he did at the first establishment of the Christian church, and that he testified this peculiar presence to several of the faithful, by miracles, predictions, dreams, and visions of various kinds. He retained, indeed, the doctrines commonly received among the Anabaptists, in relation to the baptism of infants, the millenium, or thousand years reign of Christ upon earth, the exclusion of magistrates from the Christian church, the abolition of war, and the prohibition of oaths enjoined by our

Saviour, and the vanity as well as the pernicious effects of human ſcience. But while Menno retained theſe doctrines in a general ſenſe, he explained and modified them in ſuch a manner, as made them reſemble the religious tenets that were univerſally received in the Proteſtant churches; and this rendered them agreeable to many, and made them appear inoffenſive even to numbers who had no inclination to embrace them. It however ſo happened, that the nature of the doctrines conſidered in themſelves, the eloquence of Menno, which ſet them off to ſuch advantage, and the circumſtances of the times, gave a high degree of credit to the religious ſyſtem of this famous teacher among the Anabaptiſts, ſo that it made a rapid progreſs in that ſect. And thus it was in conſequence of the miniſtry of Menno, that the different ſorts of Anabaptiſts agreed together in excluding from their communion the fanatics that diſhonoured it, and in renouncing all tenets that were detrimental to the authority of civil government; and, by an unexpected coalition, formed themſelves into one community.

Though the Mennonites uſually paſs for a ſect of Anabaptiſts, yet M. Herman Schyn, a Mennonite miniſter, who has publiſhed their hiſtory and apology, maintains, that they are not Anabaptiſts, either in principle or by origin. However, nothing can be more certain than this fact, *viz.* that the firſt Mennonite congregations were compoſed of the different ſorts of Anabaptiſts, of thoſe who had been always inoffenſive and upright, and of thoſe who, before their converſion by the miniſtry of Menno, had been ſeditious fanatics: beſides, it is alleged that the Mennonites do actually retain, at this day, ſome of thoſe opinions and doctrines, which led the ſeditious and turbulent Anabaptiſts of old to the commiſſion of ſo many and ſuch enormous crimes: ſuch particularly is the doctrine concerning the nature of Chriſt's kingdom, or of the church of the New Teſtament, though modified in ſuch a manner as to have loſt its noxious qualities, and to be no longer pernicious in its influence.

The Mennonites are ſubdivided into ſeveral ſects; whereof the two principal are the Flandrians, or Flemingians, and the Waterlandians. The opinions, ſays Moſheim, that are held in common by the Mennonites, ſeem to be all derived from this fundamental principle, that the kingdom which Chriſt eſtabliſhed upon earth is a viſible church or community, into which the holy and juſt alone are to be admitted, and which is conſequently exempt from all thoſe inſtitutions and rules of diſcipline, that have been invented by human wiſdom, for the correction and reformation of the wicked. This principle, indeed, was avowed by the ancient Mennonites, but it is now almoſt wholly renounced; nevertheleſs, from this ancient doctrine, many of the religious opinions, that diſtinguiſh the Mennonites from all other Chriſtian communities, ſeem to be derived: in conſequence of this doctrine, they admit none to the ſacrament of baptiſm, but perſons that are come to the full uſe of their reaſon; they neither admit civil rulers into their communion, nor allow any other members to perform the functions of magiſtracy; they deny the lawfulneſs of repelling force by force, and conſider war, in all its ſhapes, as unchriſtian and unjuſt: they entertain the utmoſt averſion to the execution of juſtice, and more eſpecially to capital puniſhments; and they alſo refuſe to confirm their teſtimony by an oath. The particular ſentiments that divided the more conſiderable ſocieties of the Mennonites are the following; the rigid Mennonites, called the Flemingians, maintain with various degrees of rigour, the opinions of their founder Menno, as to the human nature of Chriſt, alleging that it was produced in the womb of the Virgin, by the creating power of the Holy Ghoſt; the obligation that binds us to waſh the feet of ſtrangers, in conſequence of our Saviour's command; the neceſſity of excommunicating and avoiding, as one would do the plague, not only avowed ſinners, but alſo all thoſe who depart, even in ſome light inſtances pertaining to dreſs, &c. from the ſimplicity of their anceſtors; the contempt due to human learning, and other matters of leſs moment. However, this auſtere ſyſtem declines, and the rigid Mennonites are gradually approaching towards the opinions and diſcipline of the more moderate Waterlandians.

The firſt ſettlement of the Mennonites, in the United Provinces, was granted them by William, prince of Orange, towards the cloſe of the ſixteenth century; but it was not before the following century, that their liberty and tranquillity were fixed upon ſolid foundations, when, by a confeſſion of faith, publiſhed in the year 1626, they cleared themſelves from the imputation of thoſe pernicious and deteſtable errors that had been laid to their charge. In order to appeaſe their inteſtine diſcords, a conſiderable part of the Anabaptiſts of Flanders, Germany, and Frieſland, concluded their debates in a conference held at Amſterdam, in the year 1630, and entered into the bonds of fraternal communion, each reſerving to themſelves a liberty of retaining certain opinions. This aſſociation was renewed and confirmed by new reſolutions, in the year 1649; in conſequence of which the rigorous laws of Menno and his ſucceſſors were, in various reſpects, mitigated and corrected. Moſheim's Eccl. Hiſt.

MENOCHIO, Jacopo, in *Biography*, a learned Italian juriſt, was born at Pavia, where he was probably educated, and was elected, in 1555, to the profeſſorſhip of civil law in its univerſity. Five years afterwards he accepted an invitation from Emanuel Philibert, duke of Savoy, to the newly erected univerſity of Mondovi. In 1566, he removed to Padua, and became profeſſor there, firſt of common law, and afterwards of civil law. In 1589, he was recalled by the ſenate of Milan to Pavia, and was, at length, elected a ſenator of Milan, and preſident of the extraordinary magiſtracy. He died in the city in 1607. He was a voluminous writer on ſubjects connected with his profeſſion, ſome of which are ſtill referred to by lawyers, particularly his treatiſes "De conjecturis ultimum Voluntatum," and "De tacitis et ambiguis conventionibus." Theſe are held in high eſtimation, and their author was unqueſtionably reckoned the firſt doctor in civil and canon law of the age in which he lived.

Menochio, John Stephen, a learned Jeſuit, who flouriſhed in the former part of the ſeventeenth century, ſon of the preceding, was born at Pavia in 1576. At the age of ſeventeen he entered the ſociety of Jeſus, where he diſtinguiſhed himſelf by his induſtry and talents, and was, at the cloſe of his academical courſe, ſelected to fill the chair of profeſſor: he was afterwards raiſed to the moſt honourable poſts belonging to the ſociety, in the colleges and provinces of Italy. He died at Rome in 1656. His principal works are, 1. "Hieropoliticon, ſeu Inſtitutiones Politicæ è Sacris Scripturis depromptæ;" 2. "De Republica Hebræorum;" 3. "Inſtitutiones Œconomicæ ex Sacris Literis depromptæ;" 4. "Brevis Explicatio ſenſus Literalis totius Scripturæ." The beſt edition of the laſt mentioned work was edited by father Tournemine in 1719, in 2 vols. folio: it was accompanied with a number of valuable treatiſes and diſſertations on biblical ſubjects. This father wrote "A Hiſtory of Chriſt," and ſix volumes of "Diſſertations," chiefly intended to elucidate the holy ſcriptures. Moreri.

MENOLOGY, Menologium, from μην, *month*, and λογος, *diſcourſe*, in the Greek church, is much the ſame with *martyrology*, or *calendar*, in the Latin.

The

The Greek menologium is divided into the several months in the year; and contains an abridgment of the lives of the saints, with a bare commemoration of the names of such whose lives were never written. The Greeks have various menologies; and the Romans tax them with inserting divers heretics, in their menologies, as saints. Baillet treats of them at large.

MENORRHAGIA, in *Medicine*, an excessive discharge of the menses in women.

The flow of the menses is considered as excessive, when it recurs more frequently, when it continues longer, or when, during the ordinary continuance, it is more abundant, than is usual with the same person at other times, and more especially when it gives rise to a train of symptoms, indicative of a general diminution of the constitutional strength. But as most women are liable to some inequality with respect to the period, the duration, and the quantity of the catamenia; so it is only when these deviations are excessive, or permanent, so as to induce a manifest deterioration of the health, that they are to be deemed morbid. The affections of the other functions of the body, therefore, are considered by Dr. Cullen as the chief test of the excessive discharge in individuals respectively. When a larger flow than usual, he says, of the menses has been preceded by headache, giddiness, or dyspnœa, and has been ushered in by a cold stage, and is attended with much pain of the back and loins, with a frequent pulse, heat and thirst, it may then be considered as preternaturally large. (Cullen, First Lines, par. 971.) The symptoms which inordinate menstruation leaves behind, however, are the most decided proofs of its morbid influence. For after a repetition of the copious discharges, the patient exhibits many symptoms of debility: the face becomes pale, and, if the loss of blood have been profuse, of a remarkably sallow or yellowish-white complexion, which has been aptly termed exsanguine, or bloodless; the pulse is weak and small, and rather more frequent than natural; an unusual lassitude is felt, and great debility on attempting to use exercise; the breathing is hurried by slight exertions; and the back becomes painful from continuance in an erect posture, in consequence of the feebleness of the muscles which support it: towards evening, likewise, the feet are somewhat enlarged by œdematous swelling. Other marks of debility, too, often appear; especially loss of appetite, with pain of the stomach, flatulence, and other symptoms of indigestion; frequent tendency to syncope or fainting; palpitation of the heart; and a weakness of mind, which becomes liable to strong emotions from slight causes, particularly when suddenly applied. From the local debility, produced in the parts from which the excessive discharge proceeds, there is also frequently a mucous discharge, or leucorrhæa, succeeding the menorrhagia; and, in many cases, when the debility has been much augmented by a recurrence of the disorder, there is a regular alternation of the one and the other; the leucorrhæa always appearing on the cessation of the menorrhagia, and continuing until the latter again returns; or, in a word, becoming habitual. See LEUCORRHÆA.

We shall not here enter into any theoretical discussion of the nature of the menstrual hæmorrhagy. It will be sufficient to state, that it is generally of what is called the active kind, and that it is accompanied by some degree of febrile *nisus* throughout the circulating system. The menorrhagia has hence been considered as depending, either upon the preternatural increase of the hæmorrhagic effort of the vessels of the uterus, or upon a preternatural laxity of the extremities of the uterine arteries, the hæmorrhagic effort remaining as in the natural state. Cullen, loc. cit.

The *exciting causes* of menorrhagia may, therefore, be included under the following heads. 1st. Those which increase the plethoric state of the uterine vessels; such as a full nutritious diet, much strong liquor, and especially when taken to the length of frequent intoxication, or combined with a sedentary life. There is much less of menorrhagia among the females of the lower class, in the country, who use a moderate diet, and take regular exercise, than among the ladies of the higher class, who live high, and use little active exercise, and particularly among those who take wine freely, though not to excess. And when young women have been weakened by this hæmorrhage, their matron-friends have too often recourse to more wine, and fuller diet, to restore the strength. This is even done in the pregnant state, to prevent abortions, when the opposite system should be adopted, with a view of diminishing both local and general plethora. 2dly. All causes which determine the blood more copiously and forcibly into the uterine vessels, tend of course to bring on menorrhagia. Such are violent strainings of the whole body, from particular exertions of the muscular strength; violent shocks from falls; severe blows or contusions on the lower belly; violent passions of the mind; and violent exercise, especially in dancing. For in the last mentioned instance, the combination of the muscular exertion with the erect posture tends materially to direct the current of blood to the uterus: and hence the exercise of dancing has sometimes been found an effectual remedy for obstructed menstruation. 3dly. Whatever irritates particularly the vessels of the uterus, may induce menorrhagia; as excess in venery, or the exercise of it during the time of menstruation; a costive habit of body, giving occasion to violent straining at stool; cold applied to the feet. 4thly. Whatever may have forcibly overstrained the extremities of the uterine vessels, and left them consequently in a weakened and relaxed state: such as frequent abortions, and tedious difficult labours, which give rise to excessive discharge; likewise frequent pregnancy, without nursing, which often not only deranges the general health, but occasions such a derangement of the uterine system, as leads to the production of frequent abortion, terminating in the constant occurrence of menorrhagia and leucorrhæa in alternate succession. And, lastly, all causes inducing a general laxity of the habit, such as living much in hot chambers, drinking much of warm relaxing liquors, as tea and coffee; or, on the other hand, the inability of procuring more substantial diet, combined with watching, fatigue, anxiety of mind, and other causes of constitutional debility, which often give rise to the constant alternations of menorrhagia and leucorrhæa in women of the lower classes.

The *treatment* of menorrhagia must necessarily differ according to the different causes of the disease, and the different states of constitution under which it occurs. In all instances, however, it is of the first importance to avoid the immediate causes of the malady, where these are obvious, and can be shunned; for in this way the returns of the disease may be often entirely warded off, and the health be fully restored, without recourse to medicine.

When this has not been done, and a copious menstrual discharge has come on, it will require the same kind of treatment as other active hæmorrhagies; especially if the patient be of a moderately strong habit; namely, such means as tend to allay inordinate action of the blood-vessels. One of the most important of these means is the application of *cold*, or, more correctly speaking, the abstraction of the stimulus of heat. With this view the apartment should be kept cool, the bed clothes should be light, and the beds not too soft; cold drink should be taken, as freely as the former

former habits of the patient will allow; and even cold applications should be made, as near to the bleeding vessels as may be, by applying wet cloths to the pudendum and round the loins. At the same time it is extremely important for the patient to remain entirely at rest, and that in the horizontal posture; to avoid the quickened circulation, which exertion produces, and the influence of gravitation upon the unsupported vessels in the erect position. The diet should likewise be light and cooling, all stimulants being discarded; and the bowels should be kept open by gentle laxatives, that occasion little stimulus; such as the neutral salts, castor oil, manna, sulphur, &c. Or the lower bowels may be emptied by clysters, which, if used cold, will have the double effect of removing the irritation of fæces, and also of refrigerating the uterus, by the contiguity of these parts.

It now and then happens that menorrhagia occurs in robust women, and is accompanied with quickness and some hardness of the pulse, with severe pains in the back resembling those of parturition, and other febrile symptoms. In these cases it is sometimes advisable to diminish the general action of the vascular system by bleeding from the arm, such a practice, however, is not often necessary; for there are few cases, in which the refrigerating plan above mentioned, if pursued with attention and diligence, will not tend to moderate the discharge.

On the other hand, when the menorrhagia arises from an apparent relaxation of the vessels of the uterus, although the practice of depletion must not be adopted, yet all the sources of irritation must be shunned with equal care: for, under such circumstances, the general irritability, or susceptibility of excitement, is usually much increased, and less active stimuli produce a greater effect. The menorrhagia may be presumed to arise from such a relaxed state of the uterine vessels, from the general debility and laxity of the patient's habit, indicated by paleness of complexion, thin and flabby state of the muscular flesh, languor, and incapability of exertion; as well as from a knowledge of her previous state of indisposition, of her mode of life, and of the immediate exciting causes; and particularly from the circumstance, that, in the intervals of menstruation, she is subject to leucorrhæa. Quietness and the horizontal posture are still more requisite in this than in the former case. And as there is often much general irritation combined with this condition of the habit, small doses of an opiate may be employed, with considerable benefit, in moderating the discharge. In the case of a plethoric habit, however, opiates would tend to produce an aggravation of the complaint by their stimulus, and therefore must be employed with caution. Astringent medicines must be resorted to, in the case of menorrhagia from relaxation, such as alum, the sulphuric acid, and some of the preparations of iron. The astringent operation of these, however, when given internally, is not always very active: the chalybeates, especially the muriated tincture of iron, are, on the whole, the most efficacious. The astringents may be employed externally, that is, may be applied locally, as washes, with advantage. These astringent and tonic medicines, however, are administered perhaps with more decided benefit, in the intervals of menstruation, when they act rather as preventives, than as directly curative, by strengthening the whole system; and tend also to remove the leucorrhæa, which so often exists at those times. Cold bathing, chalybeate medicines, the metallic salts, cinchona and other bitters, together with exercise, especially in a carriage, are all serviceable in this view, during the intervals: and all the remedies recommended in the case of *Leucorrhæa*, (see that article,) although some of them are too stimulant to be exhibited during the occurrence of menorrhagia from debility, may be resorted to with benefit in the intervals. The patients should also use a good nutritious diet at the same time. And it may be added, that these remedies should be employed in menorrhagia, from whatever causes it may have been originally produced, if the disease have already induced a considerable degree of debility in the body. See Cullen, First Lines, par. 966—974. Hamilton on Female Complaints.

MENOSTEY, in *Geography*, a town of France, in the department of the Jura; four miles E.S.E. of Auxerre.

MENOTTE, a river of Cambodia, which runs into the gulf of Siam, N. lat. 11° 32'. E. long. 101° 30'.

MENOUGAT, a town of Asiatic Turkey, in Caramania; 20 miles N. of Alanieh.

MENOUX, St., a town of France, in the department of the Allier; seven miles W. of Moulins.

MENS, a town of France, in the department of the Isere, and chief place of a canton, in the district of Grenoble; 22 miles S. of Grenoble. The place contains 1883, and the canton 6516 inhabitants, on a territory of 242½ kiliometres, in ten communes.

MENSA *et Thoro*, *Divorce à*. See DIVORCE.

MENSÆ DOMESTICUS. See DOMESTICUS.

MENSALIA, MENSALS, such parsonages or livings as were formerly united to the tables of religious houses; and therefore by canonists called *mensal* benefices. See PARSONAGE and BENEFICE.

MENSARII, among the Romans, officers appointed to manage the public treasury, being sometimes three, and sometimes five in number.

MENSES, in *Physiology*, the monthly discharge from the uterus of the female subject. See GENERATION, under the head of *Physiology of the Female Organs*.

MENSES, *Suppression of*, in *Medicine*, or *Amenorrhæa* in the language of the nosologists, an interruption to the monthly discharge of women.

The interruption of the menstrual flux has been considered by physicians of two kinds; namely, the one, when the menses do not begin to flow at that period of life at which they usually appear, which has been called the *retention* (or *emansio mensium*); and the other, when, at a subsequent age, and after they have repeatedly taken place, they cease to return (independently of pregnancy) at their usual periods, which has been called the *suppression* of the menses (*suppressio mensium.*) See Cullen, Nosol. Method. Gen. cxxvi.

The first of these species of amenorrhæa, the *retention* of the menses, occurs of course in girls about the age of puberty, and is accompanied by a number of symptoms, indicative of great general languor of the whole habit; but it is most commonly marked especially by an extraordinary paleness of the complexion, often with some degree of yellow, or even of a greenish hue, from which the appellation of *green-sickness*, or technically *chlorosis*, has been given to the disease. It is true, indeed, that this appearance of the complexion is not always present, where there is a *retention* of the catamenia; but the general train of symptoms varies little, and the same plan of treatment is requisite under most of the varieties of the complaint; we shall, therefore, not repeat here the detail of the symptoms, or of the methods of cure, which we have described at great length under the article CHLOROSIS; which see.

The *suppression* of the menstrual flux, then, after it has been for some time established in its regular course, will be the subject of the few following observations. Every interruption

terruption of the difcharge, after it has once taken place, is not to be confidered as a cafe of fuppreffion; for, at its firft appearance, it is not always immediately eftablifhed with perfect regularity; and, therefore, an early interruption, efpecially when accompanied with the chlorotic fymptoms, may be deemed a cafe of *retention*. On the other hand, the difcharge may, at any period of life, be fuppreffed, when great general debility is induced by any caufe; and it commonly is thus interrupted, when any great chronic affection occurs, to enfeeble the powers of life. In fuch cafes, the fuppreffion is merely fymptomatic of thofe other affections, and does not itfelf become an object of medical treatment.

Moft of the inftances of idiopathic fuppreffion of the catamenia, in this country, are occafioned by, or at leaft are afcribed to, the action of *cold*, which is believed to produce a conftriction of the extreme veffels of the uterus, and thus to occafion a refiftance to the flow of blood through them. The influence of fear, and other depreffing paffions, is fuppofed to produce a fimilar effect. The fuppreffion feldom continues long, before it is accompanied by various fymptoms or diforders in different parts of the body; partly, perhaps, originating from an irregular determination of blood into other organs, in confequence of the plethoric condition occafioned by the fuppreffion of the cuftomary difcharge; and partly from the great general fympathy of the whole nervous fyftem, and of feveral organs in particular, with the condition of the uterus. From the firft of thefe caufes arife hæmorrhagies from various parts; as from the nofe, lungs, ftomach, &c. when the menfes are fuppreffed; as well as violent head-ache, acute pains in the cheft, &c.; and, at the fame time, from the nervous fympathy, various hyfterical and other nervous affections occur, often to a formidable extent. The convulfions of hyfteria, thus produced, are fometimes indeed more violent even than thofe of epilepfy; the colic pains, with coftivenefs, the *globus* in the throat, the violent flatulence, and other fymptoms of dyfpepfia, become often exceedingly tormenting.

Where the fuppreffion of the catamenia is obviously idiopathic, and productive of thefe fymptoms fecondarily, the principal indication of cure appears to be to remove the obftructed ftate of the circulation in the veffels of the uterus. In very ftrong and robuft habits, where, together with acute local pains, there is a great tendency to hæmorrhage, and a febrile or inflammatory difpofition alfo manifefts itfelf, even blood-letting may be reforted to with benefit in the commencement, to leffen the conftrictive action of the blood-veffels in general; and in fuch cafes, free purgation, together with the antiphlogiftic regimen, will likewife be requifite. In the great majority of inftances, however, the detraction of blood is unneceffary. A beneficial change is often produced upon the action of the uterine veffels, by local remedies; fuch efpecially as warm bathing, directed to the region of the uterus, by means of the femicupium, or of fomentation; the pediluvium; or emollient glyfters, which, from the contiguity of the large inteftine to the uterus, operate as an internal fomentation. In cafes where the fuppreffion is accompanied with great pain about the uterine region, but without fever, an anodyne glyfter, combining the effects of fomentation with thofe of an opiate, is fometimes extremely beneficial. Dr. Gregory ufed to mention, in his lectures at Edinburgh, that an anodyne enema, adminiftered at night, had fometimes brought back the catamenia before morning. Such applications, indeed, appear to be particularly efficacious, when there is an obvious attempt, as it were, in the conftitution to effect the difcharge. For, as Dr. Cullen has remarked, it commonly happens, in the cafes of fuppreffed catamenia, that though the difcharge does not actually appear at the ufual periods, there are often, at thofe periods, fome marks of an effort, having a tendency to produce the difcharge; it is, therefore, at thofe times efpecially, when the efforts of the fyftem concur, that we ought to refort to the remedies for curing a fuppreffion. Thefe concurring efforts are indicated by the exiftence of pains in the loins, with a fenfe of fulnefs in the region of the uterus, and other fymptoms which ufually indicate the approach, or accompany the flow of the catamenia in the healthy condition.

Thofe cafes in which the menfes flow after longer intervals, and in lefs quantity than ufual, approximate to the cafes of actual fuppreffion; and when they are attended with any of the diforders of the fyftem before alluded to, they are to be treated by the fame remedies as the cafes of entire fuppreffion. See Cullen, Firft Lines, par. 1007—1012.

The partial impediment to the flow of the menfes, which is accompanied with confiderable pain, (the *Amenorrhœa difficilis*, fpec. 3. of Cullen,) has been treated of under the more common appellation, *Dyfmenorrhœa*; which fee.

MENSGUT, in *Geography*, a town of Pruffia, in the province of Oberland; eight miles N. of Ortelfburg.

MENSHIÉ, or MEDCHIÉ, a town of Egypt; five miles N. of Girgé. The markets of this town are always well fupplied, becaufe the boats that are bound to the N. of Egypt, are accuftomed to put in here for a ftock of provifions. A conferve of wheat is fold here, which is highly valued in the country. It is compofed of corn fteeped in water for two days, then dried in the fun, and boiled to the thicknefs of a jelly: the pafte thus prepared is called "elnede" dew: it is fweet and nutritive. Menfhié is decorated with a large mofque. "Ptolemais Hermei," or Hermes, fo called becaufe the fymbolical deity Mercury was worfhipped there, a large and populous city, formerly ftood fouth of this fpot and near it. A few fcattered ruins, and a ftone-dike to confine the waters of the river, are the only remains which Menfhié preferves of its ancient fplendour. Sonnini.

MENSIS. See MONTH.

MENSIS *Chymicus*. See MENSTRUUM.

MENSIS *Vetitus*. See FENCE-*Month*.

MENSOORIA, in *Geography*, a caftle of the empire of Morocco, eight leagues from Rabat, in the province of Temfena, or Tremecen, built in the 12th century, by Jacob Almanfor, to afford an afylum to travellers during the night; the inhabitants of the furrounding country being a mifchievous and thieving people.

MENSORES, among the Romans, harbingers or officers, whofe bufinefs it was to go and fix upon lodgings for the emperor, when he took a journey to any of the provinces. Their office was alfo to mark out encampments, and affign every regiment its poft.

MENSORES alfo fignified land-furveyors, architects, or appraifers of houfes and public buildings. Thofe likewife who diftributed the provifions in the army, were called *menfores frumentarii*; and fervants who waited at table had the appellation of menfores.

MENSORES was likewife the title of officers among the Romans appointed to receive the provifions brought to the city by fea, and to fee them carefully laid up and preferved in public granaries, of which there were great numbers.

MENSTRUAL, or MENSTRUOUS, a term in *Medicine*, applied to the blood which flows from women in their ordinary monthly purgations. See MENSES.

MENSTRUAL *Epacts*. See EPACT.

MENSTRUAL *Longitude of the Moon*. See ARGUMENT.

MENSTRUATION, Excessive. See Menorrhagia.

Menstruation, *Painful.* See Dysmenorrhœa.

MENSTRUUM, Solvent, or Dissolvent, in *Chemiſtry*, any liquor that will diſſolve, that is, ſeparate the parts of hard bodies

The term takes its riſe from this, that ſome chemiſts pretend the complete diſſolution of a mixed body cannot be effected in leſs than forty days; which period they call a *philoſophical month.* See Solvent, and alſo Solution.

Menstruum, *Univerſal.* See Alkahest.

Menstruum, in *Pharmacy*, chiefly denotes a body that will extract the virtues of ingredients by infuſion, decoction, or the like. See Extract, Infusion, and Decoction.

MENSURATION is that branch of mathematics which is employed in aſcertaining the extenſion, ſolidities, and capacities of bodies; and in conſequence of its very extenſive application to the various purpoſes of life, it may be conſidered as one of the moſt uſeful and important of all the mathematical ſciences: in fact, menſuration, or geometry, which were anciently nearly ſynonimous terms, ſeem to have been the root whence all the other exact ſciences, with the exception of arithmetic, have derived their origin.

As ſoon as men began to form themſelves into ſociety, and direct their attention towards the cultivation of the earth, it became neceſſary to have ſome means of diſtinguiſhing one perſon's allotment from another, both as to poſition and quantity; as it did to enumerate the number of their flocks and herds; and hence, in all probability, the former gave riſe to the ſcience of menſuration, as the latter did to that of arithmetic; and though we may eaſily imagine that each of them remained for ages in a rude uncultivated ſtate, yet it is from this period that we muſt date their commencement; and therefore, to ſtate the preciſe time when they were diſcovered, or by whom they were firſt introduced, would be to trace out the origin of ſociety itſelf: on this head, therefore, we ſhall barely obſerve that in all probability they firſt aroſe from the humbleſt efforts of unaſſiſted genius, called forth by the great mother of invention, Neceſſity; and that they have ſince grown up by ſlow and imperceptible degrees, till they have at length acquired the dignity of the moſt perfect ſciences; as the acorn which is firſt accidentally ſown in a field, is in due courſe of time converted into the majeſtic oak.

But notwithſtanding we cannot attribute the invention of the ſcience of menſuration to any particular perſon, or nation, yet we may diſcover it in an infant ſtate, riſing as it were into a ſcientific form amongſt the ancient Egyptians; and hence the honour of the diſcovery has frequently been given to this people, and to the circumſtance of the overflowing of the Nile.

It is, however, to the Greeks that we muſt conſider ourſelves indebted for having firſt embodied the leading principles of this art into a regular ſyſtem. Euclid's Elements of Geometry were probably firſt wholly directed to this ſubject, and many of thoſe beautiful and elegant geometrical properties, which are ſo much and ſo juſtly admired, it is not unlikely aroſe out of ſimple inveſtigations directed ſolely to the theory and practical application of menſuration. Theſe collateral properties, when once diſcovered, ſoon gave riſe to others of a ſimilar kind, and thus geometry, which was firſt inſtituted for a particular and limited purpoſe, became itſelf an independent and important ſcience, which has perhaps done more towards harmonizing and expanding the human faculties, than all the other ſciences united.

But notwithſtanding the perfection which Euclid attained in geometry, the theory of menſuration was not in his time advanced beyond what related to right-lined figures, and this, ſo far as regards ſurfaces, might all be reduced to that of meaſuring a triangle; for as all right-lined figures may be reduced to a number of trilaterals, it was only neceſſary to know how to meaſure theſe, in order to find the ſurface of any other figure whatever bounded only by right lines. The menſuration of ſolid bodies, however, was of a more varied and complex nature, and gave this celebrated geometrician a greater ſcope for the exerciſe of his ſuperior talents, and ſtill confining himſelf to bodies bounded by right-lined plane ſuperficies, he was able to perform all that can be done even at this day. With regard to curvilineal figures, he attempted only the circle and the ſphere, and if he did not ſucceed in thoſe, he failed only where there was no poſſibility of ſucceſs; but the ratio that ſuch ſurfaces and ſolids have to each other he accurately determined.

After Euclid, Archimedes took up the theory of menſuration, and carried it to a much greater extent. He firſt found the area of a curvilinear ſpace, unleſs indeed we except the lunules of Hippocrates, which required no other aid than that of the geometrical elements. Archimedes found the area of the parabola to be two-thirds of its circumſcribing rectangle, which, with the exception above ſtated, was the firſt inſtance of the quadrature of a curvilinear ſpace. The conic ſections were at this time but lately introduced into geometry, and they did not fail to attract the particular attention of this celebrated mathematician, who diſcovered many of their very curious properties and analogies. He likewiſe determined the ratio of ſpheres, ſpheroids, and conoids, to their circumſcribing cylinders, and has left us his attempt at the quadrature of the circle. He demonſtrated that the area of a circle is equal to the area of a right-angled triangle, of which one of its ſides about the right angle is equal to the radius, and the other equal to the circumference, and thus reduced the quadrature of the circle to that of determining the ratio of the circumference to the diameter, a problem which has engaged the particular attention of the moſt celebrated mathematicians of all ages, but which remains at preſent, and in all probability ever will remain, the deſideratum of geometricians, and at the ſame time a convincing and humiliating proof of the limited powers of the human mind.

But notwithſtanding Archimedes failed in eſtabliſhing the real quadrature of the circle, it is to him we are indebted for the firſt approximation towards it. He found the ratio between the diameter of a circle, and the periphery of a circumſcribed polygon of 96 ſides, to be leſs than 7 to 22, or leſs than 1 to $3\frac{10}{70}$; but the ratio between the diameter, and periphery of an inſcribed polygon of the ſame number of ſides, he found to be greater than 1 to $3\frac{10}{71}$; whence, *à fortiori*, the diameter of a circle is to its circumference in a leſs ratio than 1 to $3\frac{1}{7}$, or leſs than 7 to 22. Having thus eſtabliſhed this approximate ratio between the circumference and diameter, that of the area of the circle to its circumſcribed ſquare, is found to be nearly as 11 to 14. Archimedes, however, makes the latter the leading propoſition. Theſe, it is true, are but rude approximations, compared with thoſe that have been ſince diſcovered, but conſidering the ſtate of ſcience at this period, particularly of arithmetic, we cannot but admire the genius and perſeverance of the man, who, notwithſtanding the difficulties that were oppoſed to him, ſucceeded in deducing this reſult, which may be conſidered as having led the way to the other more accurate approximations which followed, moſt of which, till the invention of fluxions, were obtained upon ſimilar principles to thoſe employed by this eminent geometrician.

Archimedes alſo determined the relation between the circle and ellipſe, as well as that of their ſimilar parts; beſides which figures he has left us a treatise on the spiral, a description of which will be given under that article. See SPIRAL.

Some advances were successively made in geometry and mensuration, though but little novelty was introduced into the mode of investigation till the time of Cavalerius. Till his time the regular figures circumscribed about the circle, as well as those inscribed, were always considered as being limited both as to the number of their sides, and the length of each. He first introduced the idea of a circle being a polygon of an infinite number of sides, each of which was of course indefinitely small; solids were supposed to be made up of an infinite number of sections indefinitely thin, &c. This was called the doctrine of indivisibles, which was very general in its application to a variety of difficult problems, and by means of it many new and interesting properties were discovered; but it unfortunately wanted that distinguishing characteristic which places geometry so pre-eminent amongst the other exact sciences. In pure elementary geometry we proceed from step to step, with such order and logical precision, that not the slightest doubt can rest upon the mind with regard to any result deduced from those principles; but in the new method of considering the subject, the greatest possible care was necessary in order to avoid error, and frequently this was not sufficient to guard against erroneous conclusions. But the facility and generality which it possessed, when compared with any other method then discovered, led many eminent mathematicians to adopt its principles, and of these Huygens, Dr. Wallis, and James Gregory, were the most conspicuous, being all very fortunate in their application of the theory of indivisibles. Huygens, in particular, must always be admired for his solid, accurate, and masterly performances in this branch of geometry. The theory of indivisibles was however disapproved of by many mathematicians, and particularly by Newton, who, amongst his numerous and brilliant discoveries, has given us that of the method of fluxions, the excellency and generality of which immediately superseded that of indivisibles, and revived some hopes of squaring the circle, and accordingly its quadrature was again attempted with the greatest eagerness. The quadrature of a space and the rectification of a curve, was now reduced to that of finding the fluent of a given fluxion; but still the problem was found to be incapable of a general solution in finite terms. The fluxion of every fluent was found to be always assignable, but the converse proposition, *viz.* of finding the fluent of a given fluxion, could only be effected in particular cases, and amongst these exceptions, to the great disappointment and regret of geometricians, was included the case of the circle, with regard to all the forms of fluxions under which it could be obtained.

At length all hopes of accurately squaring the circle, and some other curves being abandoned, mathematicians began to apply themselves to finding the most convenient series for approximating towards their true lengths and quadratures; and the theory of mensuration now began to make rapid progress towards perfection. Many of the rules, however, were given in the Transactions of learned societies, or in separate and detached works, till at length Dr. Hutton formed them into a complete treatise, entitled "A Treatise on Mensuration," in which the several rules are all demonstrated, and some new ones introduced. Mr. Bonnycastle also published a very complete work on this subject, entitled "An Introduction to Mensuration." These may be considered as standard works, and the only ones of importance in our language, though there are others on the same subject, as Hawney's and Robertson's, the latter of which only requires the demonstrations of the several rules, which are omitted, in order to render it also a very useful and valuable performance.

To the above slight sketch of the history and progress of this science, we shall annex a synopsis of the principal rules, drawn from the works above mentioned, which will be found very useful as a reference in a variety of cases.

SYNOPSIS OF THE PRINCIPAL RULES OF MENSURATION.

TRIANGLES.

Let a, b, c represent the three sides of the triangle, A, B, C the angles opposite to those sides respectively; p the perpendicular falling upon the base b; then,

1. The area $= \frac{1}{2} p\, b$
2. —— $= \frac{1}{2} a\, b$. sin. C $= \frac{1}{2} a\, c$ sin. B $= \frac{1}{2} b\, c$ sin. A.

Make $a + b + c = s$; then,

3. The area $= \sqrt{\left\{ \frac{1}{2} s \left(\frac{1}{2} s - a\right) \left(\frac{1}{2} s - b\right) \left(\frac{1}{2} s - c\right) \right\}}$
4. Log. area $= \frac{1}{2} \left\{ \text{log. } \frac{1}{2} s + \text{log. } \left(\frac{1}{2} s - a\right) + \text{log. } \left(\frac{1}{2} s - b\right) + \text{log. } \left(\frac{1}{2} s - c\right) \right\}$.

TRAPEZIUMS.

Let a, b, c, d, represent the four sides, a and c, b and d, being those which are opposite to each other, δ and δ' the two diagonals, M the angle formed by their intersection, also p, p', the perpendiculars falling from two opposite angles on the diagonal δ; then,

1. The area $= \frac{1}{2} \delta\, (p + p')$
2. —— $= \frac{1}{2} \delta\, \delta'$. sin. M
3. The area $= \left\{ (a^2 + c^2) \backsim (b^2 + d^2) \right\}$ tan. M.

If the trapezium be inscribable in a circle,

4. The area $= \sqrt{\left\{ (s - a)\, (s - b)\, (s - c)\, (s - d) \right\}}$
5. —— $= (a\, b + c\, d)$ sin. N.

where N is the angle contained by a and b, or by c and d.

If a and c, or b and d, be parallel, and p their perpendicular distance, then,

6. The area $= \frac{1}{2} p\, (c + a)$, or $\frac{1}{2} p\, (b + d)$.

REGULAR POLYGONS.

Let s represent one of the equal sides, n the number of sides, p the perpendicular falling from the centre of the polygons upon one of the sides; then,

1. The area $= \frac{1}{2} p\, s\, n$
2. —— $= n\, p^2$ tan. $\frac{360^\circ}{2\, n}$
3. —— $= \frac{1}{4}\, n\, s^2$ cotan. $\frac{360^\circ}{2\, n}$

This last general formula resolves itself into the following particular ones, *viz.*

		Sides.			
4.	Trigon	3	Area	$s^2 \times$	0·4330127
5.	Tetragon	4	——	$s^2 \times$	1·0000000
6.	Pentagon	5	——	$s^2 \times$	1·7204774
7.	Hexagon	6	——	$s^2 \times$	2·5980762
8.	Heptagon	7	——	$s^2 \times$	3·6339124
9.	Octagon	8	——	$s^2 \times$	4·8284271
10.	Nonagon	9	——	$s^2 \times$	6·1818242
11.	Decagon	10	——	$s^2 \times$	7·6942088
12.	Undecagon	11	——	$s^2 \times$	9·3656399
13.	Dodecagon	12	——	$s^2 \times$	11·1961524

Circle.

Let r reprefent the radius, d the diameter, c the circumference, and a the area; then,

1. The area $= \frac{1}{4} c\, d$
2. —— $= d^2 \times \cdot 7854$
3. —— $= c^2 \times \cdot 07958$
4. The circumference $= d \times 3\cdot 14159$

If we make $3\cdot 14159 = p$, we have the following relation of the above quantities; *viz.*

1. —— $d = \frac{c}{p} = \frac{4a}{c} = 2\sqrt{\frac{a}{p}}$

2. —— $c = p\, d = \frac{4a}{d} = 2\sqrt{p\, a}$

3. —— $a = \frac{p\, d^2}{4} = \frac{c^2}{4p} = \frac{d\, c}{4}$

4. —— $p = \frac{c}{d} = \frac{4a}{d^2} = \frac{c^2}{4a}$

Circular Arcs.

The former notation remaining; let s reprefent the fine, and v the verfed fine of the half arc; alfo let m reprefent the meafure of the arc in degrees, minutes, &c. then,

1. The arc $= r\, m \times \cdot 0174533$.

2. The arc $= \begin{cases} 2\sqrt{d v} \times \left\{ 1 + \frac{v}{2 \cdot 3 d} + \frac{3 v^2}{2 \cdot 4 \cdot 5 \cdot d^2} + \frac{3 \cdot 5 v^3}{2 \cdot 4\; 6 \cdot 7 d} + \text{\&c.} \right\} \text{ or,} \\ 2 d \sqrt{q} + \frac{q}{2 \cdot 3} A + \frac{3^2 q}{4 \cdot 5} B + \frac{5^2 q}{6 \cdot 7} C + \frac{7^2 q}{8 \cdot 9} D \end{cases}$

where $q = \frac{v}{d}$; and A, B, C, &c are the 1ft, 2d, 3d, &c. terms.

3. The arc $= \begin{cases} 2 s \times \left\{ 1 + \frac{s^2}{3 \cdot 3 r^2} + \frac{3 s^4}{5 \cdot 2 \cdot 4 r^4} + \frac{3 \cdot 5 s^6}{7 \cdot 2 \cdot 4 r^6}, \text{\&c.} \right\} \text{ or,} \\ 2 s + \frac{q}{2 \cdot 3} A + \frac{3^2 q}{4 \cdot 5} B + \frac{5^2 q}{6 \cdot 7} C + \frac{7^2 q}{8 \cdot 9} D, \text{\&c.} \end{cases}$

where $q = \frac{s^2}{r^2}$; and A, B, C, D, &c. the preceding terms.

To which may be added the following approximations:

4. The arc $= 2 d \sqrt{\frac{3 v}{3 d - v}}$ nearly.

5. —— $= \frac{2}{9} \times \left\{ 5 d \sqrt{\frac{5 v}{5 d - 3 v}} + 4 \sqrt{d v} \right\}$ nearly.

6. —— $= \frac{8 c' - C'}{3}$ nearly.

where C′ is the chord of the whole arc, and c' the chord of half the arc.

Circular Sectors.

Let l reprefent the length of the arc of the fector, and m its meafure in degrees, minutes, &c.; then,

1. Area of fector $= \frac{1}{2} r\, l$
2. —— $= \cdot 7854\, d^2 \times \frac{m}{360}$

Circular Segments.

If A′ reprefent the area of the circular fector, and C′ the chord of the arc; then,

1. Area of fegment $= A' - \frac{1}{2} C' (r - v)$.

2. Area $= \begin{cases} 2 v \sqrt{d v} \times \left\{ \frac{2}{3} - \frac{v}{5 d} - \frac{v^2}{28 d^2} - \frac{v^3}{72 d^3} - \text{\&c.} \right\} \text{ or,} \\ 2 \sqrt{d v} \times \left\{ \frac{2}{3} - \frac{3 v}{5 \cdot 2 d} A - \frac{5 v}{7 \cdot 4 d} B - \frac{7 \cdot 3 v}{9 \cdot 6 d} C - \frac{9 \cdot 5 v}{11 \cdot 8 d} D \right\} \end{cases}$

A, B, C, &c. being the preceding terms.

3. Area $= \frac{1}{3} v \sqrt{v V} + \frac{5}{5 V} A - \frac{1}{7 V} B + \frac{3}{9 V} C - \frac{5}{11 V} D$, &c. where $V = (d \quad v)$.

4. Area $= 2 r c'' - \frac{1}{2 \cdot 3} q^2 A - \frac{1 \cdot 3}{4 \cdot 5} q^2 B - \frac{3 \cdot 5}{6 \cdot 7} q^2 C$, &c. where c'' reprefents the cofine of half the arc, and $q = \frac{c''}{r}$, A, B, C, &c. being the preceding terms.

To which may be added the following approximations, *viz.*

5. Area $= \frac{4}{5} \left\{ \sqrt{(d v - v^2)} + \frac{2}{3} \sqrt{d v} \right\}$ nearly.
6. Area $= \frac{4}{7} v (d v - \frac{3}{5} v^2)$ nearly.

If C′ be made to reprefent the chord of the whole arc, and c the chord of half the arc, then

7. Area $= \frac{4}{10} v (C' + \frac{4}{3} c)$ nearly.
8. Area $= \frac{4}{3} v \sqrt{(\frac{1}{4} C'^2 + \frac{2}{5} v)}$ nearly.
9. Area $= d^2 \times$ by tabular number anfwering to $\frac{v}{d}$, in the table of circular fegments.

Note.—The area of circular zones will be found by finding the difference of the two fegments: and the area of circular rings, by finding the difference of the areas of the two circles.

Or

Or by making D and d the diameters, then

10. Area of the ring $= (D + d)(D - d) \times \cdot 7854$.

ELLIPSIS.

Let t represent the semi-transverse axis, c the semi-conjugate, x any abscissa, y the corresponding ordinate, and p the parameter; then will these quantities have the following relations, *viz.*

1. Ordinate $(y) = \frac{c}{t} \sqrt{(2xt - x^2)}$

2. Abscissa $(x) = t \pm \frac{t}{c} \sqrt{(c^2 - y^2)}$

3. Conjugate $(c) = \frac{ty}{\sqrt{(2tx - x^2)}}$

4. Transverse $(t) = \frac{cx}{y^2} \times \left\{ c \mp \sqrt{(c^2 - y^2)} \right\}$

5. Parameter $(p) = \frac{c^2}{t}$.

The same formulæ obtain for any pair of conjugate diameters.

Make $1 - \frac{c^2}{t^2} = m$; then,

1. Elliptic circum. $= C \times \left\{ 1 + \frac{m}{2^2} - \frac{3m^2}{2^2 \cdot 4^2} - \frac{3^2 \cdot 5 m^3}{2^2 \cdot 4^2 \cdot 6^2} - \frac{3^2 \cdot 5^2 \cdot 7 m^4}{2^2 \cdot 4^2 \cdot 6^2 \cdot 8^2}, \text{ \&c.} \right\}$ where C is the circumference of the circumscribing circle.

2. Elliptic circum. $= (t + c) \times 3\cdot1416$ nearly.

3. —— $= 3\cdot1416 \times \sqrt{2(t^2 + c^2)}$ nearer.

4. —— $= \frac{1}{2} \left\{ 3\sqrt{2(t^2 + c^2)} - \frac{6t + p}{4} \right\} \times 3\cdot1416$ still nearer.

5. Elliptic circum. $= \frac{1}{2} \left\{ 5\sqrt{2(t^2 + c^2)} - \frac{35t + 7p}{8} + \frac{pc^2}{16t^2} \right\} \times 3\cdot1416$.

6. Elliptic circum. $= \frac{1}{2} \left\{ t + c + \sqrt{2(t^2 + c^2)} \right\} \times 3\cdot1416$.

7. Elliptic area $= 3\cdot14159 \times tc$.

8. —— $= 3\cdot14159 \times tc \times$ sin. angle of intersection, in which last expression t and c are any pair of semi-conjugate diameters.

ELLIPTIC ARCS.

Let t represent still the semi-transverse, c the semi-conjugate, and z the distance of the ordinate from the centre; then the arc bounded by the ordinate, and the parallel axis, will be

1. Elliptic arc $= z \left\{ 1 + \frac{c^2}{6t^4} z^2 + \frac{4t^2c^2 - c^4}{40t^8} z^4 + \frac{8t^4c^2 - 4t^2c^4 + c^6}{112t^{12}} z^6, \text{ \&c.} \right\}$

Make $\frac{t^2 - c^2}{t^2} = q$; then,

2. Elliptic arc $= z \sqrt{\frac{t^2 - \frac{1}{3}qz^2}{t^2 - \frac{1}{3}z^2}}$ nearly.

3. —— $= \frac{1}{5} \left\{ qz \sqrt{\frac{t^2 - \frac{1}{3}qz^2}{t^2 - \frac{1}{3}z^n}} - \left(1 + \frac{c^2z^2}{6t^4}\right) 4z \right\}$

4. Elliptic arc $= \frac{15pC + (19C - 21p)y}{15pC + (9C - 21p)y} \times x$ nearly, C being the whole axe, where the arc begins; and p, x, and y the corresponding parameter, abscissa, and ordinate.

ELLIPTIC SEGMENTS.

Find the area of the circular segment described on that axe to which the base of the segment is perpendicular, and call it A; then,

1. As this axe : the other axe :: A : the elliptic segment, make the height of the segment $= h$, and vertical axe of the ellipse $= v$, also put $\frac{h}{v} = q$; then,

2. Elliptic seg. $= tc \times$ tabular number answering to y in a table of circular segments.

PARABOLA.

Make any abscissa $= x$, ordinate $= y$, parameter $= p$, and area $= a$; then will these quantities have the following relations, *viz.*

1. Parameter $(p) = \frac{y^2}{x}$

2. Abscissa $(x) = \frac{y^2}{p}$

3. Ordinate $(y) = \sqrt{px}$

4. Area contained between x, y, and the curve $\Big\}$ $(a) = \frac{2}{3} xy$.

PARABOLIC ARCS.

Make $\frac{2y}{p} = q$, and $\sqrt{(1 + q^2)} = s$; then,

1. Parabolic arc $= \frac{1}{2} p \left\{ qs + \text{hyp. log. } (q + s) \right\}$

2. Parabolic arc $= \begin{cases} 2y \left(1 + \frac{q^2}{2 \cdot 3} - \frac{q^4}{2 \cdot 4 \cdot 5} + \frac{3q^6}{2 \cdot 4 \cdot 6 \cdot 7} - \frac{3 \cdot 5 q^8}{2 \cdot 4 \cdot 6 \cdot 8 \cdot 9}, \text{ \&c.} \right\} \\ 2y \left(1 + \frac{q^2}{2 \cdot 3} A - \frac{1 \cdot 3 q^2}{4 \cdot 5} B + \frac{3 \cdot 5 q^2}{6 \cdot 7} C - \frac{5 \cdot 7 q^2}{8 \cdot 9} D, \text{ \&c.} \right\} \end{cases}$

where A, B, C, &c. represent the preceding terms. To which may be added the following approximations:

3. Parabolic arc $= 2\sqrt{(y^2 + \frac{4}{3}x^2)}$ nearly.

4. —— $= \frac{2}{3} \left\{ \sqrt{(y^2 + \frac{4}{3}x^2)} - \frac{y^2 + \frac{2}{3}x^2}{\frac{1}{4}y} \right\}$ nearly.

PARABOLIC FRUSTUM, OF ZONE.

Let D and d represent the two ends, and a the perpendicular distance between them; then,

1. Area of zone $= \frac{2}{3} a \times \frac{D^3 - d^3}{D^2 - d^2}$

When $d = 0$, the area becomes $\frac{2}{3} aD$.

HYPERBOLA.

Let $t =$ the semi-transverse diameter, $c =$ the semi-conjugate, x any abscissa, and y its corresponding ordinate; then will these quantities have the following relations, *viz.*

1. Ordinate $(y) = \frac{c}{t} \sqrt{(2tx + x^2)}$

2. Abscissa

2. Abſciſs - $(x) = t \pm \frac{t}{2c}\sqrt{(c^2+y^2)}$

3. Conjugate $(c) = \frac{ty}{\sqrt{(2tx+x^2)}}$

4. Diameter - $(t) = \frac{cx}{y}\left\{\sqrt{(c^2+y^2)} \pm c\right\}$

Hyperbolic Arcs.

Let t and c be any ſemi-diameter and its conjugate as before; and y the ordinate which limits the arc to be meaſured from the vertex; then,

Making $\frac{t^2+c^2}{c^4} = q$, and hyp. log. $\frac{y+\sqrt{(c^2+y^2)}}{c} = \mathrm{A}$.

Alſo, $\frac{1}{2}\left\{y\sqrt{(c^2+y^2)} - c^2\mathrm{A}\right\} = \mathrm{B}.$

$\frac{1}{4}\left\{y^3\sqrt{(c^2+y^2)} - 3c^2\mathrm{B}\right\} = \mathrm{C}.$

$\frac{1}{6}\left\{y^5\sqrt{(c^2+y^2)} - 5c^2\mathrm{C}\right\} = \mathrm{D}.$

&c. &c. &c.

The length of the arc contained between the vertex and ordinate will be,

$$1.\ \text{Arc} = c \times \left\{\mathrm{A} + \frac{q}{2}\mathrm{B} - \frac{q^2}{2 \cdot 4}\mathrm{C} + \frac{3q^3}{2\cdot4\cdot6}\mathrm{D} - \frac{3\cdot5q^4}{2\cdot4\cdot6\cdot8}\mathrm{E},\ \&c.\right\}$$

$$2\ \text{Arc} = y \times \left\{\begin{array}{l} 1 + \frac{t^2y^2}{6c^4} - \frac{(t^4+4t^2c^2)y^4}{40c^8} + \frac{(t^6+4t^4c^2+8t^2c^4)y^6}{112c^{12}} \\ - \frac{(5t^8+24t^6c^2+48t^4c^4+64t^2c^6)y^8}{1152c^{16}},\ \&c. \end{array}\right.$$

$$3.\ \text{Arc} = y \left\{\begin{array}{l} 1 + \frac{t^2y^2}{6c^4}\mathrm{A} - \frac{t^2+4c^2}{c^4}\cdot\frac{3y^2}{20}\mathrm{B} + \frac{t^4+4t^2c^2+8c^4}{t^2+4c^2}\cdot\frac{5y^2}{14c^4}\mathrm{C} \\ - \frac{5t^6+24t^4c^2+48t^2c^4+64c^6}{t^4+4t^2c^2+8c^4}\cdot\frac{7y^2}{72c^4}\mathrm{D}\ \&c. \end{array}\right.$$

To which may be added the following approximation:

$$4.\ \text{Arc} = \frac{120c^2t + (19t^2+21c^2)4x}{120c^2t + (9t^2+21c^2)4x} + y,\ \text{nearly.}$$

Hyperbolic Segments.

Let t and c ſtill repreſent the ſemi-diameter and its conjugate, x an abſciſs, $2y$ the double ordinate, which cuts off the ſegment, and z its diſtance from the centre; then,

1. Hyp. area $= zy - tc \times$ hyp. log. of $\frac{ty+cz}{tc}$.

Making $\frac{x}{2t+x} = q$, we have

2. Hyp. area $= 2xy\left\{\frac{1}{3} - \frac{q}{1\cdot3\cdot5} - \frac{q^2}{3\cdot5\cdot7} - \frac{q^3}{5\cdot7\cdot9} - \&c.\right\}$

3. Hyp. area $= 2xy\left\{\frac{1}{3} - \frac{1}{5}\mathrm{A}q - \frac{1}{7}\mathrm{B}q - \frac{1}{9}\mathrm{C}q - \&c\right\}$

where A, B, C, &c. repreſent the preceding terms. To which may be added the following approximations, *viz.*

4. Hyp. area $= \frac{4cx}{15t}\left\{4\sqrt{(2tx+\frac{3}{4}x^2)} + \sqrt{2tx}\right\}$ nearly.

5. Hyp. area $= \frac{4cx}{75t}\left\{21\sqrt{(2tx+\frac{5}{7}x^2)} + 4\sqrt{2tx}\right\}$ nearly.

Hyperbolic Frustum, or Zone.

The ſame notation remaining as above, let z be the diſtance of a ſecond double ordinate $2\mathrm{Y}$; then,

1. The area of zone contained between $2y$ and $2\mathrm{Y}$ - $= \left\{\mathrm{ZY} - zy - tc \times \text{hyp. log.}\ \frac{t\mathrm{Y}+c\mathrm{Z}}{ty+cz}\right.$.

Prisms and Cylinders.

Let p repreſent the perimeter of the baſe, a its area, and h the height or perpendicular altitude; then,

1. Surface $= ph + 2a$
2. Solidity $= ah.$

Pyramids and Cones.

Let p, a, and h, repreſent, as above, the perimeter, area and altitude; then,

1. Surface $= \frac{1}{2}ph + a$
2. Solidity $= \frac{1}{3}ah.$

The latter rule obtains alſo in oblique cones and pyramids.

Frustums of Cones and Pyramids.

Let A and a repreſent the areas of the two ends, P and p their perimeters, and h the altitude of the body; then,

1. Surface $= \frac{1}{2}h(\mathrm{P}+p) + (\mathrm{A}+a)$
2. Solidity $= \frac{1}{3}h(\mathrm{A}+a) + \frac{1}{3}h(\sqrt{\mathrm{A}a}).$

If the ends are circles, or regular polygons, by putting D and d for the diameters, and C and c for the circumferences in the former caſe; alſo S and s for the ſides of the polygon in the latter, and T for the tabular number anſwering to any particular polygon; then,

4. Solidity of fruſt. cone $= \frac{1}{3}h(\mathrm{D}^2 + \mathrm{D}d + d^2)\ {\cdot}7854.$
5. —— fruſt. cone $= \frac{1}{3}h(\mathrm{C}^2 + \mathrm{C}c + c^2)\ {\cdot}07958.$
6. —— fruſt. pyra. $= \frac{1}{3}h(\mathrm{S}^2 + \mathrm{S}s + s^2)\ \mathrm{T}.$

Prismoid.

Let A and a repreſent the areas of the two ends, a the area

area of the middle section, and l the length of the solid; then,

1. Solidity $= \frac{1}{6} l (A + 4 a + a)$.

Wedge.

Make L the length of the base, l the length of the edge, b the breadth of the base, and h the height of the wedge; then,

1. Solidity $= \frac{1}{6} b h (2 L + l)$.

Cylindric Ungula.

When the plane passes through the base of the cylinder.

Make the altitude $=$ H, the base $= b$, $\frac{1}{2}$ arc of base $= a$, the sine, cosine, and versed sine of $\frac{1}{2}$ arc $= s$, c, and v, and diameter of cylindric base $= d$; then,

1. Curve surf. ungula $= \dfrac{(d s - a c)\,H}{v}$

2. Solidity ungula $= \dfrac{(\frac{2}{3} s^3 - b c)\,H}{v}$.

When the cutting plane does not pass through the base.

Put, in addition to the above notation, h for the least height of the ungula, H still representing the greater height; then,

1. Curve surface $= \frac{1}{2} (H + h) \times 3\cdot1416\, d$
2. Solidity $= \frac{1}{2} (H + h) \times \cdot7854\, d^2$
3. ——— $= \frac{1}{2} (H + h) \times \cdot07958\, c^2$

where c is the circumference of the cylinder.

Conic Ungula.

When the cutting plane passes through the opposite ends of the frustum.

Make the diameter of the greater end $=$ D, of the less end $= d$, and altitude $= h$; then,

1. Solidity gt. hoof $= \dfrac{D^2 - d\sqrt{Dd}}{D - d} \times \cdot2618\, D\, h$

2. ——— lt. hoof $= \dfrac{D\sqrt{Dd} - d^2}{D - d} \times \cdot2618\, D\, h$

3. Differ. of hoofs $= \dfrac{(D - d)^2}{D - d} \times \cdot2618\, h$.

Sphere, or Globe.

Let d represent the diameter, c the circumference, s the surface, and S the solidity of the sphere; then,

1. Surface $(s) = c\, d$
2. ——— $(s) = 3\cdot1416\, d^2$
3. ——— $(s) = \cdot3183\, c^2$
4. Solidity $(S) = \frac{1}{6} s\, d$
5. ——— $(S) = \cdot01688\, c^3$
6. ——— $(S) = \cdot5236\, d^3$.

Spherical Segments and Zones.

The same notation remaining, let r represent the radius of the base of the segment, and h its height; then,

1. Surface of seg. $= 3\cdot1416\, d\, h$
2. Solidity of seg. $= \cdot5236\, h\, (3 r^2 + h^2)$
3. ——— $= \cdot5236\, h\, (3 d - 2 h)$.

For the zone, put R and r for the two radii of its ends, and h its altitude; then,

4. Surface of zone $= 3.1416\, d\, h$
5. Solidity $= 1\cdot5708\, h\, (R^2 + r^2 + \frac{1}{3} h^2)$.

Circular Spindle.

Put $l = \frac{1}{2}$ length of the spindle, $m = \frac{1}{2}$ its middle diameter, a the length of the generating arc, and A the area of generating segment.

Make $\dfrac{l^2 + m^2}{2 m} = r$; then,

1. Surface of spindle $= 2 \left\{ l r - a (r - m) \right\} \times 3\cdot1416$

2. Solidity $= 4 \left\{ \frac{1}{3} l^3 - \frac{1}{2} A (r - m) \right\} \times 3\cdot1416$.

For the middle zone of a circular spindle, make L $= \frac{1}{2}$ the length of the spindle, $l = \frac{1}{2}$ the length of the zone, A the generating area, r and m being the same as above; then

3. Solidity of zone $= 2 \left\{ (L^2 - \frac{1}{3} l^2)\, l - A (r - m) \right\} \times 3.1416$

The Regular Bodies.

Let S represent the side or edge of one of the equal faces; then,

1. Tetraedron $\begin{cases} \text{Surf.} = s^2 \times 1\cdot73205 = s^2 \sqrt{3} \\ \text{Solid.} = s^3 \times 0\cdot11785 = \frac{1}{12} s^3 \sqrt{2} \end{cases}$

2. Hexaedron $\begin{cases} \text{Surf.} = s^2 \times 6\cdot00000 = 6 s^2 \\ \text{Solid.} = s^3 \times 1\cdot00000 = s^3 \end{cases}$

3. Octaedron $\begin{cases} \text{Surf.} = s^2 \times 3\cdot46410 = 2 s^2 \sqrt{3} \\ \text{Solid.} = s^3 \times 0\cdot47140 = \frac{1}{3} s^3 \sqrt{2} \end{cases}$

4. Dodecaedron $\begin{cases} \text{Surf.} = s^2 \times 20\cdot64578 = 15 s^2 \\ \qquad \sqrt{(1 + \frac{2}{5} \sqrt{5})} \\ \text{Solid.} = s^3 \times 7\cdot66312 = 5 s^3 \\ \qquad \sqrt{\dfrac{47 + 21\sqrt{5}}{40}} \end{cases}$

5. Icosaedron $\begin{cases} \text{Surf.} = s^2 \times 8\cdot66025 = 5 s^2 \sqrt{3} \\ \text{Solid.} = s^3 \times 2\cdot18169 = \frac{5}{6} s^3 \\ \qquad \sqrt{\dfrac{7 + 3\sqrt{5}}{2}} \end{cases}$

Spheroid.

Let f denote the fixed axe, and r the revolving axe; then making $3\cdot1416 = p$, and $\dfrac{f^2 \backsim r^2}{f^2} = q$; we have

1. Solidity $= \frac{1}{6} f r^2 p$

2. Surface $= f r p \left\{ 1 \mp \dfrac{A q}{2\cdot3} - \dfrac{3 B q}{4\cdot5} \mp \dfrac{3\cdot5 C q}{6\cdot7} - \dfrac{5\cdot7 D q}{8\cdot9}, \text{ \&c.} \right\}$ the upper sign having place in the oblong sphere, and the lower sign in the oblate-sphere.

If, also, we make $\dfrac{r}{f} = z$, $\sqrt{1 \backsim z^2} = s$, $m =$ the measure in degrees of the arc whose sign is s; likewise

P $= \cdot01745329\, m$ in the oblong sphere,
P $= 2\cdot30285$ log. $(s + z)$ in the oblate sphere; then

3. Surface $= \dfrac{P f + r s}{2 s} \times 3\cdot1416\, r$.

Frustums of Spheroids.

Let f represent the fixed axe, and r the revolving one; $3\cdot1416 = p$, $\dfrac{f^2 \backsim r^2}{f^2} = q$; h the height of the frustum, $\dfrac{4 q h^2}{f^2} = z$; then the frustum being cut off by two planes perpendicular to the fixed axe, one of those planes passing through the centre of the spheroid, we shall have

1. Surface $= p r h \left\{ 1 \pm \dfrac{A z}{2\cdot3} - \dfrac{3 B z}{4\cdot5} \pm \dfrac{3\cdot5 C z}{6\cdot7} \right.$

$\frac{5 \cdot 7 Dz}{8 \cdot 9}$, &c.$\}$ where A, B, C, &c. are the preceding terms, and the upper or under fign is to be ufed, according as it is the oblate or oblong fpheroid.

For the folidity, make the diameter of the greater end = D, of the lefs end = d; then

2. Solidity $= \frac{1}{12} (2 D^2 + d^2) h \times 3 \cdot 1416$.

If the fruftum be cut off by planes, one of which paffes through the fixed axe, and the other parallel to it; then putting T the tranfverfe axe, and C the conjugate of the greater end; and t and c for thofe of the lefs end;

3. Solidity $= \frac{1}{12} (2 T C + t c) h \times 3 \cdot 1416$.

Note.—For the whole middle fruftum the above refults muft be doubled.

Segments *of* Spheroids.

Let f denote the fixed axe; r the revolving axe; h the height of the fegment; then

1. *When the bafe is parallel to the revolving axe.*

$$\text{Solidity} = \frac{r^2}{f^2} (3 f \backsim 2 h) h^2 \times \cdot 5236.$$

2. *When the bafe is perpendicular to the revolving axe.*

$$\text{Solidity} = \frac{r^2}{f^2} (3 r \backsim 2 h) h^2 \times \cdot 5236$$

Elliptic Spindles.

Put the perpendicular axe of the ellipfe = a; the parallel axe = b; length of the fpindle = l; diftance of the centre of the fpindle and ellipfe = C; and area of the generating fegment = A; then

1. Solidity $= 1 \cdot 57078 \times \left\{ \frac{a^2 l^3}{3 b^2} - 4 c A \right\}$

2. Solidity $= \frac{2}{3} l \times \cdot 7854 \left\{ D^2 - 4 c \left(\frac{3 A}{l} - D \right) \right\}$

where D is the greateft diameter of the fpindle.

Paraboloid.

Let y reprefent the ordinate or femi-diameter of the bafe; x the altitude of the folid; $3 \cdot 1416 = p$; then

1. Surface $= \frac{2 p y}{12 x^2} \left\{ (y^2 + 4 x^2)^{\frac{3}{2}} - y^3 \right\}$

2. Solidity $= \frac{1}{2} p y^2 x$.

Frustums *of* Paraboloids.

Let D denote the greater diameter, d the lefs; P the parameter; and h the height of the fruftum; then

1. Surface $= \frac{(P^2 + D^2)^{\frac{3}{2}} - (P^2 + d^2)^{\frac{3}{2}}}{P} \times \frac{1}{6} p$

where $p = 3 \cdot 1416$.

2. Solidity $= \cdot 3927 h (D^2 + d^2)$.

Thefe formulæ only obtain when the bafe of the fruftum is perpendicular to the axis of the folid. For an oblique fegment, multiply the bafe by half the altitude for the content.

Parabolic Spindle.

Let m denote the middle diameter, and l the length of the fpindle; then

1. Solidity $= \cdot 418879 \, l m^2$

For the folidity of the middle fruftum.

Let d denote the diameter of the end, then the former notation remaining,

1. Solidity $= \cdot 05236 \, l (8 m^2 + 3 d^2 + 4 d m)$.

Hyperboloid.

Let a and c reprefent the femi-axes of the generating hyperbola; v the diftance of its bafe from the centre.

Alfo let $A = \frac{a^2}{\sqrt{(a^2 + c^2)}}$ be the femi-tranfverfe of another hyperbola, whofe femi-conjugate is c, the fame with that of the former.

Then find by the proper formula, the area of the fruftum of this latter hyperbola, whofe ends are diftant from the centre by v and a; multiply this area by $3 \cdot 1416$ for the furface; that is

1. Surface $= p \times \left\{ v Y - a y - A C \text{. hyp. log. of } \frac{A Y + c v}{A y + a c} \right\}$, where $p = 3 \cdot 1416$, Y and y the ordinates of the latter hyperbola.

2. Solidity $= \frac{1}{2} \text{par.}^2 \times \frac{t + \frac{2}{3} a}{t + a}$

where a = altitude, r = radius of the bafe, t the tranfverfe axis, and $p = 3 \cdot 1416$.

3. Solidity $= \frac{r^2 + d^2}{6} \times a p$

where d is the diameter, in the middle between the bafe and vertex.

Frustums *of* Hyperboloids.

Let D and d denote the femi-diameters of the two ends, a the altitude, t and c the tranfverfe and conjugate axes, $p = 3 \cdot 1416$; then

1. Solidity $= \frac{1}{3} p a \left\{ D^2 + d^2 - \frac{c^2 a^2}{3 t^2} \right\}$

2. Solidity $= \frac{1}{6} p a \left\{ D^2 + 4 \delta^2 + d^2 \right\}$

where δ is the middle diameter.

Hyperbolic Spindle.

Let A = the generating area, D the greateft diameter, L the length of the fpindle, $p = 3 \cdot 1416$; then

1. Solidity $\frac{1}{2} p \left\{ \frac{(L^2 + D^2)}{D} A - \frac{1}{3} L^3 \right\}$

2. Solidity $\frac{1}{6} p L \left\{ D^2 + \frac{(3 A - L D)}{L} 4 C \right\}$

where C is the central diftances.

To the preceding formulæ it will be proper to annex the following table of the area of circular fegments, which will be found very convenient in various problems relating to the circle and ellipfe; and with this addition, the foregoing formulæ will be found to contain all that is effentially neceffary for meafuring any plane or folid, with the exception of fome of the higher curves, which could not be conveniently reduced into a fimilar form. In thofe cafes where logarithms, fines, tangents, &c. are neceffary, fee Logarithms, Sines, &c.

6 Table

TABLE of Circular Segments to Radius ½.

Versed Sine.	Area of Segment.	Versed Sine.	Area of Segment.	Versed Sine.	Area of Segment.	Versed Sine.	Area of Segment.	Versed Sine.	Area of Segment.	Versed Sine.	Area of Segment.	Versed Sine.	Area of Segment.	Versed Sine.	Area of Segment.	Versed Sine.	Area of Segment.	Versed Sine.	Area of Segment.
·001	·000042	·051	·015119	·101	·041476	·151	·074589	·201	·112624	·251	·154412	·301	·199085	·351	·245934	·401	·294149	·451	[illegible]
·002	·000119	·052	·015561	·102	·042080	·152	·075306	·202	·113426	·252	·155280	·302	·200001	·352	·246889	·402	·295330	·452	[illegible]
·003	·000219	·053	·016007	·103	·042687	·153	·076026	·203	·114230	·253	·156149	·303	·200922	·353	·247845	·403	·296311	·453	[illegible]
·004	·000337	·054	·016457	·104	·043296	·154	·076740	·204	·115035	·254	·157019	·304	·201841	·354	·248801	·404	·297292	·454	[illegible]
·005	·000470	·055	·016911	·105	·043908	·155	·077469	·205	·115842	·255	·157890	·305	·202761	·355	·249767	·405	·298273	·455	[illegible]
·006	·000618	·056	·017369	·106	·044522	·156	·078194	·206	·116650	·256	·158762	·306	·203863	·356	·250715	·406	·299255	·456	[illegible]
·007	·000779	·057	·017831	·107	·045139	·157	·078921	·207	·117460	·257	·159636	·307	·204605	·357	·251673	·407	·300238	·457	[illegible]
·008	·000951	·058	·018296	·108	·045759	·158	·079649	·208	·118271	·258	·160510	·308	·205527	·358	·252631	·408	·301220	·458	[illegible]
·009	·001135	·059	·018766	·109	·046381	·159	·080380	·209	·119083	·259	·161386	·309	·206451	·359	·253590	·409	·302203	·459	[illegible]
·010	·001329	·060	·019239	·110	·047005	·160	·081112	·240	·119897	·260	·162263	·310	·207376	·360	·254550	·410	·303187	·460	[illegible]
·011	·001533	·061	·019716	·111	·047632	·161	·081846	·211	·120712	·261	·163140	·311	·208301	·361	·255510	·411	·304171	·461	·353769
·012	·001746	·062	·020196	·112	·048262	·162	·082582	·212	·121529	·262	·164019	·312	·209227	·362	·256471	·412	·305155	·462	·354736
·013	·001968	·063	·020680	·113	·048894	·163	·083320	·213	·122347	·263	·164899	·313	·210154	·363	·257433	·413	·306140	·463	·355732
·014	·002199	·064	·021168	·114	·049528	·164	·084059	·214	·123167	·264	·165780	·314	·211082	·364	·258395	·414	·307125	·464	·356730
·015	·002438	·065	·021659	·115	·050165	·165	·084801	·215	·123988	·265	·166663	·315	·212011	·365	·259357	·415	·308110	·465	·357727
·016	·002685	·066	·022154	·116	·050804	·166	·085544	·216	·124810	·266	·167546	·316	·212940	·366	·260320	·416	·309095	·466	·359725
·017	·002940	·067	·022652	·117	·051046	·167	·086289	·217	·125634	·267	·168430	·317	·213871	·367	·261284	·417	·310081	·467	·359723
·018	·003202	·068	·023154	·118	·052090	·168	·087036	·218	·126459	·268	·169315	·318	·214802	·368	·262248	·418	·311068	·468	·360721
·019	·003471	·069	·023659	·119	·052736	·169	·087785	·219	·127285	·269	·170902	·319	·215733	·369	·263213	·419	·312054	·469	·361719
·020	·003748	·070	·024168	·120	·053380	·170	·088535	·220	·128113	·270	·171089	·320	·216666	·370	·264178	·420	·313041	·470	·362717
·021	·004031	·071	·024680	·121	·054036	·171	·089287	·221	·128942	·271	·171978	·321	·217599	·371	·265144	·421	·314029	·471	·363715
·022	·004322	·072	·025195	·122	·054689	·172	·090041	·222	·129773	·272	·172867	·322	·218533	·372	·266111	·422	·315016	·472	·364713
·023	·004618	·073	·025714	·123	·055345	·173	·090797	·223	·130605	·273	·173758	·323	·219468	·373	·267078	·423	·316004	·473	·365712
·024	·004921	·074	·026236	·124	·056003	·174	·091554	·224	·131438	·274	·174649	·324	·220404	·374	·268045	·424	·316992	·474	·366710
·025	·005230	·075	·026761	·125	·056663	·175	·092313	·225	·132272	·275	·175542	·325	·221340	·375	·269013	·425	·317981	·475	·367709
·026	·005546	·076	·027289	·126	·057326	·176	·093074	·226	·133106	·276	·176435	·326	·222277	·476	·269982	·426	·318970	·476	·368708
·027	·005867	·077	·027821	·127	·057991	·177	·093836	·227	·133945	·277	·177330	·327	·223215	·377	·270951	·427	·319959	·477	·369707
·028	·006194	·078	·028356	·128	·058658	·178	·094601	·228	·134784	·278	·178225	·328	·224154	·378	·271920	·428	·320948	·478	·370706
·029	·006527	·079	·028894	·129	·059327	·179	·095366	·229	·135624	·279	·179122	·329	·225093	·379	·272890	·429	·321936	·479	·371705
·030	·006865	·080	·029435	·130	·059999	·180	·096134	·230	·136465	·280	·180019	·330	·226033	·380	·273816	·430	·322928	·480	·372764
·031	·007209	·081	·029979	·131	·060672	·181	·096903	·231	·137307	·281	·180918	·331	·226974	·381	·274832	·431	·323918	·481	·373703
·032	·007558	·082	·030526	·132	·061348	·182	·096674	·232	·138150	·282	·181817	·332	·227915	·382	·275803	·432	·324909	·482	·374702
·033	·007913	·083	·031076	·133	·062026	·183	·098447	·233	·138995	·283	·182718	·333	·228858	·383	·276775	·433	·325900	·483	·375702
·034	·008273	·084	·031629	·134	·062707	·184	·099221	·234	·139841	·284	·183619	·334	·229801	·384	·277748	·434	·326892	·484	·376702
·035	·008638	·085	·032186	·135	·063389	·185	·099997	·235	·140688	·285	·184521	·335	·230745	·385	·278721	·435	·327882	·485	·377701
·036	·009008	·086	·032745	·136	·064074	·186	·100774	·236	·141537	·286	·185425	·336	·231689	·386	·279694	·436	·328874	·486	·378701
·037	·009383	·087	·033307	·137	·064760	·187	·101553	·237	·142387	·287	·186329	·337	·232684	·387	·280668	·437	·329866	·487	·379700
·038	·009763	·088	·033872	·138	·065449	·188	·102334	·238	·143238	·288	·187234	·338	·233580	·388	·281642	·438	·330858	·488	·350700
·039	·010148	·089	·034441	·139	·066149	·189	·103116	·239	·144091	·289	·188140	·339	·234526	·389	·282617	·439	·331850	·489	·381699
·040	·010537	·090	·035011	·140	·066833	·190	·103900	·240	·144944	·290	·189047	·340	·235473	·390	·283592	·440	·332843	·490	·382699
·041	·010931	·091	·035585	·141	·067528	·191	·104685	·241	·145799	·291	·189955	·341	·236421	·391	·284568	·441	·333836	·491	·383699
·042	·011330	·092	·036162	·142	·068225	·192	·105472	·242	·146655	·292	·190864	·342	·237369	·392	·285544	·442	·334829	·492	·384699
·043	·011734	·093	·036741	·143	·068924	·193	·106261	·243	·147512	·293	·191775	·343	·238318	·393	·286521	·443	·335822	·493	·385699
·044	·012142	·094	·037323	·144	·069625	·194	·107051	·244	·148371	·294	·192684	·344	·239268	·394	·287498	·444	·336816	·494	·386699
·045	·012554	·095	·037909	·145	·070328	·195	·107842	·245	·149230	·295	·193596	·345	·240218	·395	·288476	·445	·337810	·495	·387699
·046	·012971	·096	·038496	·146	·070033	·196	·108636	·246	·150091	·296	·194509	·346	·241169	·396	·289453	·446	·338804	·496	·388699
·047	·013392	·097	·039087	·147	·071741	·197	·109430	·247	·150953	·297	·195422	·347	·242121	·397	·290432	·447	·339798	·497	·389699
·048	·013818	·098	·039680	·148	·072450	·198	·110226	·248	·151816	·298	·196337	·348	·243074	·398	·291411	·448	·340793	·498	·390699
·049	·014247	·099	·040276	·149	·073161	·199	·111024	·249	·152680	·299	·197252	·349	·244026	·399	·292390	·449	·341787	·499	·391699
·050	·014681	.000	[illegible]	·150	·073874	·200	·111823	·250	·153546	·300	·198168	·350	·244980	·400	·293396	·450	·342782	·500	·392699

Let us now, before we conclude this article, give a few examples in order to illuſtrate the uſe of the preceding formulæ; in doing which we ſhall only ſelect a few of the moſt difficult caſes, the others being ſo extremely obvious, that no heſitation or doubt can poſſibly ariſe in their application.

Example 1.—The three ſides of a triangle are 790, 1000, and 864: required the area.

By formula 4, *for triangles, we have*

$$\text{Log. area} = \tfrac{1}{2}\left\{\begin{matrix}\log.\ \tfrac{1}{2}s + \log.\ (\tfrac{1}{2}s - a) + \log.\ (\tfrac{1}{2}s - b) \\ + \log.\ (\tfrac{1}{2}s - a)\end{matrix}\right\}$$

$$\begin{array}{rl} \text{Now}\quad 790 &= a \\ 1000 &= b \\ 864 &= c \\ \hline 2)2654 &= s \end{array}$$

$$\begin{array}{rl|rl} 1327 = & \tfrac{1}{2}s & \log.\ 1327 = & 3{\cdot}122871 \\ 537 = & (\tfrac{1}{2}s - a) & \log.\ 537 = & 2{\cdot}729974 \\ 327 = & (\tfrac{1}{2}s - b) & \log.\ 327 = & 2{\cdot}514548 \\ 463 = & (\tfrac{1}{2}s - c) & \log.\ 463 = & 2{\cdot}665581 \\ \hline & & 2) & 11{\cdot}032974 \end{array}$$

$$\text{The area} = 328474 = 5{\cdot}516487$$

Example 2.—The two diagonals of a trapezium are 30 and 40, and their angle of interſection 48°: required the area.

By formula 2, *the area* $= \tfrac{1}{2}\,\delta\,\delta'$ *ſin.* M′.

$$\begin{array}{rr} \text{ſin. } 48^\circ = & {\cdot}743145 \\ \tfrac{1}{2}\delta\delta = \tfrac{1}{2}(30 \times 40) = & 600 \\ \hline \text{The area} = & 445{\cdot}887000 \end{array}$$

Example 3.—Required the length of a circular arc, whoſe chord is 6, and radius 9.

By formula 2, *for circular arcs.*

$$\text{The area} = 2d\sqrt{q} + \frac{q}{2\cdot 3}A + \frac{3^2 q}{4\cdot 5}B + \frac{5^2 q}{6\cdot 7}C, \text{ \&c.}$$

where $q = \dfrac{v}{d}$; v being the verſed ſine, and d the diameter.

By the property of the circle we readily find the verſed ſine, $v = 9 - 6\sqrt{2} = {\cdot}51471862$, and ${\cdot}51471862 \div 18 = {\cdot}02859548$.

$$\begin{array}{rl} \text{Whence } A = 2d\sqrt{q} = & 6{\cdot}087672 \\ B = \dfrac{q}{2\cdot 3}A = & 29013 \\ C = \dfrac{3^2 q}{4\cdot 5}B = & 373 \\ D = \dfrac{5^2 q}{6\cdot 7}C = & 6 \\ \hline & 6{\cdot}117064 = \text{arc as required.} \end{array}$$

Or, by uſing formula 3, we have

$$\text{arc} = 2s + \frac{q}{2\cdot 3}A + \frac{3^2 q}{4\cdot 5}B + \frac{5^2 q}{6\cdot 7}C + \frac{7^2 q}{8\cdot 9}D, \text{ \&c.}$$

where s is the ſine of the half arc $= 3$, and $q = \dfrac{s^2}{r^2} = \dfrac{9}{81} = \dfrac{1}{9} = 0{\cdot}1111111$, &c.

$$\begin{array}{rl} \text{Whence } A = 2s & = 6{\cdot}00000 \\ B = \dfrac{q}{2\cdot 3}A & = 0{\cdot}11111 \\ C = \dfrac{3^2 q}{4\cdot 5}B & = 0{\cdot}05555 \\ D = \dfrac{5^2 q}{6\cdot 7}C & = 0{\cdot}00367 \\ E = \dfrac{7^2 q}{8\cdot 9}D & = 0{\cdot}00028 \\ F = \dfrac{9^2 q}{10\cdot 11} & = 0{\cdot}00002 \\ \hline \text{The required arc} & = 6{\cdot}11063 \end{array}$$

Example 4.—Required the area of that circular ſegment, of which the diameter is 52, and the height or verſed ſine 2.

By formula 2, *for circular ſegments.*

$$\text{Area} = 2\sqrt{dv} \times \left\{\tfrac{2}{3} - \frac{3v}{5\cdot 2d}A - \frac{5v}{7\cdot 4d}B - \frac{7\cdot 3v}{9\cdot 6d}C \text{ \&c.}\right\}$$

where v is the verſed ſine $= 2$, and the diameter $= 52$.

$$\begin{array}{rlll} +A = & \dfrac{4v\sqrt{dv}}{3} & = \tfrac{8}{3}\sqrt{104} = & 27{\cdot}1947707 \\ -B = & \dfrac{3v}{5\cdot 2d}A & = \dfrac{3}{10\cdot 26}A = & 0{\cdot}3137858 \\ -C = & \dfrac{5v}{7\cdot 4d}B & = \dfrac{5}{7\cdot 4\cdot 29}B = & 0{\cdot}0021551 \\ -D = & \dfrac{7\cdot 3v}{9\cdot 6d}C & = \dfrac{7}{3\cdot 6\cdot 26}C = & 0{\cdot}0000322 \\ -E = & \dfrac{9\cdot 5v}{11\cdot 8d}D & = \dfrac{9\cdot 5}{11\cdot 8\cdot 26}D = & 0{\cdot}0000007 \\ \hline & & \text{Negative terms} = & -0{\cdot}3159738 \\ & & \text{Area of ſegment} = & 26{\cdot}8787969 \end{array}$$

But the readieſt method of finding the area of circular ſegment is by formula 9; where the area $= d^2 \times$ by tabular number correſponding to $\dfrac{v}{d}$.

In the preſent examples $\dfrac{v}{d} = \tfrac{2}{52} = \tfrac{1}{26} = {\cdot}038\tfrac{6}{13}$, the correſponding tabular number by preceding table $= {\cdot}009940$ and ${\cdot}009940 \times 52^2 = 26{\cdot}878$, the area required.

This method, however, can only be practiſed in caſes where great accuracy is not required, unleſs the table of ſegments be very extenſive, ſuch as that given by Hutton in his Menſuration.

Note.—In thoſe caſes where the quotient is not found *exactly* in the column of heights, or verſed ſines, as in the example above, a proportional part muſt be found for the fractional part of the number; *viz.* as 1 is to the difference between the two areas correſponding to the two verſed ſines, between

between which the given number lies; ſo is the fractional part of that number to a fourth proportional, which muſt be added to the leaſt area, or ſubtracted from the greater.

Example 5.—Required the periphery of an ellipſe, the diameters of which are 24 and 18.

By formula 1, *for the ellipſe.*

$$\text{Periphery} = C \times \left\{1 + \frac{m}{2^2} - \frac{3\,m^2}{2^2 \cdot 4^2} - \frac{3^2 \cdot 5\,m^3}{2^2 \cdot 4^2 \cdot 6^2} - \frac{3^2 \cdot 5^2 \cdot 7\,m^4}{2^2 \cdot 4^2 \cdot 6^2 \cdot 8^2}\ \&c.\right\}$$

where $m = 1 - \frac{c^2}{t^2}$, t and c being the tranſverſe and conjugate diameters, and C the circumference of the circumſcribing circle $= t \times 3{\cdot}1416$.

Here, then, $1 - \frac{c^2}{t^2} = {\cdot}4375 = m$.

$$\text{1ſt term} \quad 1 \quad = \quad +\,1{\cdot}00000$$

$$\text{2d term A} = \frac{m}{2^2} = \frac{m}{4} = -\,{\cdot}10938$$

$$\text{3d term B} = \frac{3\,m^2}{2^2 \cdot 4^2} = \frac{3\,m}{4^2}\,A = -\,{\cdot}00897$$

$$\text{4th term C} = \frac{3^2 \cdot 5\,m^3}{2^2 \cdot 4^2 \cdot 6^2} = \frac{3 \cdot 5\,m}{6^2}\,B = -\,{\cdot}00164$$

$$\text{5th term D} = \frac{3^2 \cdot 5^2 \cdot 7\,m^4}{2^2 \cdot 4^2 \cdot 6^2 \cdot 8^2} = \frac{5 \cdot 7\,m}{8^2}\,C = -\,{\cdot}00039$$

$$\text{6th term E} = \frac{3^2 \cdot 5^2 \cdot 7^2 \cdot 9\,m^5}{2^2 \cdot 4^2 \cdot 6^2 \cdot 8^2 \cdot 10^2} = \frac{7 \cdot 9\,m}{10^2}\,D = -\,{\cdot}00011$$

$$\text{7th term F} = \frac{3^2 \cdot 5^2 \cdot 7^2 \cdot 9^2 \cdot 11\,m^6}{2^2 \cdot 4^2 \cdot 6^2 \cdot 8^2 \cdot 10^2 \cdot 12^2} = \frac{9 \cdot 11\,m}{12^2}\,E = -\,{\cdot}00003$$

$$\text{8th term G} = \frac{3^2 \cdot 5^2 \cdot 7^2 \cdot 9^2 \cdot 11^2 \cdot 13\,m^7}{2^2 \cdot 4^2 \cdot 6^2 \cdot 8^2 \cdot 10^2 \cdot 12^2 \cdot 14^2} = \frac{11 \cdot 13\,m}{14^2}\,F = -\,{\cdot}00001$$

Negative terms	=	·12053
Firſt term	=	1·00000
		·87947

whence $.87947 \times 24 \times 3{\cdot}1416 = 66{\cdot}31056$, the length of the curve required.

Example 6.—Required the length of the curve of a parabola, cut off by a double ordinate to the arc, whoſe length is as 12, the abſciſs being 2.

By formula 1, *for parabolic arcs.*

$$\text{Parabolic arc} = \tfrac{1}{2}\,p\left\{q\,s + \text{hyp. log.}\,(q + s)\right\}$$

where p is the parameter $= \frac{y^2}{x} = \frac{b^2}{2} = 18$, $q = \frac{2\,y}{p} = \frac{12}{18} = \frac{2}{3}$, and $s = \sqrt{(1 = q^2)} = \sqrt{(1 + \frac{4}{9})} = 1{\cdot}2018504$, whence the required arc =

$$9 \times \left\{\tfrac{2}{3} \times 1{\cdot}2018504 + \text{hyp. log. } 1{\cdot}8675170\right\}$$

Now hyp. log. $1{\cdot}867517 = {\cdot}6251449$

$\frac{2}{3} \times 1{\cdot}2018504 = {\cdot}8012336$

		1·4263785
Multiplier		9
Parabolic arc	—	12·8374065

Example 7.—Required the length of an hyperbolic arc, beginning at the vertex, the tranſverſe diameter being 80, conjugate 60, and ordinate 10.

By formula 1, *for hyperbolic arcs.*

$$\text{Arc} = c \times \left\{A + \frac{q}{2}\,B - \frac{q^2}{2 \cdot 4}\,C + \frac{3\,q^3}{2 \cdot 4 \cdot 6}\,D - \frac{3 \cdot 5\,q^4}{2 \cdot 4 \cdot 6 \cdot 8}\,E +, \&c.\right\}$$

$$\text{where} \quad \frac{t^2 + c^2}{c^4} = q = \frac{80^2 + 60^2}{60^4} = \frac{1}{324}$$

$$A = \text{hyp. log. } \frac{y + \sqrt{(c^2 + y^2)}}{c} = {\cdot}3274501$$

$$B = \tfrac{1}{2}\left\{y\,\sqrt{(c^2 + y^2)} - c^2\,A\right\} = 10.76133$$

$$C = \tfrac{1}{4}\left\{y^3\,\sqrt{(c^2 + y^2)} - 3\,c^2\,B\right\} = 641{\cdot}796405$$

$$D = \tfrac{1}{6}\left\{y^5\,\sqrt{(c^2 + y^2)} - 5\,c^2\,C\right\} = 45698{\cdot}7933$$

E =

$$E = \tfrac{1}{8}\left\{y^7\sqrt{(c^2+y^2)} - 7\,c^2 D\right\} = 3540529{\cdot}3125$$

$$\begin{array}{rrcl|rrcl}
\text{Hence} + & A & = & {\cdot}327450 & - & \frac{q^2}{2\,.\,4} C & = & {\cdot}000764 \\
+ & \frac{q}{2} B & = & {\cdot}016607 & - & \frac{3\,.\,5\,q^4}{2\,.\,4\,.\,6\,.\,8} E & = & {\cdot}000012 \\
+ & \frac{3\,q^2}{2\,.\,4\,.\,6} D & = & {\cdot}000084 & & \&c. & = & \&c. \\
 & \text{Sum} & + & {\cdot}344141 & & \text{Sum} & - & {\cdot}000776
\end{array}$$

therefore difference $\cdot 343365 \times 30 = 10{\cdot}30095$, the arc required.

Example 8.—Required the solidity of a conic frustum of which the altitude is 16, and two diameters 20 and 30.

By formula 4, *for conic frustums.*

$$\text{Solidity} = \tfrac{1}{3}\,p\left\{D^2 + D\,d + d^2\right\} \times {\cdot}7854$$

where $D = 30$, $d = 20$, and $h = 16$.

Now $30^2 + 30\,.\,20 + 20^2 = 1900$

therefore $\frac{16}{3} \times 1900 \times {\cdot}7854 = 7625{\cdot}38$, the solidity required.

Example 9.—Required the surface and solidity of the five regular bodies, the linear side of each being 2.

By the formula for the regular bodies.

Tetraedron	Surface =	$1{\cdot}73205 \times 4 = 6{\cdot}92820$
	Solidity =	$0.11785 \times 8 = {\cdot}94280$
Hexaedron	Surface =	$6{\cdot}00000 \times 4 = 24{\cdot}00000$
	Solidity =	$1{\cdot}00000 \times 8 = 8{\cdot}00000$
Octaedron	Surface =	$3{\cdot}46410 \times 4 = 14{\cdot}65640$
	Solidity =	$0{\cdot}47140 \times 8 = 3{\cdot}77120$
Dodecaedron	Surface =	$20{\cdot}64578 \times 4 = 82{\cdot}58312$
	Solidity =	$7.66312 \times 8 = 61{\cdot}30496$
Icosaedron	Surface =	$8{\cdot}66025 \times 4 = 34{\cdot}64100$
	Solidity =	$2{\cdot}18169 \times 8 = 17.45352$

These examples will be sufficient for illustrating the use of the preceding formulæ, and for rendering their application to any other problems perfectly simple and obvious. Neither the limits of this article, nor the nature of the work, would allow of our entering upon their investigation; the reader, therefore, who is desirous of information on this head, is referred to the works of Dr. Hutton and Mr. Bonnycastle, above-mentioned.

MENSURATION *of Altitudes, Distances*, &c. See ALTITUDE and DISTANCE.

MENSURATION *of Land.* See SURVEYING.

MENSURATION *of Timber*, or *Timber Measure*, is the method employed by artificers in measuring trees, joists, beams, &c.: and as these always fall under one or other of the regular solids which have been already treated of in the preceding article, it would seem unnecessary to repeat here any rules for the mensuration of timber: but the fact is, that an erroneous rule has been adopted by persons concerned in this line of business, which common practice has so established, that it is rather to be wished than expected it should be replaced by some other, either perfectly true, or approaching towards the truth; for, according to the present rule, a tree frequently contains $\frac{1}{4}$th more or less timber than it is estimated at, which, at the modern price of that article, is a matter of some importance, and merits the attention of the timber grower, as well as the merchant. Government has, in some instances, come forward to fix a standard of measure, as in corn, coals, land, &c.; and as old prejudices can never be so successfully combated, as by the authority of enlightened legislators, it is to be hoped that we may some day find this, and other topics of a similar nature, become the subject of parliamentary investigation. We will, in the following pages, shew the great inaccuracy attending the present method, but, in the first place, it will be proper to state the rule as it is at present employed by all persons concerned in the buying or selling of timber.

GENERAL RULE.

Multiply the square of the mean quarter girt, or quarter circumference, by the length of the tree, for the contents; which, when the dimensions are taken in feet, will be also feet; and this divided by 50, the number of feet in a load, will give the number of loads.

Note—1. If the piece of timber is of the same girt throughout, the girt any where taken is the mean girt.

2. If the tree tapers regularly from one end to the other, the girt taken in the middle is accounted the mean girt; or take half the sum of the girts at the two ends for the same.

3. But if the tree do not taper regularly, but is unequal, being thick in some places and small in others; it is customary to take several different dimensions, the sum of which, divided by the number of them, is accounted the mean girt. But when the tree is very irregular, it is best to divide it into several lengths, and to find the content of each separately.

4. That part of a tree, or of the branches, whose quarter girt is less than half a foot, is not accounted timber.

5. It is usual to make a certain allowance in girting a tree for the thickness of the bark, which is generally one inch to every foot in the girt. This practice, however, is unreasonable, and ought to be discouraged. Elm timber is the only kind in which any allowance is necessary, and even in this, one inch out of the whole girt is quite sufficient.

As an example in the preceding rule: let it be required to find the content of a tree, the length of which is 9 feet 6 inches; and quarter girt 3 feet 6 inches.

	By Decimals.	By Duodecimals.
	3.5	3—6
	3.5	3—6
	175	10—6
	105	1—9
Carry forward	12.25	12—3

By Decimals.		By Duodecimals.
Brought forward	12·25	12 — 3
	95	9 · 6
	6125	110 — 3
	11025	6 — 1½
Feet	116·375 = Content = Feet	116 — 4½

Such is the rule commonly uſed by perſons concerned in buying and ſelling of timber, on which we intend to make a few remarks, in order to point out its inaccuracy, which is not ſo generally known as it ought to be. Suppoſe, for inſtance, we take a balk 24 feet long, and a foot ſquare throughout, and, conſequently, its ſolidity 24 feet. Now if this piece of timber be ſlit exactly in two, from end to end, making each piece 6 inches, or ½ a foot broad, and 12 inches, or a foot thick, it is evident that the true ſolidity of each piece will be 12 feet. But by the quarter girt method they would amount to much more: for the falſe quarter girt being equal to half the ſum of the breadth and thickneſs, in this caſe will be 9 inches, or $\frac{3}{4}$ of a foot; the ſquare of which is $\frac{9}{16}$, and therefore $\frac{9}{16} \times 24 = 13\frac{1}{2}$ feet for the ſolidity of each part, making the two pieces together 27 feet, inſtead of 24, which is the true content.

Again, ſuppoſe this balk to be ſo cut, that the breadth of the one piece may be only 4 inches, or $\frac{1}{3}$ of a foot; and that of the other 8 inches, or $\frac{2}{3}$ of a foot. Here the true content of the leſs piece will be 8 feet, and that of the greater 16 feet. But proceeding by the other method, we have the quarter girt of the leſs piece $\frac{2}{3}$ of a foot, and of the other piece $\frac{5}{6}$ of a foot. Whence the content of the leſs piece will be found $= \frac{4}{9} \times 24 = 10\frac{2}{3}$ feet, inſtead of 8 feet; and the content of the greater piece will be $16\frac{2}{3}$ feet, inſtead of 16; making the ſum of the two $27\frac{1}{3}$ feet, inſtead of 24 feet. Farther, if the leſs piece be cut only two inches broad, and conſequently the greater 10 inches, the true content of the leſs piece would be 4 feet, and that of the greater 20 feet. Whereas by the other method, the quarter girt of the leſs piece would be 7 inches, or $\frac{7}{12}$ of a foot; and $\frac{49}{144} \times 24 = 8\frac{1}{2}$ feet, inſtead of 4 feet, for the content; and by the ſame method, the content of the greater piece would be $20\frac{1}{6}$ feet, inſtead of 20, and their ſum $28\frac{1}{6}$ feet, inſtead of 24.

Hence it is obvious, that the greater the proportion is between the breadth and the depth, the greater will be the error, by uſing the falſe method; and the ſum of the two parts, by the ſame method, is greater, as the difference of the ſame two parts is greater; and, conſequently, the ſum is leaſt when the two parts are equal to each other; or when the balk is cut equally in two; and finally, when the ſides of a piece of timber differ not above an inch or two from each other, the quarter girt may be uſed without any very ſenſible error. To avoid, therefore, this inconſiſtency in the reſult, the following method ſhould be employed, *viz. Multiply the length, breadth, and depth continually together, and the product will be the true content in all caſes of this kind.*

With regard to round timber the error is of a different kind. We have ſeen in the preceding article, that the area of a circle is found by ſquaring the circumference, and multiplying that ſquare by ·07958, and, therefore, if a quarter of the circumference is uſed, we muſt multiply its ſquare by $·07958 \times 16 = 1·27328$.

Hence, to find the true content of a piece of cylindrical timber, we ought to multiply the ſquare of the quarter girt by the conſtant number 1·27328, and that product by the length, inſtead of which the conſtant multiplier is omitted, and conſequently the ſolidity is returned about [illegible] parts leſs than it is. But as the utmoſt accuracy is not neceſſary in thoſe caſes, the following rule might be uſed, which is as ſimple as can be deſired, *viz. Multiply the ſquare of* $\frac{1}{5}$ *of the mean girt by double the length for the content, which is not far from the truth.*

Another error to which timber meaſure is always ſubject, is the way in which the mean girt is aſſumed in tapering trees, which, as we have before ſtated, is done either by taking the girt in the middle, or half the ſum of the extreme girts, both of which are equally falſe, ſo obviouſly ſo, that a tree of certain dimenſions will meaſure more after a part of it has been cut off, than it did before. This being the caſe, it will not be amiſs to ſhew the extreme inaccuracy of the method, and the folly in perſiſting in it, by the ſolution of the following problems, which have been taken from Dr. Hutton's Menſuration.

Problem I.

To find where a tapering timber muſt be cut, ſo that the two parts, meaſured ſeparately, ſhall meaſure the moſt poſſible, and be greater than if it were cut in any other two parts, and greater than the whole.

Put G = the greateſt girt, g = the leaſt girt, x = the girt at the ſection, z = the length of the part to be cut off, and L the whole length of the timber. Then by ſimilar figures $L : z :: G - g : x - g$; hence $x = \frac{Gz - gz}{L} + g$: but $(g + x)^2 z + (G + x)^2 (L - z)$ is to be a *maximum;* which being put into fluxions, and reduced, gives $z = \frac{1}{2} L$.

Therefore, a tree being cut exactly in the middle, the two parts will meaſure more than if it were cut in any other two parts, and more than the whole tree. If a tree, of which the greater girt is 12 feet, and leſs girt 2 feet, and length 32 feet, be thus cut in two parts, the meaſure of the two parts will exceed the meaſure of the whole tree by 18 feet.

Problem II.

To find where a tree muſt be cut, ſo that the part next the greater end may meaſure the greateſt poſſible.

Here, by uſing the ſame notation as in the laſt problem, we have alſo $x = \frac{Gz - gz}{L} + g$, and $(G + x)^2 (L - z)$ a *maximum;* which, put into fluxions as before, gives $z = \frac{G - 3g}{G - g} + \frac{1}{3} L$.

Therefore, from the greater girt ſubtract the leſs girt, and that difference divided by the difference of the girts, and multiplied by $\frac{1}{3}$ of the whole length, will be the length to be cut off.

Problem III.

To find where a tree muſt be cut, ſo that the part next the greater end may meaſure the ſame as the whole tree before it was cut.

Uſing ſtill the ſame notation, and writing beſides s for the ſum of the two girts, and d for their difference; we ſhall have $s^2 L = (L - z)(G + x)^2$, or ſubſtituting, inſtead of x, its value $\frac{Gz - gz}{L} + g$, or $\frac{dz}{L} + g$, we obtain

$$z = \frac{L}{2d} + \left\{ \sqrt{(4s^2 + d)} - 2s + d \right\}$$

which

which length being cut off, the remaining part will measure the same as the whole tree.

These results, which are the necessary consequence of the preceding rules, are so obviously erroneous and inconsistent, that they speak for themselves, and therefore require no farther comment.

MENTAL, something that relates, or is restrained, to the operation of the understanding.

Thus, a mental prayer is such a one as is made merely in the mind, without pronouncing one word of it.

Mental reservations are the refuge of hypocrites. See RESERVATION.

MENTAL *Derangement.* Under this head may be comprehended a variety of terms, which have been employed to designate certain affections of the mind, or, as they have been called, disorders of the intellect. In the preliminary part of this investigation, it is highly important to understand fully the force and meaning of the words, which are intended to establish these different significations; and also to discover the contrivances of language, which have served to characterize the phenomena of disordered understanding. That the mind has no language peculiar to itself, seems to be an admitted axiom; because all the terms which are applied to it have their origin in the physical circumstances which surround us. The mental operations, which are supposed to be extensive, have not furnished any terms, (as the result of such internal operations,) which we did not previously possess, and which we have been compelled to borrow from the objects and impressions of the material world.

Although authors have generally divided mental derangement into *mania* aand *melancholia*, according to the system of the Greeks; yet most nations have adopted peculiar expressions, to signify the form or degree of derangement of intellect. The term *derangement*, which we have taken immediately from the French, and which means out of *rank*, or *order*, is metaphorically applied to the mind, to denote that its ideas are out of the rank, or order, generally preserved by intelligent beings. *Delirium*, employed by the Romans, had its origin from the process of ploughing: for when the oxen deviated from the line to be pursued, they were said to be *de lira*, out of the track; and this figure was transferred to the deviations of the human intellect, when it erred from the established course. *Insane*, *insanus*, means merely *unsound.* The Greek μανία was probably from their verb μαίνομαί, *I rage;* μελανχολια, from μελας, *black*, and χολὴ, *bile;* black bile being supposed the cause of this disease. In the opinion of Cicero, (Disputat. Tusculan. lib. iii. c. 5.) the Roman terms, which marked the disorders of the intellect, were more appropriate than those employed by the Greeks. "Multoque melius hæc notata sunt verbis Latinis, quam Græcis: quod aliis quoque multis locis reperietur. Sed id alias: nunc, quod instat. Totum igitur id quod quærimus, quid et quale sit, verbi vis ipsa declarat. Eos enim sanos quoniam intelligi necesse est, quorum mens motu, quasi morbo, perturbata nullo sit; qui contra affecti sunt, hos insanos appellari necesse est. Itaque nihil melius, quam quod est in consuetudine sermonis Latini; cum *exisse ex potestate* dicimus eos, qui effrenati feruntur aut libidine aut iracundia: quamquam ipsa iracundia libidinis est pars: sic enim definitur, *iracundia ulciscendi libido.* Qui igitur *exisse ex potestate* dicuntur; idcirco dicuntur, quia non sunt in potestate mentis: cui regnum totius animi a natura tributum est. Græci autem μανίαν unde appellant, non facile dixerim. Eam tamen ipsam distinguimus nos melius, quam illi; hanc enim insaniam, quæ juncta stultitiæ patet latius, a furore disjungimus: Græci volunt illi quidem, sed parum valent verbo: quem nos furorem, μελανχολίαν illi vocant. Quasi vero atra bili solum mens, ac non sæpe vel iracundia graviore, vel timore, vel dolore moveatur! quo genere Athamantem, Alcmæonem, Ajacem, Orestem furere dicimus. Qui ita sit affectus, eum dominum esse rerum suarum vetant duodecim tabulæ." The supposed regulation of the intellect, in certain states, by the influence of the moon, has produced the term *lunatic;* which word still prevails in all legal proceedings relative to the insane. The vulgar opinion, that in madness the mind was broken into fragments, has given rise to the terms *crazy* (*ecrasé*, Fr.), *cracked*, and *shatter-brained.* The word *mad* has been derived by Mr. Haslam ("Observations on Madness and Melancholy") from the Gothic *mod*, which signifies *rage.* He observes, "It is true, we have now converted the *o* into *a*, and write the word *mad;* but *mod* was anciently employed." Of the similarity between violent anger and madness, the observation has been general. Cicero says, "An est quicquam similius insaniæ quam ira? quam bene Ennius initium dixit insaniæ." (Disp. Tusc.) Dr. Beddoes (Hygeia, N° 12.) observes, that "*mad* is one of those words which means almost every thing and nothing. At first, it was, I imagine, applied to the transports of rage; and when men were civilized enough to be capable of insanity, their insanity, I presume, must have been of the frantic sort; because, in the untutored, intense feelings seem regularly to carry a boisterous expression."

Authors, who have treated on the subject of mental derangement, have commonly been desirous of affording a definition: they have endeavoured to compress into a few words, or a short sentence, the prominent and discriminating phenomena of insanity, and thus to establish an essential character of the disorder. However meritorious their labours, their success has been by no means proportionate to their exertions. They have all fundamentally differed; and to enumerate their attempts is only to record their failures. Dr. Mead conjectures, "that this disease consists entirely in the strength of imagination." "Insanity," says Dr. Cullen, "consists in such false conceptions of the relations of things as lead to irrational emotions or actions. Melancholy is partial insanity, without indigestion; mania is universal insanity." Dr. Ferriar, adopting the generally accepted division of insanity into mania and melancholia, conceives, in mania, *false perception*, and consequently confusion of ideas, to be a leading circumstance. Melancholia he supposes to consist in *intensity of idea*, which is a contrary state to false perception. Dr. Arnold observes, that "insanity, as well as delirium, may be considered as divisible into two kinds; one of which may be called *ideal*, and the other *notional insanity.*

"*Ideal insanity* is that state of mind, in which a person imagines he sees, hears, or otherwise perceives, or converses with, persons or things, which either have no external existence to his senses at the time; or have no such external existence, as they are then conceived to have; or if he perceives external objects as they really exist, has yet erroneous and absurd ideas of his own form, and other sensible qualities:—such a state of mind continuing for a considerable time, and being unaccompanied with any violent or adequate degree of fever.

"*Notional insanity* is that state of mind, in which a person sees, hears, or otherwise perceives external objects, as they really exist, as objects of sense; yet conceives such notions of the powers, properties, designs, state, destination, importance, manner of existence, or the like, of things and persons, of himself and others, as appear obviously, and often grossly erroneous, or unreasonable to the common sense of the sober and judicious part of mankind. It is of considerable confiderable duration; is never accompanied with any great degree of fever, and very often with no fever at all."

Mr. Haflam, in the firft edition of his work (Obfervations on Infanity), defined infanity to be "an incorrect affociation of familiar ideas, which is independent of the prejudices of education, and is always accompanied with implicit belief, and generally with either violent or depreffing paffions." But the fame author, in his fecond edition, has omitted this definition, and feems to be convinced that, inftead of endeavouring to difcover an infallible definition of madnefs, which he believes will be found impoffible, (as it is an attempt to comprife in a few words the wide range and mutable character of this Proteus-diforder,) much greater advantage would be obtained, if the circumftances could be precifely defined, under which it is juftifiable to deprive a human being of his liberty.

Symptoms.—The approaches of infanity have been varioufly related by different writers. The late Dr. John Monro, in a pointed and elegant reply to Dr. Battie's Treatife on Madnefs, has remarked, that "high fpirits, as they are generally termed, are the firft fymptoms of this kind of diforder: thefe excite a man to take a larger quantity of wine than ufual; (for thofe who have fallen under my obfervation, in this particular, have been naturally very fober;) and the perfon thus affected, from being abftemious, referved, and modeft, fhall become quite the contrary; drink freely, talk boldly, obfcenely, fwear, fit up till midnight, fleep little, rife fuddenly from bed, go out a hunting, return again immediately, fet all his fervants to work, and employ five times the number that is neceffary: in fhort, every thing he fays or does betrays the moft violent agitation of mind, which it is not in his power to correct; and yet, in the midft of all this hurry, he will not mifplace one word, or give the leaft reafon for any one to think he *imagines* things to exift that really do not, or that they appear to him different from what they do to other people. They who fee him but feldom, admire his vivacity, are pleafed with his fallies of wit, and the fagacity of his remarks: nay, his own family are with difficulty perfuaded to take proper care of him, until it becomes abfolutely neceffary, from the apparent ruin of his health and fortune."

In many inftances, pain of the head and throbbing of its arteries precede an attack of infanity: fometimes giddinefs and confufed vifion are complained of, as precurfory fymptoms. Thofe who have been feveral times difordered are now and then fenfible of the return of their malady. Some have defcribed the attack as highly delightful; and of this pleafurable feeling, a curious inftance is recorded in the Bibliotheque Britannique, by a recovered lunatic, who had been a patient of the late Dr. Willis. "I always expected with impatience the acceffion of the paroxyfms, fince I enjoyed, during their prefence, a high degree of pleafure. They lafted ten or twelve hours. Every thing appeared eafy to me. No obftacles prefented themfelves either in theory or practice. My memory acquired, all of a fudden, a fingular degree of perfection: long paffages of Latin authors occurred to my mind. In general, I have great difficulty in finding rhythmical terminations; but then I could write in verfe with as much facility as in profe. I was cunning, malicious, and fertile in all kinds of expedients." Some have defcribed a fenfe of working in the head, and alfo in the inteftines, as if they were in a ftate of fermentation. Others obferve that they do not feem to poffefs their natural feelings; and they all agree that they become confufed, from the fudden and rapid intrufion of unconnected thoughts.

Mr. Haflam, whofe fituation in Bethlem Hofpital affords abundant opportunities of obferving this diforder, has thus related the commencement of madnefs and melancholy. "On the approach of mania, they firft become uneafy, are incapable of confining their attention, and neglect any employment to which they have been accuftomed. They get but little fleep; they are loquacious, and difpofed to harangue, and decide promptly and pofitively upon every fubject that may be ftarted. Soon after, they are diverted of all reftraint, in the declaration of their opinions of thofe with whom they are acquainted. Their friendfhips are expreffed with fervency and extravagance; their enmities with intolerance and difguft. They now become impatient of contradiction, and fcorn reproof. For fuppofed injuries, they are inclined to quarrel and fight with thofe about them. They have all the appearance of perfons inebriated; and thofe, who are unacquainted with the fymptoms of approaching mania, generally fuppofe them to be in a ftate of intoxication. At length fufpicion creeps upon the mind, they are aware of plots which had never been contrived, and detect motives that were never entertained. At laft, the fucceffion of ideas is too rapid to be examined; the mind becomes crowded with thoughts, and confufion enfues. Thofe under the influence of the depreffing paffions will exhibit a different train of fymptoms. The countenance wears an anxious and gloomy afpect; and they are little difpofed to fpeak. They retire from the company of thofe with whom they formerly affociated; feclude themfelves in obfcure places, or lie in bed the greater part of their time. Frequently, they will keep their eyes fixed to fome object for hours together, or continue them an equal time 'bent on vacuity.' They next become fearful, and conceive a thoufand fancies: often recur to fome immoral act which they have committed, or imagine themfelves guilty of crimes which they never perpetrated; believe that God has abandoned them, and with trembling await his punifhment. Frequently they become defperate, and endeavour by their own hands to terminate an exiftence, which appears to be an afflicting and hateful incumbrance."

The mental characteriftics of this diforder involve all thofe aberrations from intellectual foundnefs, and moral rectitude, which render man a worthlefs, and frequently a dangerous affociate to the community. A degree of cunning, infcrutable by ordinary perfons, and not always to be penetrated by thofe who have acquired extenfive experience of the infane, conftitutes a leading feature in mental derangement. Whenever they have meditated their own deftruction, or intended mifchief to others, the accomplifhment of the deed has often been the only notice of the intention; and the pride, which ufually accompanies this malady, has frequently induced thefe unhappy fufferers to haunt the perfons of thofe diftinguifhed by rank and elevated in office.

The bodily marks which diftinguifh the infane, are, a peculiar caft of countenance, familiar to, and recognizable by thofe verfed in this difeafe; a quick, oftentimes protruded and gliftening eye; coldnefs of the hands and feet; and a capability of fuftaining cold with impunity. But Dr. Pinel, phyfician to the Bicétre at Paris, conceives this exception from the effects of fevere cold to be by no means general, and inftances the frequent occurrence of mortified extremities during winter; and others of much experience are of the fame opinion. Obftinate conftipation has been mentioned as an unvarying attendant on madnefs; but the beft informed writers regard it merely as an occafional fymptom, prevailing only when general infenfibility is the confequence of preffure on the brain. In deranged perfons, the ear is the organ of fenfe moft af-

fected;

fected; *tinnitus aurium* and deafnefs being found very generally to prevail: whereas blindnefs, or deprivations of the fmell and tafte, have been feldom noticed. Mr. Haflam has exclufively obferved, in fome cafes, a relaxation of the fcalp; by which it may be wrinkled, or rather gathered up by the hand to a confiderable degree: it more generally occurs on the pofterior part; is not noticed in the early ftages of the difeafe, but after a raving paroxyfm of fome continuance.

Appearances on Diffection.—From the teftimonies of Chiarugi in Italy, Greding in Germany, and from Mr. Haflam's work, difeafed appearances of the brain and its membranes have been detected in thofe who have died infane. But there may exift many alterations in the ftructure of thefe parts, too minute for the eye to obferve, and which can never be brought in view by the fcalpel. Although Dr. Pinel denies the diforganifation of the brain in madnefs as peculiar to that difeafe; yet he admits, that the fame appearances are found, as occur in thofe who have died from epilepfy, apoplexy, fever, and convulfions. Thefe morbid appearances confift in exceffive determination of blood to the brain, with enlargement of its veffels, and effufion of fluids into its cavities. In many inftances the fubftance of the brain has poffeffed an increafed degree of firmnefs, and, according to the late Mr. John Hunter, has been found fo tough, as to have fome elafticity. Dr. Baillie has alfo remarked, that "when thefe changes take place in the brain, the mind is at the fame time deranged; there is either mania or lethargy; or the perfon is much fubject to convulfive paroxyfms." In other cafes the brain was of a preternaturally foft confiftence. Gangrene of the brain has fometimes occurred, but more frequently in the warmer climates, as may be feen by confulting Chiarugi. The membranes of the brain have been found varioufly altered from their healthy ftate: the tunica arachnoidea has become thickened, and rendered more or lefs opaque. The pia mater is often inflamed, and turgid with blood, and not unfrequently an extravafated blotch appears on fome part of this tunic. Effufion of a watery fluid between the membranes of the brain is a very common occurrence, and likewife into its ventricles, which have been confequently enlarged to a furprifing extent. Offifications have been detected, but principally on the dura mater.

Caufes.—In the inveftigation of the caufes of mental derangement, there is obvioufly much uncertainty; our knowledge of the human mind is too limited to affirm that particular ftates of the intellect will be the neceffary refult of certain circumftances preceding. Thofe who have attentively confidered this fubject have divided the caufes of infanity into *phyfical* and *moral*. Under the head of *phyfical* caufes, hereditary difpofition has been ftated very generally to prevail; whereby the offspring of an infane parent, or parents, will moft probably become fimilarly affected; but, whether this tranfmiffion depend more efpecially on the male, or female, has not yet been certainly determined. Injuries to the head from external violence; frequent intoxication, particularly when produced by fermented liquors which have undergone the procefs of diftillation; fever, during the courfe of which delirium has particularly prevailed; mercurial medicines, largely exhibited, and continued for a confiderable time, without due precautions; paralytic affections (but thefe are very frequently the confequence as well as the caufe of mental derangement); the fuppreffion of periodical or occafional difcharges and fecretions; and, in fome inftances, the retropulfion of cutaneous eruptions; are the ordinary phyfical caufes to which infanity has been afcribed.

The *moral* caufes include thofe emotions which are conceived to originate from the mind itfelf, and which, from their excefs, tend to diftort the natural feelings, or, from their repeated acceffions, and unreftrained indulgence, at length overthrow the barriers of reafon and eftablifhed opinion. Such are the gufts of violent anger, and the protracted indulgence of grief; the terror impreffed by erroneous views of religion; the degradation of pride; difappointment in love; and fudden fright.

Although mental derangement has been obferved in perfons of all habits and complexions, yet there is doubtlefs a temperament which particularly difpofes to infanity: and there are alfo certain modes of education, and employment of the faculties, which conduce to their derangement. According to Mr. Haflam's ftatement, out of 265 patients in Bethlem Hofpital, 205 were found to be of a fwarthy complexion, with dark or black hair; the remaining 60 were of a fair fkin; with light, brown, or red hair. Dr. Pinel, on examining the regifters of the Bicétre, fays, that he found infcribed a great many monks and priefts, as alfo a confiderable number of country people, who had been driven befide themfelves by horrid pictures of futurity; feveral artifts, as fculptors, painters, and muficians; fome verfifiers, in extacies with their own productions; a pretty confiderable number of advocates and attornies; but there does not appear the name of a fingle perfon accuftomed to the habitual exercife of his intellectual faculties; not one naturalift, or natural philofopher of ability; no chemift nor geometrician.

The *prognofis*, or means of afcertaining the probable event of mental derangement, is founded on the experience of thofe practitioners who have particularly attended to the treatment of this diforder. It is, however, to be lamented, that very few of thofe perfons, who have been beft qualified to afford information, have tranfmitted to the world the refult of their practice. Much valuable knowledge may therefore be prefumed to have perifhed. In the year 1758 Dr. Battie, the phyfician to St. Luke's Hofpital, juftly obferved in his "Treatife on Madnefs," that "among the many good reafons, offered to the public for eftablifhing another hofpital for the reception of lunatics, one, and that not the leaft confiderable, was the introducing more gentlemen of the faculty to the ftudy and practice of one of the moft important branches of phyfic." In England, females are more fubject to infanity than men; but abroad, the cafe is believed to be reverfed. From 1748 to 1794, a period of 46 years, there were admitted into Bethlem Hofpital 4832 women, and 4042 men. Dr. Chiarugi of Florence, who, during four years, faw in the hofpitals of St. Dorothea and St. Bonifacio 1157 lunatics, ftates the proportion of deranged males, as exceeding that of females by one-fifth. Females recover from mental derangement in a greater proportion than men: of the above mentioned 4832 women, 1402 were difcharged cured; of the 4042 men, 1155 recovered.

As infanity frequently fupervenes on parturition, women, becoming deranged from fuch caufe, recover in a very large proportion. During ten years, 80 patients of this defcription were admitted into Bethlem Hofpital, 50 of whom perfectly recovered. When females become worfe at the period of menftruation, or have their catamenia in profufe or deficient quantities, fuch occurrences may be confidered unfavourable.

The chance of recovery is greater when the patient is attacked with mania, than when affected with melancholia. When the maniacal and melancholic ftates alternate, the hope of recovery is diminifhed. A greater number of patients are obferved to recover, when the mental derange-

ment

ment has been produced from remote *physical* causes, than when it has arisen from causes of a *moral* nature.

It appears from the united testimonies of Dr. Pinel and Mr. Haslam, that a greater number of insane patients have been admitted into the Bicêtre, and Bethlem Hospital, from the age of 30 to 40, than during any other equal period of life; and from the statement of the latter, it may be inferred, that the disease is less frequently cured when it attacks persons of an advanced age. The following statement comprises the number of patients admitted into Bethlem Hospital from 1784 to 1794. The first column marks the age: the second the number admitted; the third notes the number cured; the fourth those who were discharged not cured.

Age between.	Number admitted.	Number discharged cured.	Number discharged uncured.
10 and 20	113	78	35
20 — 30	488	200	288
30 — 40	527	180	347
40 — 50	362	87	275
50 — 60	143	25	118
60 — 70	31	4	27

It is also calculated, that the chance of cure is diminished, in proportion to the length of time which the disorder has continued.

Where mental derangement is complicated with palsy or epilepsy, or where the natural powers of the mind become enfeebled during its continuance, there is but little hope of the patient's recovery. The insanity, which is often excited by the impression of religious terror,—by those gloomy views of futurity, and that constant dread of divine vengeance which false notions on this subject usually inspire,—has seldom a favourable termination. When the derangement has acquired a systematic character, it becomes very difficult to remove: in this state, incidents the most unconnected are easily reconciled, and become fondly involved with the prevailing delusion.

The *Cure* of mental derangement may properly be divided into *management* and *medicine:* for it appears to be the opinion of those who have most successfully treated this disorder, that the proper controul and subjection of the patient to salutary and established rules are of equal importance with the prescription of remedies.

By the common consent of foreigners, the English are supposed particularly to excel in the moral management of this disorder. It is, however, to be regretted, that general directions only can be given on this subject: the precise adaptation of these principles to individual cases, must depend on the skill, address, and experience of the practitioner.

Insane persons are most advantageously treated when removed from home, and from the interference of their immediate relations and friends. While they remain in their own houses, it is nearly impossible to divest them of the authority which they had been accustomed to maintain; and the salutary regulations of the superintendant are frequently rendered useless, by the mistaken indulgence of their family connections. A system of regularity should be established in their actions; and restraint should instantly be imposed on disobedience. As the deranged person should be taught to view the superintendant of his conduct with respect, the latter should be careful to deserve it by vigilant firmness, and steady decorum. The confidence of the maniac can never be reposed in ignorance and mismanagement, nor can his esteem be imparted to unfeeling and tyrannical assumption. Although it is proper to curb the extravagant sallies of the patient; yet no advantage appears to be derived from an endeavour to convince him by argument; the less frequently the subjects of his delusion are referred to, the more easily he becomes managed. When the insane are convalescent, the occasional visits of their friends are attended with manifest advantage: such intercourse brightens the prospects of future life, and often acts as a stimulus to self-restraint. But in certain states of the disorder, where pride, malevolence, and cunning, form the leading features of derangement, the ill-timed admission of friends has been signally prejudicial: it has tended to unfix the authority of the superintendant, and introduced a train of associations which has aggravated the malady. Of the beneficial effects of mild and humane treatment in this disorder, Mr. Haslam says, "Speaking of the effects of management on an extensive scale, I can truly declare, that by gentleness of manner, and kindness of treatment, I have seldom failed to obtain the confidence and conciliate the esteem of insane persons; and have succeeded by these means in procuring from them respect and obedience. There are certainly some patients who are not to be trusted, and in whom malevolence forms the prominent feature of their character: such persons should always be kept under a certain restraint, but this is not incompatible with kindness and humanity."

Deception on the part of the medical superintendant should never be resorted to. The late Dr. John Monro emphatically observes, "The physician should never deceive them in any thing, but more particularly with regard to their distemper; yet as they are generally conscious of it themselves, they acquire a kind of reverence for those who know it, and by letting them see that he is thoroughly acquainted with their complaint, he may very often gain such an ascendant over them, that they will readily follow his directions." Formerly coercion was employed with a degree of severity, that amounted to vindictive punishment: recourse was had to the whip, and stripes were actually inflicted by medical direction. The more rational and humane treatment of modern practitioners, has induced them to employ coercion only as a protecting restraint; to guard the patient from doing mischief to himself, or offering violence to others; and for this purpose the straight-waistcoat is usually sufficient.

Medicine.—An enumeration of all the remedies which have been proposed, and strongly recommended for the cure of mental derangement, would extend this article to an unprofitable length. The ancient physicians principally confided in a species of hellebore, which was cultivated with the greatest attention, prepared with the utmost care, and exhibited under particular cautions; but concerning these matters there was unfortunately much diversity of opinion. Considering the various and opposite states of mental derangement, a rational mind would scarcely expect any particular drug to possess powers adequate to the restoration of reason. If insanity be a disease of the *mind itself*, corporeal remedies can be of little utility; if an affection of the brain, and nervous system, no particular medicine can be supposed capable of restoring the various lesions, which anatomical investigation has detected.

When the experience of eminent practitioners is at variance; when remedies, which have been extolled for their virtues and successful operation by one medical writer, have been asserted by another to be impotent and unprosperous, the subject of cure becomes entangled with insuperable difficulties. Modern practitioners are nearly agreed, that at the commencement of this disorder, *bleeding* may be employed with advantage; and drawing blood by cupping-glasses has been usually preferred. Little difference of opinion has prevailed

vailed concerning the utility of *cathartics:* some practitioners have, however, preferred particular articles of this tribe, as elaterium, calomel, jalap, &c.; while others have succeeded with the milder purgatives, as senna, and the solutions of neutral salts, with the addition of a small quantity of the antimonium tartarizatum. As recovery is often preceded by a spontaneous diarrhœa, purgative medicines may be esteemed, under a judicious exhibition, of signal utility in most cases of mental derangement.

Emetics.—Practitioners are much divided in opinion respecting the propriety of administering vomits as a remedy for insanity. The late Dr. John Monro thought "the evacuation by vomiting infinitely preferable to any other." Dr. Cox is equally partial to emetics as a cure for mental derangement. Mr. Haslam, however, entertains an unfavourable opinion of them: he states that, in some instances, paralytic affections have supervened within a few hours after the exhibition of an emetic; more especially when the patient has been of a full habit, and has had the appearance of an increased determination to the head. Perhaps in melancholia, emetics may be more generally advantageous; and in furious mania, the same remedies may be employed merely in nauseating doses, to prevent the severe convulsion of vomiting.

Opium has seldom procured sleep, when given in the furious state of insanity. Notwithstanding the encomium of this remedy by Bernard Heute, the respectable testimonies of Dr. Ferriar and others have not induced any expectation of benefit from its employment. Dr. Chiarugi deposes to the sedative effect of a watery solution of opium, applied to the internal membrane of the nose with a camel's-hair pencil. Of the remaining tribe of narcotic remedies we have little that is satisfactory on record.

Digitalis, though strongly recommended by some, has produced no benefit in the hands of others. Dr. Ferriar expressly states, "that he has given this remedy, even to nauseating doses; but with no advantage. It never suspended the appearances of insanity for a moment."

Camphor has been much extolled for its virtues in mental derangement; but Dr. Ferriar and Mr. Haslam, who gave it in large doses, did not experience any considerable benefit from the employment of this remedy. Dr. Laughter mentions nine cases of insanity cured by camphor; but in these instances it was combined with vinegar. Dr. Leopold Avenbrugger, in a curious tract entitled "Experimentum noscens de remedio specifico, sub signo specifico in mania virorum," Vienna, 1772, has spoken still more highly of the specific virtues of camphor in this disease. *Blisters* have had their advocates; but it seems to be the opinion of those whose experience has been most extensive, that they succeed better when put to the lower extremities, than applied directly to the head. Issues and setons may in many cases be used with advantage; but they should be allowed to discharge for a considerable time; as their beneficial effects are not immediately apparent.

In some instances the *warm bath* has mitigated the fury of the patient, and in melancholia the use of the *cold bath* has been thought advantageous.

It appears to be a radical defect in almost all the institutions for the insane, that no plan for the *employment* of the patients has been hitherto adopted. Many difficulties certainly occur, as to the nature of the labour in which they ought to be engaged; but a judicious contrivance might surmount them, and appropriate a salutary exercise and amusement to the different classes of the insane.

MENTCHIKOF, Alexander, in *Biography*, a statesman and general under the czar Peter I., was the son of peasants who were the vassals of the monastery of Cosmopoli. At the age of thirteen he went to Moscow to obtain the means of subsistence, and was taken into the service of a pastrycook, who employed him to vend his goods by crying them about the streets of that then celebrated city, now, alas, [Oct. 1812,] desolated by the madness of war. The czar happened one day to hear him, and being struck with the pleasant song which he annexed to his cry, entered into conversation, and, in the end, ordered him to come to court, where he was at first placed in a very low station, but his talents were discoverable in the midst of all disadvantages, and it was seen he had a wonderful facility in acquiring several languages. The czar took him to serve about his person, and he was from that time gradually advanced to the highest employments, till at length he became one of the most successful generals in the Russian army. When Peter went on his travels for improvement, he took Mentchikof for his companion, and, in 1706, he was created a prince of the German empire, and was, after this, frequently employed on occasions of ceremony to personate the czar, who chose rather to appear as a private person in his train. He was victorious over the Swedes, in the war against Charles XII., and had the command of the left wing of the Russians at the decisive battle of Pultowa, in the year 1709. His situation enabled him to acquire great wealth, but in 1715 he was called to an account for certain abuses of the administration, and fell under the censure of his sovereign. He was afterwards restored to his favour, and even placed at the head of the council of regency, when Peter set out on his expedition to Persia. He greatly contributed to the succession of the empress Catherine at the death of Peter, and upon her demise he took measures to insure the crown to Peter Alexievitch, on condition that he should espouse his eldest daughter. The accession took place in 1727, and Peter was betrothed to his intended bride. Mentchikof now assumed all the arrogance of uncontrollable sway, which in a very short time occasioned an order for his arrest: this was followed by a decree of banishment. It was intended to confine him to his own estate; he imprudently left the capital with a splendid train, which his enemies construed into marks of contempt for the emperor, who readily dispatched an order to carry him prisoner to Siberia. The place of his confinement was Beresof, on the rude and desolate banks of the Oby. His wife, who had been delicately brought up, wept herself blind, and expired in the course of her journey. His own mind soon accommodated itself to his situation. He cultivated a small farm, and, by industry and frugality, saved enough from his daily pittance, of ten rubles, to build a wooden church, in the erection of which he assisted with his own hands. He died in November 1729, little more than two years from the time of his banishment. Univer. Hist.

MENTHA, in *Botany*, an ancient Latin word, mostly written Menta, adopted from the Greeks, whose μινθη is synonimous with their ἡδυοσμος, the latter being most generally used; see Dioscorides, book 3. chap. 41. The nymph Mintha, a favourite of Pluto, is fabled to have been changed by Proserpine into this herb, as incidentally mentioned by Ovid; Metam. book 10. 729.—Mint.—Linn. Gen. 291. Schreb. 387. Willd. Sp. Pl. v. 3. 74. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 609. Tr. of Linn. Soc. v. 5. 171. Prodr. Fl. Græc. Sibth. v. 1. 402. Brown. Prod. Nov. Holl. v. 1. 505. Ait. Hort. Kew. ed. 2. v. 3. 387. Juss. 113. Tourn. t. 89. Lamarck Dict. v. 4. 102. Illustr. t. 503.—Class and order, *Didynamia Gymnospermia*. Nat. Ord. *Verticillatæ*, Linn. *Labiatæ*, Juss.

Gen.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, tubular, erect, with five nearly equal teeth, permanent. *Cor.* of one petal, erect, tubular, somewhat longer than the calyx; limb in four deep, nearly equal, segments, the uppermost only being rather the broadest, and cloven. *Stam.* Filaments four, awl-shaped, erect, distant, the two nearest ones longest; anthers roundish. *Pist.* Germen superior, four-cleft; style thread-shaped, erect, longer than the corolla; stigma in two divaricated divisions. *Peric.* none, except the permanent straight calyx. *Seeds* four, small, generally abortive.

Ess. Ch. Calyx five-cleft, nearly equal. Corolla nearly equal, four-cleft; its broadest segment cloven. Stamens erect, distant.

This is one of the most natural genera possible; well marked in habit and characters. The herbage, and even the flowers, abound with resinous dots, the seat of an essential oil, on which the warm and aromatic qualities of these plants depend. Their flavour is different in the different species, and variable in the same, but on the whole almost peculiar to the genus. The following characters apply to the species in general. *Root* creeping, perennial. *Stems* square, branched, leafy. *Leaves* opposite, simple, undivided, generally serrated. *Flowers* in stalked many-flowered whorls, which are either axillary, capitate, or spiked. *Calyx* striated, or ribbed, rather dilated upward, almost regular, either naked, or clothed more or less completely with simple hairs, whose direction differs in different species, but is very constant in the same. Very rarely this part is covered with soft downy pubescence. *Corolla* funnel-shaped, purplish. *Stamens* inserted into its tube; when perfect generally longer than the limb. *Herbage* generally more or less hairy.

Mentha is principally an European and British genus. There are however some American and even East Indian species. Those of our own country have always been found extremely difficult to determine. Neither the shape of the leaves, general pubescence, length of the stamens, nor even the inflorescence, all which have been resorted to by botanists, has been found constant or certain. The writer of this article first proposed a mode of distinction, founded on the pubescence of the calyx and flower-stalks, and its various direction. By this clue all the British species are settled in the Transactions of the Linn. Soc. and Fl. Brit. above quoted, and we shall here apply it to the exotic ones. For want of having received information of this mode of discrimination, Willdenow has greatly failed in his view of the species. The same may, in some measure, be said of Mr. Sole of Bath, who published, in 1798, a Botanical Arrangement of the British Mints, in folio, with 24 plates; a work nevertheless of much original observation, and more correct as to species than most that had preceded it; though no attention is paid by his draughtsman to the pubescence of the calyx, in which respect no dependence whatever can be placed on his figures.

1. M. *auricularia.* Ear Mint. Linn. Mant. 81. Mat. Med. ed. 4. 169. Dale Pharmac. 160. Stokes Mat. Med. v. 3. 310. (M. fœtida; Burm. Ind. 126. Majana fœtida; Rumph. Amboin. v. 6. 41. t. 16. f. 2.)—Spikes tapering, close, hairy. Leaves ovate, coarsely serrated; hairy and green on both sides. Bracteas ovate.—Native of the East Indies. We have it from China, as well as from Java. The *stem* is densely clothed with long, shaggy, tawny, horizontal hairs. *Leaves* on very short hairy stalks, ovate or somewhat oblong, bluntish, coarsely and unequally serrated, from one to two inches in length, various in breadth; bright green above, and clothed with numerous, scattered, silky hairs; a very little paler beneath, finely dotted, not at all hoary, the ribs and veins extremely hairy. *Spikes* solitary, terminal, an inch or two long, tapering, close and uninterrupted; each whorl accompanied by a pair of opposite, ovate, fringed *bracteas*, each pair crossing the next. *Flowers* crowded, small, nearly sessile. *Calyx* bell-shaped, spreading, with five broad blunt teeth, which are fringed with numerous hairs, the rest of the calyx being smooth and even, besprinkled with shining glandular dots. *Corolla* twice as long as the calyx, somewhat hairy. *Stamens* a little prominent.—This herb is celebrated as a powerful remedy for deafness. We have already mentioned, see HEDYOTIS, that Linnæus confounded it, at one time, with our second species of that genus, than which few plants can be more distinct.

2. M. *quadrifolia.* Downy Four-leaved Mint. Rottl. MSS.—Leaves linear-lanceolate, serrated, downy on both sides; those of the stem four in a whorl. Spikes cylindrical, very long, close, hairy. Bracteas linear-lanceolate.—Sent by Dr. Rottler from Madras. The whole *plant* is clothed with dense velvet-like down. *Stem* nearly round, with whorled branches. The *leaves* on the latter are opposite only; those of the stem four in each whorl; all narrow, bluntish, with shallow serratures. *Spikes* terminal, solitary, cylindrical, very close, the principal one about six inches long, those of the branches much smaller. *Bracteas* lanceolate, or linear, minutely hispid. *Flowers* innumerable, crowded. *Calyx* bell-shaped, even, most hairy in its upper part, especially about the teeth. *Corolla* hairy. *Stamens* and *style* prominent.—We are much inclined to suspect this may be the *Stoechado-mentha,* Linn. Zeyl. 194, Mentha zeylanica camphorata hirsuta, Burm. Zeyl. 157; but the descriptions of the inflorescence, in these works, do not accord with our plant; the spikes or heads being there implied, if not positively said, to be short, whereas in our specimen they are remarkably long.

3. M. *verticillata.* Smooth Whorl-leaved Mint. Rottl. MSS.—Leaves linear-lanceolate, serrated, smooth, all whorled. Spikes solitary, cylindrical, somewhat interrupted. Calyx longer than the bracteas, with blunt, spreading, very hairy teeth.—Sent by Dr. Rottler from Madras. The *herbage* is nearly smooth. *Stem* striated, almost round, tumid above and below each joint, with whorled *branches* and *leaves.* The latter are linear, tapering at each end, furnished with shallow distant serratures. *Spikes* terminal, solitary, cylindrical, from one to two inches long; their whorls tumid and slightly interrupted, with short concealed *bracteas.* *Calyx* funnel-shaped, clothed in its upper half with copious short dense hairs; the teeth obtuse and widely spreading; the inside smooth. *Corolla* very small, whitish, hairy. Only one *seed* seems to come to perfection, and this is large, globose and smooth.

4. M. *stellata.* Stellated Cluster-spiked Mint. Lour. Cochinch. 361. *Rau ngu hoang* of the Cochinchinese.—Leaves oblong, obtuse, serrated, smooth, four in a whorl. Spikes clustered, oblong.—Found by Loureiro in moist uncultivated ground in Cochinchina. *Stem* a foot high, with four furrows. *Leaves* stellated, four in a whorl. *Flowers* minute, pale violet. *Calyx* erect, with sharp teeth. *Stamens* surrounded about the middle with long hairs. *Seeds* four, roundish.—We know nothing of this species but from the author quoted. The clustered *spikes* mark it as distinct from the last.

5. M. *incana.* Hoary Slender-spiked Mint. Sole MSS. Donn. Cant. ed. 5. 142. (M. chalepensis; Mill. Dict. ed. 8. n. 10. Menthastrum chalepense angustifolium, raro florens; Boerh. Lugd-Bat. ed. 2. v. 1. 185.)—Leaves ovate-oblong, serrated, nearly sessile, very soft and downy on both sides. Spikes solitary, very slender.—Native of Aleppo.

 Hardy

Hardy in our gardens, but it rarely flowers, unlefs, as Miller fays, it be confined in a pot. The *ftem* is fquare, a yard high, purplifh, minutely hairy, roughifh to the touch, leafy, with numerous oppofite branches. *Leaves* from one to two inches long, nearly or quite feffile, ovate-oblong, or fomewhat elliptical, acute, finely and fharply ferrated, entirely clothed with fine, fhort, denfe, hoary pubefcence. The *flowers* we have never feen. This fpecies feems neareft akin to the *fylveftris*.

6. M. *fylveftris*. Horfe Mint. Linn. Sp. Pl. 804. Engl. Bot. t. 686. Fl. Dan. t. 484. (M. villofa; Sole Menth. t. 1 and 2. M. rotundifolia; Sole Menth. t. 4. Menthaftrum; Ger. em. 684. Riv. Monop. Irr. t. 51. f. 1. Camer. Epit. 479. Fuchf. Hift. 292. M. hortenfis fecunda; ibid 298.)—Leaves acute, with tooth-like ferratures, chiefly downy beneath. Spikes hairy, flightly interrupted. Bracteas awl-fhaped.—Native of wafte ground, in rather moift fituations, throughout Europe, flowering, like moft of the genus, towards autumn. The *ftem* is from two to four feet high, fquare, fhaggy with hairs pointing downwards. *Leaves* feffile, of a grey and hoary afpect, whitifh underneath, with a ftrong difagreeable fcent for the moft part, though fome German and Swifs varieties are faid to be agreeably fragrant. Their fhape varies greatly, from oblong, or ovate, to a very broad, almoft orbicular, figure, as may be feen by the different figures above cited. The *fpikes*, folitary at the end of every branch, are thick, various in length, confifting of crowded, many-flowered, hairy *whorls*, with long, linear, acute, hairy *bracteas*, the lowermoft of which are broadeft. *Flower-ftalks* covered with clofely deflexed hairs. *Calyx* all over hairy, with long fharp teeth. *Corolla* pale lilac, hairy, twice as long as the calyx. *Stamens* occafionally longer or fhorter than the corolla, generally the latter.

We have from Switzerland, under the name of *M. fuavis* of Hoffmann, a narrow fharp-leaved variety of this; and from Pyrmont, one with broad ovate leaves, as *M. gratiffima* of Ehrhart, fee Hoffm. Germ. for 1791. 203; both have very hoary fpikes. We prefume the latter is the identical *M. fuaveolens*, Ehrh. Beitr. fafc. 7. 149, but the fynonyms there given all belong to the real *rotundifolia*, than which nothing can lefs deferve the name of *fuaveolens*. Willdenow quotes Ehrhart, with doubt, but rightly, under his own *nemorofa*, which is merely the ovate variety of *fylveftris*. The *gratiffima* of Willdenow is a repetition of the fame.

7. M. *niliaca*. Egyptian Mint. Jacq. Hort. Vind. v. 3. 46. t. 87.—Leaves ovate, acute, ferrated, hairy on both fides; paler beneath. Spikes clustered. Stamens much longer than the corolla, fmooth.—Native of Egypt. As Vahl and Willdenow adopt this fpecies, and we have feen no fpecimen, we would not prefume to refer it abfolutely to the laft, but we are much perfuaded that it is a mere variety. Jacquin defcribes the *leaves* as villous, though green on both fides; Vahl fays they are, in the wild plant, foft and hoary. The length of the *ftamens*, though ftriking, is by no means to be relied on for a fpecific character.

8. M. *glabrata*. Smooth Spiked Mint. Willd. n. 6. Vahl. Symb. v. 3. 75. (M. kahirina; Forfk. Ægypt-Arab; 213.)—"Leaves ftalked, ovato-lanceolate, ferrated, fmooth. Flowers in whorled clufters."—Found by Forfkall about Cairo in Egypt. The whole *plant* is faid to be fmooth. *Leaves* half an inch (we prefume) in breadth, dotted beneath. *Clufter*, or *fpike*, terminal of courfe. *Whorls* with nine umbellate flowers at each fide. *Bracteas* linear, the length of the whorls. *Stamens* fhorter, and *ftyle* longer, than the corolla.—Our account is taken from Willdenow, who copies Vahl. The latter examined Forfkall's fpecimen.

9. M. *rotundifolia*. Round-leaved Mint. Linn. Sp. Pl. 805. Engl. Bot. t. 446. (M. crifpa; Linn. Sp. Pl. ed. 1. 576. M. fylveftris; Sole Menth. t. 3. Menthaftrum anglicum; Riv. Monop. Irr. t. 51. f. 2. M. niveum anglicum; Ger. em. 684.)—Leaves elliptical, obtufe, rugged, crenate, villous beneath. Spikes interrupted, fomewhat hairy. Bracteas lanceolate.—Native of Germany, Switzerland, and England, in wafte marfhy ground. With us it is rather rare. In a variegated ftate, as defcribed by Gerarde, it often occurs in gardens, and is fometimes almoft entirely white, like blanched endive. This, which Mr. Sole unaccountably miftook for the *fylveftris*, is totally diftinct from every variety of that fpecies. The invariably fhort, roundifh, convex, and obtufe *leaves*, rugofe, of a dark grafs green, (not grey or hoary,) above; ftrongly reticulated with very hairy veins, but not hoary, beneath; and the very peculiar ftrong fmell, and vifcidity, of the whole plant, mark it with fufficient precifion. The *fpikes* are often clustered or panicled, more or lefs interrupted. *Bracteas* ovate, fharp-pointed, prominent. *Flower-ftalks* clothed with deflexed hairs. *Calyx* fhort, bell-fhaped, hairy all over, with long, fharp, coloured teeth. *Corolla* much like that of *fylveftris*. *Stamens*, as far as we have obferved, always longer than the petal.

Mr. Sole greatly commends this mint for its ftimulating refrefhing virtues, to which we can readily give credit, on account of its powerful fcent, well compared by that writer to a mixture of volatile falt of amber, camphor, and mint. He found it of great ufe in *chlorofis*, and not without fome effect in epilepfy. He miftakes however in thinking it the "true *Menthaftrum*, or Wild Horfe Mint, of the fhops." That plant of Dale's *Pharmacologia*, 159, our beft authority, is certainly the *fylveftris*; defcribed above. The *Mentha fylveftris* of Dale, as well as of Sole, is our *rotundifolia* here defcribed. This is the more important to be obferved, as the plants are probably very different in qualities.

10. M. *viridis*. Spear Mint. Linn. Sp. Pl. 804. Engl. Bot. t. 2424. Woodv. Med. Bot. t. 170. Sole Menth. t. 5. (M. romana; Ger. em. 680.)—Leaves feffile, lanceolate, acute, naked. Spikes interrupted. Bracteas briftle-fhaped, more or lefs hairy, as well as the teeth of the calyx.—Native of moift meadows, in various parts of Europe. In gardens it is fufficiently well known, by the names of Spear Mint, and Mackerell Mint, and is the *Mentha*, fimply fo called, of the fhops, the firft fpecies in Dale's *Pharmacologia*; being the only kind, except Peppermint next mentioned, retained in the moft recent London *Pharmacopeia*.—There are however feveral remarkable varieties of this fpecies, wild in England, whofe flavours and qualities differ from the beft or cultivated kind; though the latter is alfo a native of the fouthern parts of our ifland. The *ftems* are two or three feet high, erect, fmooth, with fharp angles, branched, often purplifh. *Leaves* feffile, lanceolate, acute, fharply ferrated, or in fome cafes toothed, fmooth, except an occafional hairinefs beneath. They are ftrongly veined, and in the varieties juft alluded to, they are confiderably rugofe, as well as of a broader and fhorter figure. In an exotic variety, whofe hiftory is given in Tranf. of the Linn. Soc. v. 5. 187, 188, and from which the defcription of Miller's *rubra*, n. 9, of his 8th edition, was made, the *leaves* are broadly ovate, with long wavy teeth, almoft like *M. crifpa*, hereafter mentioned. The *fpikes* are always more or lefs interrupted, tapering. *Bracteas* awl-fhaped, very flender at the point, keeled, roughifh, fometimes three-cleft, the lower and larger ones moftly affuming an ovate form. *Flower-ftalks* always fmooth, round and fhining. *Calyx* ribbed,

ribbed, tapering at the base, and equally smooth and naked in that part, but the teeth are fringed, more or less conspicuously, even in the garden variety, and very copiously in the more common wild ones, with hoary hairs. The *corolla* is smooth. *Stamens* various in length.

This species may be known, in all cases, from the *sylvestris*, with which some of its varieties have often been confounded, by the invariable smoothness of its *flower-stalks* and base of the *calyx*. The varieties with shorter rugose *leaves*, and most hairy *calyx-teeth*, have the most strong and disagreeable flavours, and are not fit for the uses of the table. Another variety has been sent us by the Rev. Dr. Muhlenberg, from Pensylvania, of a diminutive stature, with ovate *leaves*, not an inch long at the utmost, but in every essential character agreeing with the above.

11. M. *piperita*. Pepper Mint. Sm. Fl. Brit. n. 4. Engl. Bot. t. 687. Hudſ. 251. Woodv. Med. Bot. t. 169. Sole Menth. t. 7, 8, and 24. Ehrh. Pl. Off. 216. Willd. n. 13. (M. spicis brevioribus et habitioribus, foliis Menthæ fuscæ, sapore fervido piperis; Raii Syn. 234. t. 10. f. 2.)—Leaves stalked, ovate, smoothish. Spikes obtuse, interrupted in their lower part. Calyx very smooth at the base.—Native of watery places in various parts of England, but it seems not to have been found wild any where else. In gardens it is every where cultivated, for the sake of its valuable medicinal properties, which are of a stimulating or stomachic kind, and exist in great perfection in the essential oil and distilled water. It appears by the Linnæan herbarium, and we think also by the Mat. Med. of Bergius, 516, though his description unfortunately omits what would absolutely decide the question, that the Pepper Mint cultivated in Sweden is not our's, but a high-flavoured variety of *M. hirsuta*, which, even in the old Linnæan specimen, still retains the taste of real Pepper Mint. Its *calyx* is entirely clothed with ascending hairs, the *flower-stalks* with deflexed ones, the essential characters of *M. hirsuta;* whereas the *piperita* has the *calyx-teeth* only hairy, the lower part of the *calyx*, and that of the *stalks*, being always remarkably smooth and polished. Hence it appears why Linnæus reckoned his *piperita* among the capitate species. Our's is truly spiked, though the spikes vary in length, and are usually blunter than in the *sylvestris* and *rotundifolia*. Mr. Sole's plates well display the two extremes, but we can easily trace one variety into the other.

The *stem* of *M. piperita* is generally two or three feet high, purplish, with some scattered deflexed hairs, and numerous opposite branches. *Leaves* on stalks of a moderate length, ovate, acute, more or less elongated, and varying from one to three inches in length, sharply serrated; dark green and nearly smooth above; paler beneath, with many, parallel, whitish or purplish, hairy veins. The *spikes* are thick, with lanceolate, fringed, long-pointed *bracteas;* one or two of their lower whorls often very distant. *Flower-stalks* sometimes a little hairy in their upper part. *Calyx* as above described, its teeth sharp, mostly purple. *Corolla* purplish, smooth, longer than the *stamens*.—The flavour of the whole herb is pungent, highly aromatic, leaving a coolness in the mouth, like camphor, and finally a disagreeable bitterness. We have gathered, truly wild, in the romantic dale of Bonsall, near Matlock, the precise Pepper Mint of the gardens, in its highest perfection, with elongated spikes; which is of rare occurrence in a wild state.

12. M. *crispa*. Curled Mint. Linn. Sp. Pl. 805. Berg. Mat. Med. 513. Ehrh. Pl. Off. 206. Riv. Monop. Irr. t. 50. (M. n. 230; Hall. Hist. v. 1. 100. M. crispa danica; Moris. sect. 11. t. 6. f. 5.)—Leaves sessile, heart-shaped, wavy, strongly toothed. Spikes capitate, blunt. Teeth of the calyx, and top of the flower-stalks slightly hairy.—Native of Siberia, according to Linnæus. Haller considered it as merely the outcast of gardens in Switzerland. With us it is only seen in a cultivated state, and that but rarely. The stems are three or four feet high, rather bluntly quadrangular, clothed with a few hairs curved downward, but little branched, leafy. *Leaves* numerous, nearly or quite sessile, heart-shaped, somewhat pointed, short and very broad, wavy and plaited, with very strong, twisted, crowded, acute, marginal teeth; nearly smooth above; slightly hairy beneath; the veins all radiating, as it were, from the lower part of the mid-rib. *Spikes* usually short, capitate, and very blunt; sometimes more elongated and tapering, as in the plate of Rivinus. *Bracteas* broad, recurved. *Flower-stalks* smooth, except a roughness, or slight hairiness, at the very summit. *Calyx* ribbed, tumid at the base, contracted a little higher up, smooth, except a few marginal hairs on the long and sharp teeth. *Corolla* smooth, purplish, rather longer than the stamens.—This is most akin in foliage to the exotic variety of *M. viridis* above-mentioned; nor do their *calyces* or *flower-stalks* much differ. We are by no means certain that it ought not likewise to be considered as a form of *viridis*. The original *crispa* of Sp. Pl. ed. 1, is no other than *rotundifolia*, which is also the *crispa* of Jacquin. As the specimen came from Siberia, it seems to have caused Linnæus to attribute that *habitat* to the species, which thus proves erroneous. Roth says the true *crispa*, which by his description he seems to understand, is found in watery places near Rübeland in Hercynia.—*M. dentata*, Willd. n. 15, seems by his own suggestion, as well as the description, to be a whorled variety of this.

13. M. *odorata*. Bergamot Mint. Sm. Fl. Brit. n. 5. Engl. Bot. t. 1025. Sole Menth. t. 9. (M. citrata; Ehrh. Beitr. fasc. 7. 150. Willd. n. 13. M. rubra; Mill. Dict. ed. 8. n. 9, with a false description, as mentioned under *M. viridis*.)—Leaves stalked, heart-shaped, naked on both sides. Spikes capitate, very blunt. Calyx and flower-stalks perfectly smooth.—Native of watery places in Cheshire and North Wales. *Sole*. Willdenow thinks it may possibly be wild in the Palatinate. In gardens it is often preserved, for the sake of its fine scent, resembling that of the Bergamot Orange, being more powerful than *Monarda didyma*. The whole *herb* often assumes a dark purplish hue, in which it agrees with *piperita;* but it differs from all the Mints known to us, at least all that otherwise approach it, in being perfectly destitute of hairiness throughout. The *leaves* are broad, short, and heart-shaped. *Inflorescence* more truly capitate than in any variety of the Pepper Mint, and agreeing with the capitate state of *M. hirsuta*, n. 14, from which the uniformly smooth *flower-stalks* and *calyx* always keep it very distinct.

14. M. *hirsuta*. Hairy Mint. Sm. Fl. Brit. 616.

α, with short round terminal heads. M. hirsuta; Linn. Mant. 81. Sm. Tr. of L. Soc. v. 5. 193. Hudſ. ed. 1. 223. Engl. Bot. t. 447. (M. aquatica; Hudſ. 252, α and β. Sole Menth. t. 10, 11. M. aquatica, sive Sisymbrium; Raii Syn. 233. Ger. em. 684. M. palustris spicata; Riv. Monop. Irr. t. 49. M. Sisymbrium dicta hirsuta, glomerulis ac foliis minoribus ac rotundioribus; Dill. in Raii Syn. 233. t. 10. f. 1. M. piperita; Linn. Sp. Pl. 805. Berg. Mat. Med. 516. Origanum vulgare; Fl. Dan. t. 638!)

β, with a more elongated terminal head, or blunt spike. M. hirsuta δ and ε. Fl. Brit. 617. (M. palustris; Sole Menth. t. 6. M. paludosa; ibid. t. 22. Menthastri aquatici genus hirsutum, spicâ latiore; Bauh. Hist. v. 3. p. 2. 222. Raii Syn. 234. M. minus; Ger. em. 685.)

γ, with

γ, with whorled flowers. M. hirsuta ζ—θ; Fl. Brit. 617. (M. sativa; Linn. Sp. Pl. 805, excluding the synonyms. Sm. Tr. of L. Soc. v. 5. 199. Engl. Bot. t. 448. M. rivalis β, γ, and δ; Sole Menth. 45.)

Leaves stalked, ovate. Flowers capitate or whorled. Calyx entirely clothed with hairs curved upwards. Flower-stalks rough with deflexed hairs.—Common in watery places throughout Europe. This is the most variable species of the whole. It is often purplish; always more or less hairy, and in general remarkably so; the hairs of the *stem, branches*, and *flower-stalks* all curved downward, those of the *foot-stalks, leaves*, and especially those which clothe the *calyx*, all turned forward or upward. The direction of the pubescence never varies, though its quantity is extremely variable. We have a wild specimen, which to the naked eye looks nearly as smooth as the *odorata* last described, but which is, indeed, minutely hairy, especially the *calyx* and *stalks*. The root that bore this, being transplanted into a neighbouring garden, produced, the following year, a plant as hairy as any variety we have seen. The smell of the present species is likewise changeable. In general it is pungent and aromatic, much like Spear Mint, but sometimes acquires the flavour of Pepper Mint, or of Camphor, and occasionally a very sweet odour, like Frankincense Thyme, very lasting in specimens seventy years old, and which is now and then found in the, usually fetid, *M. arvensis*. The *stems* are upright, mostly branched, in the manner of *M. odorata*. *Leaves* stalked, ovate, rather acute, but sometimes blunt, serrated, very variable in size; their veins strong and parallel. *Flowers* purplish; in the first variety, α, capitate, like those of *odorata*, with one or two dense, distant, stalked, axillary whorls below; in β, so many whorls terminate the stem or branches as to form a bluntish spike, still accompanied by a distant whorl, or rather a pair of stalked axillary heads, underneath; this has been made a species by most authors, but it has all the essential characters of α, into which we have observed it to change, even in a wild state, according to changes in the moisture of the soil; this is the *palustris* of Sole, t. 6; his *paludosa*, t. 22, has the whorls sessile, and more numerous, so as more nearly to resemble a properly whorled mint, which plants of this kind, from Mr. Sole, have completely become in our garden; in γ, which like α varies in size, hairiness, colour, and flavour, the inflorescence is entirely whorled throughout. It is not without repeated observations on these plants in their wild state, and long cultivation of them in two different gardens, one wet, the other dry, that we have been decided in considering these different forms of inflorescence, in the *M. hirsuta*, as constituting no specific distinction. We have indeed specimens which shew the change from α to γ. This is a point nevertheless which theoretical botanists find difficult to allow, and which nothing but great experience can establish. See a similar instance mentioned at the end of our 12th species.

15. M. *acutifolia*. Fragrant Sharp-leaved Mint. Fl. Brit. n. 7. Engl. Bot. t. 2415. (M. verticillata; Mill. Dict. ed. 8. n. 17.)—Flowers whorled. Leaves ovato-lanceolate, tapering at each end. Calyx hairy all over. Hairs of the flower-stalks spreading.—The only specimen we have ever seen, was gathered by Rand, at the side of the river Medway, in Kent. Miller says the plant grew between Rochester and Chatham, where Mr. Sowerby has sought it in vain. We doubt its being distinct from *M. hirsuta*, but the much more spreading hairs of the *flower-stalks*, first induced us to think it more than a variety. The very sweet scent, like frankincense thyme, agrees with a variety above-mentioned of *hirsuta*, nor perhaps can the tapering bases of the *leaves* be thought of more importance, as the foliage of the latter species is acknowledged to vary much. The *whorls* are all quite sessile. *Calyx* clothed with ascending hairs, especially at the base, by which this plant is essentially distinguished from *rubra*, n. 17, while the hairy *flower-stalks* distinguish it from the following.

16. M. *canadensis*. Canadian Mint. Linn. Sp. Pl. 806. Ait. Hort. Kew. n. 13.—Flowers whorled. Leaves ovato-lanceolate, tapering at each end. Footstalks twice as long as the whorls. Calyx hairy all over. Flower-stalks quite smooth.—Gathered in Canada by Kalm. It was sent in 1801, by the late Mr. Masson, to Kew garden, where it lives in the open air, flowering in July. No figure of this species has yet appeared. It is more nearly allied to our *acutifolia*, than to the *arvensis*, with which Linnæus compares it. The long slender *footstalks*, sharply serrated and more lanceolate *leaves*, and the perfectly smooth and naked *flower-stalks*, are its discriminating characters. The *calyx* is hairy all over, with more erect hairs than in *arvensis*. The *whorls* are accompanied by long linear *bracteas*.

This should seem to be *M. borealis* of Michaux, Boreal-Amer. v. 2. 2; while his *tenuis* appears to be our small American variety of *viridis*, mentioned under that species; but having seen no specimens, we decline a positive reference to his work.

17. M. *rubra*. Tall Red Mint. Tr. of L. Soc. v. 5. 205. Engl. Bot. t. 1413. (M. sativa; Sole Menth. t. 21. M. verticillata; Raii Syn. 232. Riv. Monop. Irr. t. 48. f. 1. M. sativa rubra; Ger. em. 680. M. pratensis; Sole Menth. t. 17. (See Tr. of L. Soc. v. 5. 275.)—Flowers whorled. Leaves ovate. Stem upright, zigzag. Flower-stalks and lower part of the calyx very smooth; teeth hairy. Found about ditches, wet hedges, and the borders of rivers, not unfrequently, in England. Foreign writers seem unacquainted with this, which is the tallest and handsomest of our Mints, rising to the height of four, five, or six feet, with a red, wavy, usually smooth *stem*, bearing few and short branches. *Leaves* ovate, stalked, of a dark shining green, often very broad, with strong serratures; the upper ones small and short. *Whorls* numerous, stalked, of many large purplish-red *flowers*, with linear fringed *bracteas*. *Calyx* tubular, dotted with numerous resinous points, quite smooth, like the *flower-stalks*, except the teeth, which are always more or less furnished with upright hairs. The whole plant has a strong aromatic scent, especially in a dry soil. We have seen it kept in country gardens, and called Heart Mint, from its supposed cordial qualities. The Rev. Mr. Williams has observed this species in Shropshire, acquiring the peculiar scent of *M. arvensis*, of which we know no other instance.

18. M. *gentilis*. Bushy Red Mint. Linn. Sp. Pl. 805. Engl. Bot. t. 2118. (M. rubra; Sole Menth. t. 18. M. rivalis α; ibid. t. 20. M. variegata; ibid. t. 19. M. arvensis verticillata versicolor; Moris. sect. 11. t. 7. f. 5.)—Flowers whorled. Leaves ovate. Stem very much branched and spreading. Flower-stalks and base of the calyx smooth.—In watery waste places, but not common. We have it from North Wales, Shropshire, and Somersetshire. Linnæus says it grows in the south of Europe, and Dr. Sibthorp found what he took for this species, and judged to be the Ἡδύοσμος ἄγριος of Dioscorides, frequent among stubble in Greece, at the end of autumn; but there being no specimen in his herbarium, we cannot be certain of what he intended. This differs widely from the last in having a low, bushy, much-branched *stem*. The whole plant is rather hairy, and on a dry soil pleasantly aromatic. *Leaves* paler, less shining, and more elongated than in *rubra*, as well as more uniform in shape; their veins whitish underneath.

neath. *Whorls* not quite fessile. *Bracteas* lanceolate, various in size. *Flower-stalks* round, purple, for the most part very smooth. Upper part of the *calyx* more or less rough, with ascending hairs; base smooth; the whole sprinkled with resinous dots. *Corolla* pale purple, generally as long as the stamens.—The variety with blotches of yellow on the *leaves*, (Sole's t. 10, figured also in Morison,) when cultivated in a dry gravelly soil, is much improved in scent, and undergoes other changes; the *whorls* often become elevated on long leafy stalks, and the *flower-stalks* rough with deflexed hairs.

19. M. *gracilis*. Narrow-leaved Mint. Sole Menth. t. 16. Fl. Brit. n. 10. (M. gentilis; Engl Bot. t. 449. Sole Menth. t. 15. M. hortensis verticillata, ocymi odore; Moris. sect. 11. t. 7. f. 1.)—Flowers whorled. Leaves lanceolate, nearly sessile. Stem much branched, erect. Flower-stalks and base of the calyx very smooth.—On commons and waste ground, chiefly in watery places. The variety smelling like Basil, *gentilis* of Sole, is said by that author to be "frequent in ditches and waste places, near towns and villages, but scarcely wild." We have seen it in gardens only, where it is sometimes kept for its scent, resembling Basil, or the perfume of the Muscat Grape; but this favour is not so constant in the living plant, nor so permanent in the dry one, as many others met with in this genus. The ordinary *M. gracilis* has the strong lasting scent of *viridis*, not of the finest kind. The whole *herb* is a little hairy. *Stem* erect, twelve or eighteen inches high, much branched about the middle, leafy, rough, and reddish. *Leaves* uniform, lanceolate, acute, sharply serrated, tapering much at the base, but hardly stalked, bright green, slightly clothed with short hairs. *Whorls* generally sessile, with lanceolate hairy *bracteas*. *Flower-stalks* round, purple, uniformly and perfectly smooth. *Calyx* tubular, somewhat bell-shaped, purple, with resinous dots; very smooth and naked at the base; furrowed upwards, and clothed towards the top, especially its taper-teeth, with white upright hairs. *Corolla* purplish, bearded at the extremity, longer than the *stamens*.—The Basil-scented variety has deflexed *leaves*; the lower ones ovate; the floral ones often so small, that it assumes the aspect of a spiked mint. Had we not found it by culture extremely variable in these characters, while the *flowers* constantly agree with the true *gracilis*, we might have been tempted to consider this variety a distinct species.

20. M. *arvensis*. Corn Mint. Linn. Sp. Pl. 806. Hudf. 253. Fl. Brit. n. 11. Engl. Bot. t. 2119 Sole Menth. t. 12. Ehrh. Pl. Off. 416. Fl. Dan. t. 512. (M. arvensis verticillata procumbens; Moris. sect. 11. t. 7. f. 5. Calamintha aquatica; Ger. em. 684. M. præcox; Sole Menth. t. 13.)—Flowers whorled. Leaves ovate. Stem much branched, diffuse. Calyx bell-shaped, clothed all over with horizontal hairs.—Frequent in corn-fields where water stagnates in winter, especially on a sandy or gravelly soil. It is often a troublesome weed, because of the widely-creeping nature of the *root*, and its turgid fleshy shoots, well calculated to retain life in a soil that fluctuates as to humidity. The *stems* are mostly diffuse, and much branched. *Leaves* ovate, inclining to elliptical, obtuse, pale, clothed with rather rigid prominent hairs. *Flower-stalks* shortish, round, generally smooth, sometimes furnished with a few spreading, or slightly deflexed, hairs. *Calyx* shorter, more bell-shaped, and more broadly toothed than in any of the foregoing, and essentially characterised by being clothed all over with horizontally spreading hairs. *Flowers* reddish-lilac, externally hairy.

This species is readily known by its peculiar scent, justly compared to that of blue mouldy cheese, and which Haller says he could not endure. The dried specimens strongly retain it. The neat, elliptical, smoother *leaves* of Mr. Sole's *præcox*, and its earlier time of flowering, indicate somewhat of a specific difference, but culture and repeated observations have not confirmed it. *M. austriaca*, Jacq. Austr. t. 530. Willd. n. 18, is with great probability suspected by the latter author to be a variety of *arvensis*. Mr. Winch has sent us from Northumberland an ascending unbranched specimen of *arvensis*, very like Jacquin's figure; but having seen no Austrian specimen, we can decide nothing on the subject. The hairs of the *calyx* and *flower-stalks*, which nobody has properly described or figured, must settle the matter in dispute. Jacquin's plate bears a great resemblance to the *præcox*. A variety of *arvensis*, with the flavour of Basil, is the *gentilis* of Mill. Dict. ed. 8. n. 15.

21. M. *agrestis*. Rugged Field Mint. Sole Menth. t. 14. Engl. Bot. t. 2120. (M. arvensis *β*; Fl. Brit. 624. Tr. of Linn. Soc. v. 5. 213; 216.)—Flowers whorled. Leaves somewhat heart-shaped, strongly serrated, rugose. Stem erect. Calyx bell-shaped, clothed all over with horizontal hairs.—Observed by Mr. Sole in corn-fields and neglected gardens in Somersetshire. Mr. Borrer finds it very common in Sussex. We have been induced, in the 30th vol. of Engl. Bot. to agree with Mr. Sole in separating this plant from *arvensis*, on account of its upright *stem*, and roundish-heart-shaped, rugged, dark, strongly serrated *leaves*, which give it a peculiarly coarse and harsh aspect; all which marks our cultivated and abundantly increasing specimens have now retained for thirteen years without the least variation. The parts of the *flower*, and the scent of the whole *herb*, accord entirely with the *arvensis*.

22. M. *Pulegium*. Common Penny-royal. Linn. Sp. Pl. 807. Woodv. Med. Bot. t. 171. Sole Menth. t. 23. Engl. Bot. t. 1026. (Pulegium; Fuchs. Hist. 198. Riv. Monop. Irr. t. 23. f. 1. Bruns. Herb. v. 1. 227. P. regium; Ger. em. 671.)—Flowers whorled. Leaves ovate. Stem prostrate. Flower-stalks downy. Calyx hairy all over, with fringed teeth.—Native of watery places in various parts of Europe. This is much smaller than any of the preceding, and is known by its prostrate *stems*; small, downy, stalked, ovate, reflexed *leaves*, sparingly serrated; and numerous dense whorls of purplish, sometimes white, *flowers*, without *bracteas*. The *flower-stalks* are always densely clothed with fine short prominent hairs or down. *Calyx* less densely clothed, either with hairs of the same length, or, as is most commonly the case, with longer and more bristly hairs, a little ascending: its teeth fringed with bristles; its mouth closed with hairs. *Corolla* twice the length of the calyx, very hairy externally, shorter than the *stamens*. The broadest segment of the *corolla* is decidedly cloven, as it ought to be in *Mentha*. Some botanists thought they found it otherwise, and on that ground were disposed to separate *Pulegium* as a genus.

The flavour of Penny-royal is peculiarly strong, resembling *Thymus Nepeta*, Fl. Brit., but not confined to these plants. Some *Cunilæ* and *Satureja* have the same scent.

Some old authors distinguished from this the Mentha aquatica, pulegium mas dicta; Tournef. Inst. 190. Pulegium latifolium alterum; Bauh. Pin. 222. P. mas; Ger. em. 671.—This is said to differ in having an erect stem. We have carefully examined a specimen in Sherard's herbarium, and have been inclined to make it a distinct species, the *leaves* being broad and nearly smooth, and the hairs of the *calyx* rather more long and bristly than in any British varieties of *Pulegium*. Still as we perceive gradations among the latter, we prefer leaving the matter as we find it, till living specimens fall in our way. About the following we have less doubt.

23. M.

23. M. *tomentosa*. Downy Penny-royal. (M. aquatica tomentosa minima; Tourn. Inst. 190. Pulegium tomentosum minimum; Bocc. Sic. 40. t. 41. f. 2.)—Flowers whorled. Leaves ovate, hairy. Stem ascending. Flower-stalks densely clothed with horizontal hairs. Calyx covered with long loosely-spreading hairs.—Native of Sicily. We have it from Algiers, sent by the late Monf. Brouffonet. Its appearance is altogether much more hairy or shaggy than any variety of *Pulegium;* the mouth of the *calyx* is entirely closed with wool rather than hair, and the hairy covering of the *flower-stalks* is remarkable for its great length and density. If these marks be accidental, we know no other instance of the kind among *Menthæ*, yet we confess them rather differences in degree, than in direction, of the pubescence.

24. M. *cervina*. Hyssop-leaved Mint. Linn. Sp. Pl. 807. Willd. n. 21. (M. n. 222; Hall. Hist. v. 1. 98. Pulegium angustifolium; Moris. sect. 11. t. 7. f. 7. Riv. Monop. Irr. t. 23. f. 2. Ger. em. 672.)—Flowers whorled. Bracteas palmate. Leaves linear. Calyx and flower-stalks smooth.—Native of the south of France. A most distinct and remarkable species. The whole *plant* is smooth, larger than *Pulegium*, with which it nearly agrees in flavour and qualities. *Stem* ascending, slightly quadrangular, not much branched. *Leaves* sessile, linear, keeled, nearly or quite entire; their under side copiously dotted. *Whorls* large, dense, many-flowered, each accompanied by a pair of broad, rigid, ribbed, palmate *bracteas*. *Calyx* tubular, ribbed, with short spinous teeth. *Corolla* twice as long as the calyx. *Stamens* prominent.

Two Linnæan species remain to be noticed. These are—*M. exigua;* Linn. Sp. Pl. 806 Sm. Plant. Ic. ex Herb. Linn. t. 38. This is shewn in Tr. of Linn. Soc. v. 3. 18, to be the same plant as *Cunila pulegioides* of Linnæus, and is therefore struck out of the present genus.

M. *perilloides*. Linn. Syst. Veg. ed. 13. 445. (Ocymum frutescens; Linn. Sp. Pl. 832.)—This is indeed distinct from *Perilla ocymoides*, with which some have been disposed to confound it; but so little like a *Mentha*, that it does not concern our present subject; neither is the original specimen sufficient to determine its genus. S.

MENTHA *canariensis* and *plumosa*. See BYSTROPOGON.

MENTHA, in *Gardening*, comprehends plants of the hardy herbaceous perennial kind, of which the species cultivated are, the spear-mint (M. viridis); the round-leaved mint (M. rotundifolia); the curled mint (M. crispa); the pepper-mint (M. piperita); the red mint (M. gentilis); the penny-royal (M. pulegium); and the hyssop-leaved mint, or upright penny-royal (M. cervina.)

From the first kind not being so hot to the taste as peppermint, and having a more agreeable flavour than most of the other sorts, it is generally preferred for culinary and other purposes. The leaves and tops are used in spring salads, and eaten as sauce with lamb, and, when dried, in soups, &c.

There are several varieties of it, as, the broad-leafed; the narrow-leafed; the curled-leafed; the variegated-leafed; the silver-striped-leafed; and the gold-striped-leafed.

The fourth species, in its external appearance, corresponds with the first sort, for which it may easily be mistaken; but in that the stem is taller, the leaves have scarcely any petioles, and are narrower in proportion to their length, the spikes are longer and composed of more whorls.

In the fifth sort there is a variety with the scent of basil; the orange-scented mint; the gold-striped orange mint; the yellow-orange mint; and the reddish-orange mint.

And the sixth species varies with a white flower, and with the stems erect, nearly a foot high: the leaves longer and narrower: the whorls of flowers much larger, the stamens longer than the corolla: this is Spanish penny-royal, which has almost superseded the other sort; the stems being more erect, it is easier to tie in bunches, and it comes earlier to flower, and has a brighter appearance,

In the seventh sort there is a variety with white flowers, growing taller than the common one with purple flowers, which is by some preferred to the sixth sort for medicinal use, and called Hart's penny-royal.

Method of Culture in the Mint Kind.—All these plants may be increased with facility by young offset plants or shoots, or by parting their roots, and planting them out in the spring, or by planting cuttings during any of the summer months in a moist soil. After the cuttings are planted, when the season is dry, they should be often watered until they have taken root; when they require no further care, but to be kept clean from weeds. The best method is to plant them in beds about four feet wide, allowing a path about two feet broad between them, to water, weed, and cut the plants; being set four or five inches or more distant in the rows, as the plants spread much at their roots; on which account the beds should not stand longer than three years before planting them again, as by that time the roots become so closely matted, as to rot and decay each other when they are suffered to stand longer.

With regard to the general culture it is that of clearing them from weeds in spring and summer, cutting down all the remaining stalks annually in autumn; removing all weeds; digging the alleys, and spreading a little of the earth over the beds. Plantations thus formed will afford several cuttings every summer, when only wanted young for use, for culinary purposes; but when for drying to keep in winter, or green for distilling or medicinal use, the plants should generally be suffered to stand until nearly full grown, and they are just coming into flower; which being then cut down close, the roots send up another crop fit for cutting again in the beginning of autumn, or towards Michaelmas; each general cutting being always made as close to the ground as it possibly can be done.

Method of forcing Mint on Hot-beds.—Where it is much wanted for salads in the winter and early spring seasons, a hot-bed should be made for this purpose, any time after November till the spring, about two feet thick of dung, covering it with garden frames and glasses, or with mats on arched sticks, which should then be earthed over with rich mould, six inches thick; when a quantity of roots should be taken up from a bed and planted pretty close together upon the surface of the bed, moulding them over an inch deep with fine earth, putting on the lights, or other coverings, keeping them close in the nights and in bad weather, but admitting fresh air in mild weather. The plants soon come up, when fresh air should be admitted in fine weather, and moderate waterings should be given, and they will soon be ready to have their young green tops gathered for use. When the plants are two or three inches high, they are ready for being cropped, after which they presently break out again, and fresh shoots rise from the bottom; so that the same bed furnishes fresh supplies a long time; two beds, made at different times, being generally sufficient for the whole winter use. In this way mint may be obtained young and green from the time that in the natural ground it goes off in autumn until it comes in again in the spring season.

Young mint shoots may also be procured by planting some roots thick in large pots, and placing them in a hot-house,

houſe, as they quickly ſhoot and furniſh plants of young green mint in ſuch ſituations.

Where this practice is much attended to, ſmall freſh plantations ſhould be made annually in the open ground for the purpoſe of furniſhing a ſufficiency of roots, proper for taking up at forcing time without diſturbing thoſe of the principal crops.

Method of Culture in the Pennyroyal Kinds.—Theſe may be increaſed in the ſame manner as above, and alſo by their creeping ſtems, which ſhould be cut off and planted out in freſh beds, allowing at leaſt a foot diſtance every way. The young ſhoots planted in the ſpring in the ſame way alſo take root like the other ſorts. The proper time for this work is in the early autumn, that the plants may be well rooted before winter.

It is found that in this way the plants are much ſtronger, and produce larger crops than when planted out in the ſpring. When the roots remain ſo cloſe as is generally the caſe, they are apt to rot in the winter ſeaſon. They ſucceed beſt in a moiſt ſtrong ſoil.

It may be noticed that ſome of the ſpecies and varieties may be introduced in the borders and other parts of pleaſure grounds, for ornament and variety with good effect.

Mentha, in the *Materia Medica*. Several ſpecies of this genus have ſome claims on our notice under this head. The *Mentha piperita*, or "pepper-mint," has a more penetrating ſmell than any of the other mints, and a much ſtronger and warmer taſte, pungent like pepper, ſinking as it were into the tongue, and followed by a ſenſation of coldneſs. By maceration, or infuſion, it readily and ſtrongly impregnates both water and ſpirit with its virtue. On diſtillation with water, it yields a conſiderable quantity of eſſential oil of a pale greeniſh-yellow colour, growing of a darker colour by age, very light, ſubtile, poſſeſſing in a high degree the ſpecific ſmell and penetrating pungency of pepper-mint. According to Dr. Cullen, rectification is particularly neceſſary and proper for this eſſential oil. What has been called eſſence of pepper-mint is, in his opinion, no other than the rectified oil, diſſolved in ſpirit of wine. Rectified ſpirit, drawn with a gentle heat from the tincture made in that menſtruum, brings over little of the virtue of the herb, nearly all its pungency and warmth remaining concentrated in the extract. This plant, it is obſerved, yields camphor. Its ſtomachic, antiſpaſmodic, and carminative qualities render it uſeful in flatulent colics, hyſterical affections, retchings, and other dyſpeptic ſymptoms, acting as a cordial, and often producing immediate relief. Its officinal preparations are an eſſential oil, a ſimple water, and a ſpirit. The water is prepared by pouring on, *e.g.* a pound and half of pepper-mint, ſo much water, that, after the diſtillation, a ſufficiency may remain to prevent empyreuma; and diſtilling over a gallon. The ſpirit of pepper-mint is obtained by macerating, for 24 hours, a pound and half of pepper-mint dried in a gallon of proof ſpirit, with water ſufficient to prevent empyreuma, and diſtilling a gallon by a gentle fire.

Mentha viridis, or *ſativa*, "ſpear-mint," is not ſo warm to the taſte as pepper-mint, but having a more agreeable flavour, it is preferred for culinary uſes, and more generally cultivated in our gardens. Many virtues are aſcribed by the ancients to mint, but the particular ſpecies is not aſcertained. This, however, is of no great importance in a medical view, as the virtues of all reſide in the aromatic flavour, which is common to the whole genus. On drying, the leaves loſe about three-fourths of their weight, without ſuffering much loſs of their ſmell or taſte; nor is the ſmell ſoon diſſipated by moderate warmth, or impaired on keeping. Cold water, by maceration for ſix or eight hours on the dry herb, and warm water in a ſhorter time, become richly impregnated with its flavour. By diſtillation, a pound and a half of the dry leaves communicate a ſtrong impregnation to a gallon of water: the diſtilled water proves rather more elegant, if drawn from the freſh plant in the proportion of ten pints from three pounds. Along with the aqueous fluid an eſſential oil diſtils, of a pale yellowiſh colour, changing to a red, in quantity near one ounce from ten pounds of the freſh herb in flower, ſmelling and taſting ſtrongly of the mint, but ſomewhat leſs agreeable than the herb itſelf. Dry mint, digeſted in rectified ſpirit, either in the cold or with a gentle warmth, gives out readily its peculiar taſte and ſmell, without imparting the groſſer and more ungrateful matter, though the digeſtion be long continued. The tincture appears by day-light of a fine dark green, by candle-light of a dark red colour: a tincture extracted from the remaining mint by freſh ſpirit, appears in both lights green: the colour of both tinctures changes, in keeping, to a brown. On gentle diſtillation, with proof ſpirit, the ſpirituous portion which riſes at firſt diſcovers little flavour of the mint; but as ſoon as the watery part begins to diſtil, the virtues of the mint come over plentifully with it. Hence the ſpiritus menthæ ſativæ, P. L., which is prepared by drawing off a gallon of proof ſpirit from a pound and a half of the dried plant, proves ſtrongly impregnated with the mint.

To ſpear-mint are to be aſcribed the ſame medicinal qualities which we have noticed of pepper-mint; but the different preparations of the former, though more pleaſant, are perhaps leſs efficacious. It contains much eſſential oil, but of an odour ſomewhat leſs agreeable than that of lavender or marjoram. It is therefore leſs employed as a cephalic; but it acts very powerfully on the parts to which it is immediately applied, and therefore conſiderably on the ſtomach, invigorating all its functions. It acts eſpecially as an antiſpaſmodic, and therefore relieves pains and cholic depending upon ſpaſm. It will alſo ſtop vomiting, depending upon ſuch a cauſe; but there are many caſes of vomiting in which it is of no ſervice: and in theſe caſes, anywiſe depending upon inflammatory irritation in the ſtomach itſelf, or in other parts of the body, it aggravates the diſeaſe, and increaſes the vomiting. Practitioners have thought, and we think juſtly, that the infuſion of mint in warm water agrees better with the ſtomach than the diſtilled water, which is often ſomewhat empyreumatic.

Lewis obſerves, that it is ſaid by ſome to prevent the coagulation of milk; and hence it has been recommended to be uſed along with milk diets, and even in cataplaſms and fomentations for reſolving coagulated milk in the breaſts. Upon experiment, the curd of milk, digeſted in a ſtrong infuſion of mint, could not be perceived to be any otherwiſe affected than by common water; but milk, in which mint leaves were ſet to macerate, did not coagulate near ſo ſoon as an equal quantity of the ſame milk kept by itſelf.

The officinal preparations of ſpear-mint are an eſſential oil, a conſerve, a ſimple water, and a ſpirit. Lewis M. M. Cullen M. M. Woodville Med. Bot.

The ſpear-mint water, aqua menthæ viridis of the London Pharmacopeia, is prepared by pouring on a pound and half of ſpear-mint ſo much water, that, after the diſtillation, enough may remain to prevent empyreuma; and diſtilling over a gallon. The ſpirit, ſpiritus menthæ viridis, is obtained by macerating, for 24 hours, a pound and half of dried ſpear-mint in a gallon of proof ſpirit, with water ſufficient to prevent empyreuma, and diſtilling a gallon by a gentle fire.

Mentha Pulegium, "Penny-royal mint," has a warm pungent flavour, somewhat similar to mint, but more acrid, and less agreeable both in smell and taste. Its active principle is an essential oil, of a more volatile nature than that of mint, coming over hastily with water at the beginning of the distillation, and rising also in great part with highly-rectified spirit; in taste very pungent, and of a strong smell; when newly drawn, of a yellowish colour, with a cast of green; by age turning brownish.

The pulegium certainly possesses the general properties of the other mints: it is supposed, however, to be of less efficacy as a stomachic, but more useful as a carminative and emmenagogue, and is more commonly employed in hysterical affections. We are told by Boyle, and others, that it has been successfully used in the hooping-cough; but the chief purpose to which it has long been administered is promoting the uterine evacuation. With this intention, Haller recommends an infusion of the herb with steel, in white wine, which he never knew to fail of success. However, in the opinion of Dr. Cullen, mint is in every respect a more effectual remedy than penny-royal; and nothing but the neglect of all attempts to establish principles could have made physicians think of this as a peculiar medicine different from the other species: and conformably to this remark, it may be observed, that this plant is less frequently used now than formerly.

Its officinal preparations are a simple water, a spirit, and an essential oil. Lewis M. M. Cullen M. M. Woodville Med. Bot.

Aqua pulegii, "Penny-royal water," is prepared by pouring on a pound and half of penny-royal so much water, that, after distillation, enough may remain to prevent empyreuma, and distilling over a gallon. The "spirit of penny-royal" is obtained by macerating, for 24 hours, a pound and half of dried penny-royal in a gallon of proof spirit, with water sufficient to prevent empyreuma, and distilling a gallon by a gentle fire. The water which distils over with the oils of pepper-mint, spear-mint, and penny-royal, is to be kept for use. Lond. Pharmac. 1809.

MENTI Levator, in *Anatomy*, a small muscle in the chin. It is described with the muscles of the lower lip, in the article Deglutition.

MENTOLE, in *Geography*, a town of the island of Ceylon, on the west coast; 80 miles W.N.W. of Trincomaly. N. lat. 9° 1′. E. long. 80° 3′.

MENTON, a town of France, in the department of the Maritime Alps, and chief place of a canton, in the district of Monaco; 6 miles N.E. of Monaco. The place contains 3289, and the canton 4383 inhabitants, on a territory of 60 kilometres, in 4 communes.

MENTOS, a town of Louisiana, on the Akansas; 150 miles S.W. of New Madrid. N. lat. 35° 27′. W. long. 92° 40′.

MENTUM, in *Anatomy*, the lower part of the face, beneath the mouth; which we otherwise distinguish by the name of *chin*.

MENTZ, or Mayence, *Archbishopric of*, in *Geography*, formerly an electoral principality of Germany, in which, besides corn, are breeds of cattle, fine garden fruits, and excellent wines, particularly those Rhenish wines that are furnished by the Rheingau: good salt is also manufactured here, and it has here and there iron mines. In the Mentz portion of the Berg-Strazza is found plenty of almonds, chesnuts, and filberds. The lower part of the Eichsfeld yields corn in sufficient abundance, together with large quantities of flax and tobacco. The principal rivers are the Rhine, the Maine, the Jaxt, and the Lahn. In the whole of the electoral countries of Mentz, comprehended within this circle, were 41 cities and 21 boroughs. Eichsfeld is now annexed to the kingdom of Westphalia. In the upper Eichsfeld are manufactures of serge and linen; and in the lower, tobacco and flax are cultivated. In the archbishopric are some woollen and other manufactures; and a considerable trade is carried on in wines. From Berg-Strazza are exported almonds, chesnuts, nuts, and nut-wood. The countries lying on the Rhine and on the Maine have, ever since the Reformation, been subject to the elector of Mentz, and maintained their attachment to the Roman Catholic faith. It was in the year 751 that the bishopric of Mentz was fully established as an archbishopric, which was first administered by S. Boniface; and with the archbishopric, the first in Germany, the dignity of elector was inseparably connected. In 1802, at the settlement of the indemnities, in consequence of the ascendency gained by the French in Germany, all that part of the diocese which lay on the right of the Maine, was given to the prince of Nassau-Usingen, except the bailiwick of Aschaffenburg. It was then determined that the electoral title should from that time be elector of Aschaffenburg, and count of Wetzlar; that he should still continue arch-chancellor of the empire, and hold his office at Ratisbon, with some abbies, and other indemnities, so as to yield an annual revenue of a million of florins. His jurisdiction, as metropolitan of the German church, was to extend all over Germany, except the Prussian states.

Mentz, or *Mayence*, formerly capital of the above-mentioned electorate and archbishopric of Germany, but by the treaty of Campo Formio, 1797, a city of France, chief place of a district, and capital of the department of Mont-Tonnerre, situated at the conflux of the Rhine and Maine; bearing in Latin the appellation of "Moguntium." It was considered as a barrier fortress of the empire. The city is large and populous, but consists, for the most part, of narrow streets and old-fashioned houses, intermixed with some fine buildings, a considerable palace, and a magnificent cathedral. Before the revolution, it contained seven parish churches, six monasteries, and five nunneries, with a charter-house and two other nunneries near the city, and also six hospitals. The university was founded by Charlemagne in 800, and established in 1482 by the archbishop Diether. It has undergone many revolutions, and frequently changed its masters, until in 1792 it was taken by the French; but in the following year it was retaken. By the peace between the emperor and the French it was surrendered to the latter, who took possession of it. The number of inhabitants is reckoned at 21,400, and those of its canton 21,615, in two communes. N. lat. 49° 58′. E. long. 8° 14′.

MENTZELIA, in *Botany*, named by Plumier in honour of Dr. Christian Mentzel, Counsellor and Physician to the Elector of Brandenburg, who published, in 1682, in folio, an Index of the names of plants in various languages, accompanied by a small catalogue of rare plants, with plates. He wrote also some papers in the Ephemerides Acad. Nat. Curios. on geological subjects, and died in 1701, aged 79. Plum. Gen. 40. Linn. Gen. 270. Schreb. 360. Willd. Sp. Pl. v. 2. 1175. Mart. Mill. Dict. v. 3. Jacq. Amer. 164. Ait. Hort. Kew. ed. 2. v. 3. 302. Juss. 321. Lamarck Illustr. t. 425.—Class and order, *Polyandria Monogynia*. Nat. Ord. *Calycanthemæ*, Linn. *Onagræ*, Juss.

Gen. Ch. *Cal.* Perianth superior, spreading, deciduous, of five, lanceolate, concave, pointed leaves. *Cor.* Petals five, obovate, pointed, spreading, a little longer than the calyx. *Stam.* Filaments numerous (about thirty), the length of the calyx, erect, the outer ones membranous in the upper part; anthers roundish. *Pist.* Germen inferior,

 cylindrical,

cylindrical, long; ſtyle thread-ſhaped, as long as the ſtamens; ſtigma ſimple, obtuſe. *Peric.* Capſule cylindrical, long, of one cell, three-valved at top. *Seeds* about ſix, oblong, angulated.

Eſſ. Ch. Calyx of five leaves. Petals five. Capſule inferior, cylindrical, many-ſeeded.

1. M. *aſpera.* Linn. Sp. Pl. 735. (M. foliis et fructibus aſperis; Plum. Ic. 167. t. 174. f. 1.)—Stem branched. Flowers axillary. Petals notched, obtuſe.—A native of South America, and the Weſt Indies, very common among the buſhes in all the dry ſavannahs about Kingſton, Jamaica. It flowers in the gardens during July and Auguſt. *Root* annual. Whole herb clothed with rigid, partly hooked briſtles. *Stem* round, branched, leafy. *Leaves* on longiſh ſtalks, oblong, ſomewhat haſtate, acute, unequally and coarſely ſerrated *Flowers* axillary, ſolitary, nearly ſeſſile, yellow. The germen and calyx very briſtly.

2. M. *hiſpida.* Willd. n. 2. (M. aſpera; Cavan. Ic. v. 1. 51. t. 70.)—Stem forked. Flowers ſolitary, at the forks of the ſtem. Petals entire, acutely pointed.—A native of Mexico. This differs from the laſt in having the *leaves* more ovate, *flowers* principally from the forks of the ſtem, with a much ſhorter and ovate *germen*, and longer leaves of the *calyx*. Willdenow alſo points out the above difference of the petals.

This genus is very nearly allied in habit as well as character to Loosa (ſee that article); indeed ſo much are they alike, that we greatly ſuſpect they muſt be one genus, for which *Mentzelia*, being the oldeſt name, ought to remain, and the other ambiguous appellation would be happily ſuperſeded.

MENU, in *Biography*, is the name of a very celebrated law-giver among the Hindoos. Sir William Jones tranſlated his code from the original Sanſcrit; and it is in the hands of the public, under the title of "Inſtitutes of Hindoo Law, or the Ordinances of Menu." The work compriſes, in 12 chapters and 2685 verſes, the Indian ſyſtem of duties, religious and civil, and is held in the greateſt reverence by all claſſes of Hindoos; ſo much ſo, that ſhould a ſeries of Brahmans omit, for three generations, the reading of Menu, their ſacerdotal claſs would, as they aſſert, be forfeited. They muſt, however, explain it only to their pupils of the three higheſt claſſes: and to enſure a greater degree of reverence for its ſanctity, it is underſtood that a Brahman, duly pious, would not, on any conſideration, read it on a forbidden day of the moon, or until after the performance of certain ceremonies preſcribed in the code. The learned tranſlator, from internal evidence, aſcribes the date of the Inſtitutes, in their preſent form, to a period ſo far back as 880 years before Chriſt. Whether Menu, or Menus in the nominative, and Menos in an oblique caſe, was the ſame perſonage with Minos, he leaves others to determine; but he evidently inclines to that opinion, though, with his characteriſtic modeſty, he forbears any pointed expreſſion of it. He recogniſes a ſtrong reſemblance, though obſcured and faded by time, between the Menu of the Hindoos, with his divine bull, or the emblem of abſtract juſtice, and the Mneues of Egypt, with his companion or ſymbol Apis: and though he duly guards himſelf and his readers againſt the deluſions of etymological conjecture, he ſtates Minos and Mneues, or Mneuis, to be merely Greek terminations, and that the crude noun is compoſed of the ſame radical letters in Greek and Sanſcrit. "And if," he continues in his preface, "Minos, the ſon of Jupiter, whom the Cretans, from national vanity, might have made a native of their own iſland, was really the ſame perſon with Menu, the ſon of Brahma, we have the good fortune to reſtore, by means of Indian literature, the moſt celebrated ſyſtem of heathen juriſprudence." The fables of the Hindoos, as to the antiquity and origin of the laws of Menu, are in their uſual ſtyle of extravagance. They firmly believe them to have been promulgated in the beginning of time by Menu, ſon or grandſon of Brahma, or, in plain language, the firſt of created beings; and not the eldeſt only, but the holieſt of legiſlators.

Menu is highly honoured by name in the Véda itſelf, where it is declared, that "whatever Menu pronounced was a medicine for the ſoul itſelf;" and it is aſſerted by a high authority among the Hindoos, "that Menu held the firſt rank among legiſlators, becauſe he had expreſſed in his code the whole ſenſe of the Véda; that no code was approved, which contradicted Menu; that other ſaſtras, and treatiſes on grammar or logic, retained ſplendour only ſo long as Menu, who taught the way to juſt wealth, to virtue, and to final happineſs, was not ſeen in competition with them." It has been alſo authoritatively aſſerted, that "the *Véda*, with its *Angas*, or the ſix compoſitions deduced from it, the revealed ſyſtem of medicine, the *Puranas*, or ſacred hiſtories, and the code of Menu, were four works of ſupreme authority, which ought never to be ſhaken by arguments merely human." It is the general opinion of the Pandits, that Brahma taught his laws to Menu in 100,000 verſes, which Menu explained to the world in the very words of the book tranſlated by ſir William Jones. It was afterwards abridged to 12,000 verſes, and ſubſequently to 4000; but at preſent they conſiſt only of 2685 verſes. Of the numerous gloſſes or comments on Menu, that of Cullucá Bhatta is moſt highly commended by ſir William Jones, who has implicitly followed his text and interpretation.

The work, as preſented to the European reader by ſir William Jones, contains abundance of curious matter, extremely intereſting both to ſpeculative lawyers and to antiquaries; with many beauties, and with many blemiſhes, which cannot be juſtified or palliated. It is a ſyſtem of deſpotiſm and prieſtcraft, both indeed limited by law, but artfully conſpiring to give mutual ſupport, though with mutual checks: it abounds with ſtrange conceits in metaphyſics and natural philoſophy, with idle ſuperſtitions, and with a ſcheme of theology moſt obſcurely figurative, and conſequently liable to dangerous miſconceptions; with minute and childiſh formalities; with ceremonies generally abſurd, and often ridiculous. The puniſhments denounced are partial and fanciful; for ſome crimes dreadfully cruel, for others reprehenſibly ſlight: and the morals even, though rigid enough on the whole, are, in one or two inſtances, (as in the caſe of light oaths and of pious perjury,) unaccountably relaxed. Nevertheleſs, a ſpirit of ſublime devotion, of benevolence to mankind, and of amiable tenderneſs to all ſentient creatures, pervades the whole work. Some doubt, however, has been entertained with regard to the ſublimity of the devotion, and the amiable tenderneſs of feeling, aſcribed by ſir William Jones to this ſpecimen of the Hindoo writings; and it has been alleged, that the general character of the devotion of the Hindoos is that of a debaſing ſuperſtition, and that their tenderneſs for animals is chiefly ſuperſtition and weakneſs, derived from their doctrine of tranſmigration. The ſtyle of it has a certain auſtere majeſty that ſounds like the language of legiſlation, and extorts a reſpectful awe. The ſentiments of independence on all beings but God, and the harſh admonitions, even to kings, are truly noble. Whatever opinion, in ſhort, may be formed of Menu and his laws, in a country happily enlightened by ſound philoſophy and the only true revelation, it ought to be remembered that thoſe laws are actually revered as the word

word of the Moſt High, by nations of great importance to the political and commercial intereſts of Europe, and particularly by many millions of Hindoo ſubjects, whoſe well directed induſtry adds largely to the wealth of Britain, and who aſk no more in return than protection for their perſons and places of abode, juſtice in their temporal concerns, indulgence to the prejudices of their old religion, and the benefit of thoſe laws which they have been taught to believe ſacred, and which alone they can poſſibly comprehend. See Preface to ſir William Jones's tranſlation of the "Inſtitutes of Menu," in his Works, vol. vii. p. 75, &c. 8vo. (See GENTOOS.) For an extended account of its incomparable tranſlator, ſee our article JONES, *Sir* WILLIAM.

The Hindoos have, however, ſeven holy perſons diſtinguiſhed by the common denomination of Menu, whoſe names we ſhall preſently give; but the firſt and laſt only demand any particular notice. The name is derived from the Sanſcrit root *men,* or *man,* to underſtand or think; and it ſignifies, as all the Pandits agree, *intelligent,* particularly in the doctrines of the Veda, or a thinking being: hence *menes, mens,* and *mind,* alſo *man,* both in Gothic and Engliſh. If in the firſt Menu we recogniſe Adam, our great progenitor; ſo in the ſeventh we find Noah, the great reſtorer of our ſpecies. Here follow their names: 1. Swayambhuva, meaning the ſon of the Self-exiſtent; a name applied by different ſects to the peculiar object of their adoration. 2. Swarocheſha. 3. Uttama. 4. Tamaſa. 5. Raivata. 6. Chakſuſha. 7. Satyavrata. In the time of the laſt, the general deluge occurred. See MATSYAVATARA and ILA, alſo SWAYAMBHUVA and SATYAVRATA.

Although *ſeven* Menus are uſually referred to in Hindoo books, that preciſe number is not always given. In the tenth lecture of the Gita, (ſee MAHABARAT,) "the four Menus" are mentioned; and fourteen are ſpoken of in the Siva-purana. It ſeems, indeed, a generic term for *wiſdom.* Mr. Wilford (Af. Ref. vol. v.) thinks it likely that the ſeven Menus, the ſeven Brahmadicas, and the ſeven Riſhis, (ſee RISHI,) are the ſame, and make only ſo many individuals, firſt called Brahmadicas, or children of Brahma, created for the purpoſe of ſupplying the world with inhabitants. Having fulfilled this miſſion, they became ſovereigns, or Menus, who, when far advanced in years, withdrew from the world to ſolitary places to prepare for death; as, according to the Puranas, was the general practice of mankind in the early ages; and became Riſhis, or holy penitents, who, by their ſalutary counſels and the example of their auſterities, pointed out the paths of virtue and rectitude to mankind. There are ſtill much confuſion and contradiction in the accounts of the perſon and characters of theſe holy perſons, of whom many particulars occur in Moor's Hindoo Pantheon.

MENUET, Fr., MINUET, Engl., the name of a muſical movement in triple time of three crotchets or three quavers in a bar, which is the guide to a graceful dance in the ſloweſt time of any movement that is danced off the ſtage at public or private balls, ſince the louvre has totally loſt its favour.

The minuet, according to Broſſard, had its origin in Poitou. The melody of the minuet is uſually divided into two parts, or ſtrains, conſiſting of eight bars each, of which the firſt ends on the fifth of the key, and the ſecond on the key note.

There is ſo much dignity and grace in this dance, that it is to be lamented it has ceaſed to be a part of education, and to be diſcontinued at private balls and aſſemblies where elegance and decorum uſed to be obſerved. In learning the ſteps and figure of the minuet, other things neceſſary in poliſhed ſociety uſed to be taught; ſuch as the bow, the curtſey, the entrance into a room and departure from it with eaſe and grace, the preſenting to or receiving from a ſuperior; indeed the whole carriage of the perſon uſed to be regulated in learning the minuet, in a manner not, as we can diſcover, included in the Scotch ſtep or Iriſh lilt, the cotillon, or the waltz. Thoſe who never had the courage or intention to exhibit their perſons in a ball-room, public or private, have been diſcovered to have learned to dance by ſtanding ſtill or walking in the ſtreet, as a peaſant diſcovers himſelf to have been drilled in the ſame ſituations.

MENUF, or MENOUF, in *Geography,* a town of Egypt, and chief place of a diſtrict, ſeated near a canal, which was formerly navigable, but has ceaſed to be ſo in conſequence of a dyke raiſed for reſtraining the inundations of the Nile in that branch of it which runs to Damietta. The canal ſurrounds the walls of the town from S. to W. The houſes are mean and the ſtreets narrow and crooked; nor has it many remains of antiquity. In its vicinity are no gardens, ſo that it is ſupplied with fruit and vegetables from a diſtance; but the land is well cultivated and produces wheat, barley, maize, lentils and lupines. The cultivation of maize from ſeed-time to harveſt occupies 70 or 80 days. The animals employed in huſbandry are oxen, buffaloes, camels, aſſes, and a few horſes. Menuf, during the inundation, is ſurrounded with water, but it does not long continue. It is ſheltered from the S., and being open to the N. and N.W., it is kept moderately cool. The number of inhabitants is about 5000; 22 miles N.N.W. of Cairo.

MENUFIE, or MENOUFIE, the diſtrict of which Menuf is the capital, on the S. part of the Delta, between the E. and W. branches of the Nile.

MENUGAT, a town of Aſiatic Turkey, in the province of Caramania, on a river of the ſame name, which runs into the gulf of Satalia; 21 miles W. of Alanieh.

MENYANTHES, in *Botany,* according to Linnæus, is derived from μην, *a month,* and ανθος, *a flower,* becauſe the plant continues in bloſſom about that period of time. *M. trifoliata* is undoubtedly the μινυανθες of Theophraſtus and *Minyanthes* of Pliny, becauſe thoſe authors deſcribe it as having ternate leaves and ornamental flowers. Buckbean. Linn. Gen. 82. Schreb. 107. Willd. Sp. Pl. v. 1. 810. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 225. Prod. Fl. Græc. p. 1. 128. Ait. Hort. Kew. ed. 2. v. 1. 312. Tournef. t. 15. Juſſ. 98. Lamarck Illuſtr. t. 100. Gærtn. t. 114. Claſs and order, *Pentandria Monogynia.* Nat. Ord. *Preciæ,* Linn. *Lyſimachiæ,* Juſſ. *Gentianæ,* Ventenat.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, five-cleft, erect, permanent. *Cor.* of one petal, funnel-ſhaped; tube cylindrically funnel-ſhaped, ſhort; limb cloven below the middle into five, ſpreading, recurved, obtuſe, more or leſs hairy ſegments. *Stam.* Filaments five, awl-ſhaped, ſhort; anthers acute, cloven at the baſe, erect. *Piſt.* Germen ſuperior, conical; ſtyle cylindrical, exactly as long as the corolla; ſtigma cloven, compreſſed. *Peric.* Capſule ovate, enveloped by the calyx, of one cell. *Seeds* numerous, ovate, ſmall.

Eſſ. Ch. Corolla hairy. Stigma cloven. Capſule of one cell.

1. M. *nymphæoides.* Fringed Buckbean. Leſſer Yellow Water Lily. Linn. Sp. Pl. 207. Engl. Bot. t. 217. Fl. Dan. t. 339.—Leaves heart ſhaped, entire, waved. Corolla ciliated. Found occaſionally in rivers and lakes, though by no means ſo common a plant with us as in the ſtill canals of Holland. It flowers from June to Auguſt. *Root* perennial, long and ſtringy *Stems* very long, round, bearing leaves and flowers towards their ſummits. *Leaves* oppoſite, ſimple,

fimple, on ftalks, floating, heart-fhaped or roundifh, wavy, fmooth. *Flowers* axillary, crowded together, on ftalks, expanding at noon, of a golden colour, fringed at the margin. Dr. Smith obferves, that the leaves of this plant, like thofe of the *Nymphæa*, perfpire fo quickly as to become dry in a few hours, though at firft fo fucculent. Some authors have thought from the corolla being ciliated, not hairy, that *M. nymphæoides* fhould be referred to another genus. But as Juffieu, whofe authority upon fuch a point is very great, has not feparated this from *M. trifoliata*, and as *M. indica* and *ovata* feem to connect the two, we think with Dr. Smith they may fafely remain as they are.

2. M. *ovata*. Oval-leaved Buckbean. Linn. Suppl. 133. Willd. n. 2. (M. capenfis; Thunb. Prod. 34. Villarfia ovata; Vent. Choix de Plantes, t. 9.)—Leaves ovate, on long ftalks. Stem panicled. An aquatic of the Cape, flowering in May and June. Linnæus obferves that this fpecies has the habit of an *Alifma*, but the flower of a *Menyanthes*. *Root* fibrous. *Stems* few, about two feet high and the thicknefs of a quill, ftraight, cylindrical, fometimes naked and like ftraws, more frequently furnifhed with three or four leaves, fimple, fmooth, bright green. *Leaves* obtufe, generally quite entire, nerved, fmooth, of a bright green colour and bitter flavour. *Flowers* on ftalks, bracteated, of a fine yellow or citron colour, without fmell.

3. M. *indica*. Indian Buckbean. Linn. Sp. Pl. 207. Bot. Mag. t. 658.—Leaves heart-fhaped, fomewhat notched. Flowers on fimple ftalks. Corolla internally hairy. Native of the Cape, flowering nearly through the fummer. *Root* fibrous. *Stems* floating, branched. *Leaves* peltate, bright green on one fide, dark ruffet on the other. *Flowers* forming a lax umbel, placed on the ftem juft below the leaf, of a bright yellow colour, looking as if covered with filver froft.

4. M. *criftata*. Crefted Buckbean, or Antara-Jamara of the Telingas. Roxb. Coromandel. v. 2. 3. t. 105.—Leaves heart-fhaped, wavy. Flowers on fimple ftalks. Corolla with an elevated crefted rib.—A native of banks, or pools of frefh water, in the Eaft Indies, where it floats, often not reaching the bottom with its roots. Flowering time the wet and cold feafon.—*Roots* annual, fibrous. *Stems* numerous, much fpreading. *Leaves* on fhort ftalks, fmooth; green above with a purplifh tinge. *Flowers* in a loofe umbel, not hairy, of a pure white colour, about an inch in diameter. Rheede defcribes the laft fpecies as having ten ftamens. We fufpect the prefent, which has alfo ten, though five are imperfect, is what fir William Jones defcribed in his felect Indian plants, calling it *Cumuda*, or delight of the water, which feems to be a general name for beautiful aquatic flowers.

5. M. *exaltata*. Tall Buckbean. Soland. MSS. and Herb. Banks. Ait. Hort. Kew. ed. 2. v. 1. 312. Bot. Mag. t. 1029.—Leaves roundifh-heart-fhaped, fomewhat peltate, flightly crenate. *Stem* panicled. A native of New South Wales, where it was difcovered by fir Jofeph Banks. It flowers from November to February, being kept in a ciftern near the glafs in a bark-ftove. This is a larger plant than any of the preceding, with a tall, panicled, many-flowered *ftem*. The *leaves* are heart-fhaped, veiny and wavy. *Flowers* deep yellow, their petals toothed at the edge, and bearded on the upper fide at the bafe. Dr. Sims remarks that it is nearly allied to *M. ovata*, and fhould immediately precede that fpecies.

6. M. *trifoliata*. Common Buckbean, or Marfh Trefoil. Linn. Sp. Pl. 208. Engl. Bot. t. 495. Curt. Lond. fafc. 4. t. 17—Leaves ternate. Corolla extremely hairy on the upper fide. This elegant plant is common in boggy, marfhy fituations, and flowers in June or July. *Root* perennial, formed of fpreading fcyons, black. *Stem* leafy, fpreading horizontally, branched. *Leaves* ternate, on ftalks, toothed and flightly folded at the edge. *Flowers* in fpikes, bracteated, on ftalks, of a beautiful flefh-colour, hairy and very thickly fet on the upper fide with flefhy obtufe fibres. *Style* prominent. The whole herb is bitter, powerfully inducing perfpiration. Dr. Smith remarks that "an infufion of it was long ago recommended for the rheumatifm, and has been a popular medicine in England. It has alfo been given for the gout, fcurvy, ague, catarrh and dropfy, a formidable lift of diforders: if it has any right to fuch celebrity, it muft act as a powerful tonic."

7. M. *hydrophyllum*. Water-leaf Buckbean. Loureir. Cochinch. 105. Mart. Mill. Dict. v. 3—Leaves heart-fhaped, entire. Flowers axillary, crowded together. A native of fwamps in Cochinchina. This plant is confidered by the authors above quoted as forming a connecting link between *Menyanthes* and *Hydrophyllum*. The *ftem* is thread-fhaped and creeping. *Leaves* fmooth, on ftalks, fcattered, few in number. *Flowers* white, on long ftalks.

MENYANTHES *Trifoliata*, *Water-trefoil*, or *Buck-bean*, in the *Materia Medica*. The whole plant is fo extremely bitter, that in fome countries it is ufed for hops in the preparation of malt-liquor; and yet Linnæus obferves, that the poorer people in Lapland make a bread of the powdered roots mixed with meal, acknowledging at the fame time that it is a very unpalatable food. The blacknefs manifefted by adding a folution of green vitriol to the juice, or to a ftrong infufion of the leaves of buckbean, is a fufficient teft of its aftringency; while a drachm of the powdered leaves feldom fails to open the body, or produce vomiting; fo that in common with the tonic properties of a bitter, it feems farther to poffefs a confiderable fhare of medicinal activity: we can therefore more eafily credit the reports of its fuccefs in a great number of chronic difeafes mentioned by various authors, as fcurvy, dropfy, jaundice, afthma, periodical headaches, intermittents, hypochondriafis, cachexia, obftructio menfium, rheumatifm, fcrophula, worms, gout. Dr. Boerhaave was relieved in the laft mentioned complaint by drinking the juice mixed with whey; and Dr. Alfton tells us, that "this plant had remarkable effects in the gout, in keeping off 'the paroxyfms;' but adds, "though not to the patient's advantage."

In confirmation of the good effects of water trefoil in dropfies, we are told that fheep, when forced to eat it, are cured of the rot (oves tabidæ); yet as we have but few and imperfect proofs of its diuretic powers, this fact will be confidered of little weight.

Bergius confines the ufes of this plant to fcorbutus, leucophlegmatia, arthritis, rheumatifmus, cacoethes, and this fpecification is ftill farther contracted by later writers on the materia medica. In Lewis's Mat. Med. (by Mr. Aikin) it is faid, that the leaves of buckbean "have of late years come into common ufe as an alterative and aperient, in impurities of the humours, and fome hydropic and rheumatic cafes;" and as an active and eccoprotic bitter, we fhould fuppofe them not ill adapted to fupply the want of bile in the *primæ viæ*, and thus infer their ufe in protracted jaundice, and other biliary obftructions. Dr. Cullen has "had feveral inftances of their good effects in fome cutaneous difeafes of the herpetic and feemingly cancerous kind."

The leaves may be given in powder from ℈i to ℈ij for a dofe two or three times a day, but a ftrong infufion of them is perhaps preferable, and with delicate ftomachs it may be neceffary to conjoin a grateful aromatic: they impart their properties both to watery and fpirituous menftrua, and an extract

extract is ordered to be prepared from them in the Ph. Dan. p. 171. "Efficax et frequentis commodique usus." Murray. Lewis Mat. Med. Cullen Mat. Med. Woodville Med. Bot.

MENZABANO, in *Geography*, a town of Italy, on the river Mincio, famous for a battle fought here between the French and the Austrians, on the 28th of December 1801, in which, after a very obstinate and sanguinary contest, the former were victorious, and took 8000 prisoners.

MENZALE', called by Strabo (lib. xvii.) and the Arabian authors *Tanis* (which see), a large lake, separated from the Mediterranean, to which it is parallel, by a slip of land, about 60 miles in length and from 2 to 12 in breadth; filled and occasionally overflowed by the waters of the Nile. During the inundation the water is fresh, and becomes salt as the river returns into its bed; a circumstance which was observed in the time of the caliphs. The Nile, says the geographer of Nubia, overflowing its banks at the summer solstice, the canals which discharge themselves into lake Tanis, render its waters fresh; and the sea, flowing into it, in its turn, makes them salt. In this lake are islands with buildings in them like barns; but they are only accessible in boats. About 1200 boats, each of which pays annually 40 livres to the Pacha's renter, are constantly employed in fishing on the lake. The quality of the water gives to the fish a white flesh and a fine delicate flavour. They supply Damietta at a cheap rate. As the lake has several communications with the Nile and the Mediterranean, and being full of islands, reeds, herbs, and insects, it is abundantly stocked with fish. Two thousand persons are annually employed in the fishery, and thousands of birds constantly feed upon the fish without occasioning any perceptible diminution. The waters are covered with wild geese, ducks, teals, plovers, and ibises; and various other birds of large size and beautiful plumage. The islands in this lake are for the most part uninhabited, except Matarieh; and of course are uncultivated. Menzalé communicates with the sea by two mouths, *viz.* Dibé and Eumené Fareggi, which are the Mendesian and Tanitic mouths of the ancients; each mouth is shut towards the sea with a bar or bank, forming the part of a circle. The tongue of land, separating the lake from the sea, extends, with only four interruptions in its whole length, from Damietta to Tineh. The length of the lake from N.W. to S.E. is 43,000 fathoms, and its breadth from 12,000 to 26,000.—Also, a town of Egypt, situated near the lake to which it gives name; 20 miles S.S.E. of Damietta. N. lat. 31° 3'. E. long. 32°.

MENZALINSK, a town of Russia, in the government of Upha; 132 miles W.N.W. of Upha. N. lat. 55° 16'. E. long. 52° 14'.

MENZIESIA, in *Botany*, so named many years ago, by the writer of this, in the *Plantarum Icones ex Herb. Linn. fasc.* 3, in honour of his much-valued friend Mr. Archibald Menzies, F. L. S. This gentleman, in his voyage round the world with captain Vancouver, collected many rare and nondescript plants, particularly on the western coasts of New Holland and of North America. He also discovered, near Dusky bay in New Zeeland, the richest collection of *Jungermanniæ* that was ever, perhaps, made by any one person.—Sm. Plant. Ic. 56. Willd. Sp. Pl. v. 2. 355. Michaux Boreal-Amer. v. 1. 235. Juss. in Annal. du Muf. v. 1. 55. Ait. Hort. Kew. ed. 2. v. 2. 360. Swartz Tr. of Linn. Soc. v. 10. 375. Engl. Bot. v. 35. 2469. Lamarck Dict. v. 4. 115. Illustr. t. 285. Class and order, *Octandria Monogynia*. Nat. Ord. *Bicornes*, Linn. *Rhododendra*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, more or less deeply four or five-cleft, permanent. *Cor.* of one petal, inflated, nearly ovate, deciduous; its limb spreading, in four or five small, spreading, equal segments. *Stam.* Filaments eight or ten, thread-shaped, equal, shorter than the corolla, inserted into the receptacle; anthers erect, oblong, simple, two-lobed at the base, opening by two pores at the top. *Pist.* Germen superior, roundish-oblong, furrowed; style angular, erect, rather longer than the stamens; stigma obtuse, with four or five small lobes. *Peric.* Capsules elliptic-oblong, with four or five furrows, and as many valves and cells, opening from the top downward, the partitions double, formed of the inflexed margins of the valves. *Seeds* numerous, small, oblong, more or less pointed, affixed to the ribs of the large central column.

Eff. Ch. Calyx of one leaf, four or five-cleft. Corolla of one petal, inflated. Filaments inserted into the receptacle. Capsule superior, of four or five cells, the partitions from the inflexed margins of the valves.

1. M. *ferruginea*. Rusty-flowered Menziesia. Sm. Plant. Ic. t. 56.—Calyx very slightly four-lobed. Leaves obovato-lanceolate, finely serrated; smooth beneath.—Gathered by Mr. Menzies, very copiously, in 1787 and 1788, on the west coast of North America. The *stem* is shrubby, two or three feet high, determinately branched, spreading, round, smooth, the pale *bark* scaling off in long strips; *branches* leafy, hairy when young, springing from the same buds as the flowers, the scales composing which are ovate and fringed. *Leaves* alternate, crowded towards the tops of the branches, stalked, spreading, obovate, inclining to lanceolate, one and a half or two inches long, three-fourths of an inch broad, obtuse, tipped with a gland, finely serrated, fringed, membranous, flat, veiny; green and besprinkled with white depressed hairs above; pale and smooth beneath, except a few hairs, or flat narrow scales, on the ribs; deciduous. *Footstalks* short, winged. *Stipulas* none. *Flowers* from the buds of the last season, five or more together, on simple stalks, about an inch long, covered with viscid hairs, and drooping. *Calyx* small and flat, very slightly four-lobed, or rather waved at the edge, fringed. *Corolla* ovate, one-third of an inch long, the border four-cleft, slightly expanded, altogether (as appears by Mr. Menzies's drawing and description) of a rusty hue. *Stamens* eight. *Capsule* smooth, dark brown externally, pale within.

2. M. *globularis*. Pale-flowered Menziesia. Salis. Parad. t. 44. Ait. Hort. Kew. n. 1. (M. Smithii; Michaux Boreal-Amer. v. 1. 235.)—Calyx in four rounded lobes. Leaves obovate, nearly entire; glaucous and downy beneath.—Native of South Carolina, according to Salisbury and Lyon. Of this we know nothing but from the works quoted, by which it appears to differ from the foregoing, besides the above specific characters, in having a more globose *corolla*, pale yellow with red streaks. The *flowers* are octandrous and four-cleft, as in *M. ferruginea*. Michaux mistook this for the original species; and having no information of the specific name, gave one of his own. The above writers copy his error of the press.

3. M. *polifolia*. Irish Menziesia. Juss. in Ann. du Muf. v. 1. 55. Ait. n. 2. (Erica Daboeci; Sm. Fl. Brit. 420. Engl. Bot. t. 35. Willd. Sp. Pl. v. 2. 383. Andromeda Daboecia; Linn. Syst. Veg. ed. 13. 338.)—Calyx in four deep segments. Flowers racemose. Leaves ovate; very densely downy and snow-white beneath.—Native of hills in Spain and Ireland, on a boggy soil. Mr. Lambert found it abundant on Croagh Patrick in the county of Mayo, and Dr. Wade in the district of Cunnemara, county of Galway. In gardens it is often cultivated for ornament, amongst American and other flowering shrubs which thrive in bog earth,

earth, flowering from June to September. The *ſtems* are ſhrubby, buſhy, a foot and a half high, with many upright, ſimple, leafy branches, at length decumbent and ſpreading. *Leaves* numerous, ſtalked, generally alternate, now and then oppoſite, or three together, ovate, entire, ſlightly revolute; dark green, ſhining, and ſomewhat hairy above; ſnow-white, with denſe cottony down beneath, their ſmooth red rib vaniſhing about the middle. There are axillary tufts of numerous ſmall leaves beſides. *Flowers* four-cleft, octandrous, large, purpliſh-red, ovate, with four obtuſe angles, drooping in a long, looſe, inclining, bracteated cluſter; the ſtalks and calyx red, hairy, and viſcid. *Capſule* ſmall and roundiſh, with partitions from the inflexed margin of the valves, which is never the caſe with a real *Andromeda*. Hence this plant was retained in *Erica* in Fl. Brit. according to the original opinion of Linnæus, who was chiefly led by number in the parts of fructification. M. de Juſſieu however, who always much approved this genus of *Menzieſia*, has reinforced it with the preſent ſpecies, as Dr. Swartz has done with the two following.

4. M. *cærulea*. Scottiſh Menzieſia. Swartz Tr. of Linn. Soc. v. 10. 377. t. 30. f. A. Engl. Bot. t. 2469. (Andromeda cærulea; Linn. Sp. Pl. 563. Fl. Lapp. ed. 2. 133. t. 1. f. 5. Lapl. Tour. v. 1. 272. Fl. Dan. t. 57. A. taxifolia; Pall. Roſſ. v. 1. p. 2. 54. t. 72. f. 2. Erica cærulea; Willd. Sp. Pl. v. 2. 393.)—Calyx in five deep acute ſegments. Corolla ovate. Flower-ſtalks terminal, aggregate, ſimple. Leaves ſcattered, numerous, linear, obtuſe, finely ſerrated.—Native of turfy ſtony mountainous heaths in Lapland, Norway, ſome part of Siberia, and alſo in the moſt northern parts of America. It has lately been diſcovered at Aviemore in Strathſpey, as well as in the remote weſtern iſles of Shiant. This is a more humble *ſhrub* than the laſt, with the habit of an *Empetrum*, and diſtinguiſhed from all the foregoing ſpecies, by its narrow crowded *leaves*, like thoſe of a heath, moderately ſpreading in every direction. They are almoſt linear, about half an inch long, rather ſhining above, finely toothed at the edge; their rib downy underneath. *Flower-ſtalks* four or five at the top of ſome of the branches, at firſt perfectly terminal, but the branch gradually ſhoots beyond them; each is about an inch and a half long, ſimple, rough with red glandular hairs, drooping gracefully at the top, and bearing one large ovate *flower* of a pale blueiſh or livid red; the *calyx* in five deep acute ſegments. On turning to Pallas's *Flora Roſſica*, we find he did not alter the ſpecific name to *taxifolia*, from want of underſtanding the true meaning of *cærulea*, but becauſe the *corolla* occaſionally varies to fleſh-colour or to white; but theſe changes are frequent, and do not authorize ſuch a meaſure.

5. M. *empetriformis*. Bell-flowered Menzieſia. Sm. Tr. of Linn. Soc. v. 10. 380.—Calyx in five deep obtuſe ſegments. Corolla bell-ſhaped. Flower-ſtalks terminal, aggregate, ſimple. Leaves ſcattered, linear, obtuſe, finely ſerrated; concave beneath.—Gathered by Mr. Menzies on the weſt coaſt of North America, near Nootka Sound. A much taller plant than the laſt, with leſs crowded *leaves*, which are concave beneath, with a ſmooth rib; their upper ſurface ſhining; the margin fringed with briſtly ſerratures. The *flower-ſtalks* are crowded in like manner about the tops of the branches, but in greater number. *Calyx* not above half ſo long, with five blunt, thin-edged, deep, convex ſegments. *Corolla* ſmaller, bell-ſhaped, with five ſpreading, ovate, marginal ſegments, and not contracted at the mouth. *Capſule* almoſt globular, dark brown, beſprinkled with reſinous dots.

6. M. *Bryantha*. Moſſy Menzieſia. Swartz Tr. of Linn. Soc. v. 10. 378. t. 30. f. B. (Andromeda Bryantha; Linn. Mant. 238. A. Bryanthus; Pall. Roſſ. v. 1. p. 2. 57. t. 73. f. 1. Bryanthus; Gmel. Sib. v. 4. 133. t. 57. f. 3. Erica Bryantha; Willd. Sp. Pl. v. 2. 386.)—Calyx in four deep acute ſegments. Corolla bell-ſhaped, in four deep ſegments. Flower-ſtalks terminal, corymboſe. Leaves ſcattered, elliptic-oblong, toothed; convex beneath.—Gathered by Steller, on moſſy rocks in Kamtſchatka, flowering in July. This elegant little *ſhrub* is much ſmaller than any of the reſt, clothing the ground with its long trailing branching *ſtems*; and the ſmall, oblong, numerous *leaves* give it a moſs-like aſpect. The *flowers* grow four or five together in a ſmall, corymboſe, bracteated cluſter, on a long terminal ſtalk. The *calyx* and *ſtamens* are red. *Corolla* white, divided below the middle into four ſegments. Pallas ſays it has ſometimes five or ſix diviſions, and that the *ſtamens* are equal to them in number; but he muſt mean that they are twice as numerous, which indeed his figure expreſſes, and which is the caſe in the whole genus. The *capſule* is nearly globular, with four furrows. We have ſeen no ſpecimen.

Theſe are all the ſpecies of *Menzieſia* hitherto eſtabliſhed. Willdenow ſuggeſts, Sp. Pl. v. 2. 610, that the *Andromeda octandra*, Swartz Ind. Occ. 840, may belong to this genus; but Swartz deſcribes the corolla as permanent, and though he does not deſcribe the fruit, in a manner to aſſiſt us in this enquiry, we muſt preſume he did not overlook this plant of his own, while ſeeking for *Menzieſiæ* amongſt *Andromedæ*.

MENZIL, in *Geography*, a town of Africa, in the kingdom of Tunis, anciently called "Zæta;" 4 miles S.S.W. of Suſa.

MENZINI, Benedetto, in *Biography*, an eminent Italian poet, was born at Florence of indigent parents in 1646. He was taken at an early period into the houſe of Gianvincenzo Salviati, who gave him the means of cultivating his talents. He was ſoon diſtinguiſhed for eloquence, and opened a ſchool of rhetoric. By the advice of the celebrated Redi he turned his efforts to Italian poetry, and in 1674 publiſhed a volume of poems, dedicated to the grand duke Coſmo III., and in 1679 he publiſhed a treatiſe, entitled "Conſtruzione irregolare della Lingua Toſcana," and in the following year he appeared before the public with a volume of lyric poems, by which he obtained great reputation. In 1685 he accepted an invitation from queen Chriſtina of Sweden, then reſident at Rome, who gave him a very favourable reception, and admitted him into her academy. He had now leiſure to purſue his ſtudies, but the death of the queen in 1689 obliged him to ſeek a maintenance by writing for other perſons, particularly ſermons for the clergy who were unable to compoſe their own diſcourſes. He at length received from pope Innocent XII. an office in the church of St. Angelo, in Peſchiera; and in 1701 he was nominated coadjutor in the chair of eloquence at the college of the Sapienza at Rome. He died, according to one account, in 1704, but according to another in 1708. He wrote almoſt every kind of Italian poetry, but in anacreontic ſongs, in paſtoral ſonnets, elegies, and ſacred hymns, he has few equals, and perhaps no ſuperior; and in Italian ſatires none can compare with him. All the works of Menzini were collected and publiſhed at Florence, in four volumes, in the year 1731. Of theſe the firſt contains his lyric poems: the ſecond his miſcellaneous pieces: the third his Italian proſe; and the fourth his Latin compoſitions. He was a member of the academy Della Cruſca, and his works have been conſidered as belonging to the golden age of the language.

MEOLA, in *Geography*, a town of Italy, in the Treviſan; 11 miles E. of Trevigio.

MEPHITIS, or Mephitical *Exhalation*, denotes a poiſonous

poisonous and noxious steam issuing out of the earth. See DAMP, *Mephitic* AIR, and AZOTE. See also EFFLUVIA, and GROTTO *del Cani*.

MEPHITIS, in *Mythology*, is a name given to Juno, because she is supposed to preside over stinking exhalations, or corrupted and noxious air; and hence it was used to signify such noxious air itself. Servius, upon the passage in Virgil (Æn. vii) "Sævamque exhalat opaca Mephitim," says, that this goddess may possibly be Juno taken for the air, because it is by means of the air that bad smells are communicated. According to Scaliger, the word is Etruscan, and derived from the Syrians, with whom it signified any stinking smell. Juno had a temple among the Hirpines under this appellation.

MEPPEL, in *Geography*, a town of Holland, in the department of Overissel, seated on the Walt Aa; 24 miles W. of Covorden.

MEPPEN, a town and fortress of Germany, in the bishopric of Munster, at the conflux of the Hase and Embs; 52 miles N. of Munster. N. lat. 52° 43′. E. long. 7° 26′.

MEQUINENZA, a town of Spain, in the kingdom of Aragon, at the conflux of the Segre, the Cinea, and the Ebro; anciently called "Octogesa" and "Ictosa;" defended by a castle, and once the see of a bishop; 16 miles S.S.W. of Lerida.

MEQUINEZ, an imperial city of Morocco, greatly embellished and enlarged by Muley Ishmael, and the metropolis of the north. It is situated at the extremity of Beni-Hassen, 80 leagues N. of Morocco, and 20 leagues E. of Sallee and the sea. Maknassa, the founder of this city, built it at the bottom of a valley, but Muley Ishmael made it much larger, by building on the plain to the west. The city is surrounded by vallies and eminences highly cultivated, ornamented with gardens, and plantations of olive-trees, and watered by a variety of streams, so that the fruits and vegetables are of an excellent flavour. The winter is disagreeable on account of the quantity of mud which then accumulates in the city and its environs, because the streets are not paved, and the soil is clay. Mequinez is encompassed with walls: and the palace is fortified with two bastions, in which was formerly some small artillery. The Brebes have often conspired against the tyranny of its rulers; and on the western side are still seen some walls of circumvallation, six feet in height, which were probably only intrenchments for the infantry, as the attacks of the Brebes were sudden and momentary incursions, which did not require any long defence. In Mequinez, as well as in Morocco, there is a quarter walled in and guarded for the Jews. The houses are handsomer here than in that of Morocco; the Jews are more numerous, and derive greater profit from their industry, because the Moors of Mequinez are richer, and as they are nearer, they have greater intercourse with Europe than those of the Southern provinces. Contiguous to the quarter of the Jews, is another, inclosed with walls, but now in ruins, called the Negro town, built by Muley Ishmael for the families of his black soldiers; but of this the walls only remain. At the extremity of the city, on the S.E. side, is the emperor's palace, which is a very extensive building, including several gardens, well laid out and watered by abundant streams. In the centre is a large garden, surrounded by a spacious gallery supported by columns, which maintains a communication between the apartments. Those of the women are large, and terminate in a common chamber, built on a causeway that divides the great garden, where the women may look out at the window through an iron lattice. In passing from one apartment to another, we meet at intervals with regular courts, paved with squares of black and white marble. In the middle of these courts is a marble bason, on which is raised a round shell; in the centre of this is a fountain that plays into the bason. There are many other fountains that supply water for the numerous ablutions of the Mahometans. At Mequinez, as well as at Fez, they make a kind of glazed tiles, similar to what we call Dutch tiles, of various colours; which are used to pave their rooms and face their walls, and give to their houses an air of neatness and coolness, not occurring in other towns of the empire. The Moors of Mequinez are much more affable and engaging than those of the southern provinces; and the women are extremely handsome, being very fair, with fine black eyes, and beautiful teeth. They are sometimes seen walking on the terrace; but when a Moor appears, they immediately retire. At Mequinez, as well as at Morocco, there is a hospitium, or convent, of Spanish Recollects, founded more than 100 years ago by the munificence of the kings of Spain, for the benefit and spiritual comfort of the Christian captives. These convents are much respected in the country, both for the exemplary lives of the fathers, and the service they render to the poor, whom they supply with medicines gratis; 35 miles S.W. of Fez. N. lat. 33° 56′. W. long. 5° 50′.

MER, a town of France, in the department of the Loir and Cher, and chief place of a canton, in the district of Blois; 9 miles N.E. of Blois. The place contains 4300, and the canton 10,623 inhabitants, on a territory of 172½ kiliometres, in 12 communes. N. lat. 47° 42′. E. long. 1° 35′.

MER.—*Ouster le Mer.* See OUSTER.

MERA, in *Geography*, a town of Spain, in Galicia, near the sea-coast; 3 miles E. of Corunna.

MERA, in *Hindoo Mythology*, is the fabled wife of Haimavat and mother of Uma, a name and form of Parvati, thus incarnated to become the wife of Siva, and parent, or reputed parent, of Kartikya. (See KARTIKYA.) The stories connected with this fable are very numerous, filling many books in great esteem among the Hindoos. In the thirtieth and following sections of the first kanda, or book, of the Ramayana, it is detailed in a very poetical style how the "great Haimavat, sovereign of mountains, the grand magazine of metallic substances, had two daughters of incomparable beauty, by his wife Mera." Their names were Ganga and Uma. The first (the river Ganges) was yielded in marriage to all the celestials, at their earnest solicitation. Her younger sister, remaining a virgin, became a devotee of extraordinary rigidity, and was at length espoused by Siva, whose frigidity was, however, such as to require much address, on the part of the celestials, to animate him to the due pitch of passion; his nuptials and the consequent production of Kartikya being of great moment. On this occasion it was that Kama, the god of love, artfully placing the beauteous Uma before Siva, while in the graceful act of gathering flowers wherewith to decorate his emblem, the Linga had the audacity to launch an arrow at the dreaded deity. Siva, enraged, reduced Kama to ashes (or, according to some legends, to a mental essence) by a beam of fire, darted from his central eye. This fable is noticed in the article KAMA, and is as often alluded to in Hindoo books as any perhaps in the whole range of their mythological extravagance. In the Siva-purana, the parents of Parvati in this incarnation are named Himachala and Mahina, in other works Himalaya and Mena. (See MENA.) The name of the father, in all cases, being derived from a Sanscrit word meaning snow. Mera is said to be daughter of the mountain Meru; a most fruitful source of mythological tales of wonder and extravagance. See MERU.

MERAB, in *Geography*, a town of Arabia, in the province of Nedsjed; 100 miles N. of Jamama.—Also, a town of Persia, in Khorasan; 45 miles N.E. of Meschid.

MERA-COBIN, a town of Africa, in the kingdom of Adel, on the coast of the Indian sea. N. lat. 8° 10'. E. long. 49° 14'.

MERAN, a town of the Tyrol, of which it was formerly the capital, at the conflux of the Adige and Passer, containing six churches and convents; two miles S.S.E. of Tyrol. N. lat. 46° 38'. E. long. 11° 24'.

MERAT, a town of Hindoostan, in the country of Delhi; 40 miles N. of Delhi. N. lat. 29° 20'. E. long. 78° 6'.

MERATE, a town of Italy, in the department of the Serio; 9 miles W. of Bergamo.

MERATTE, a town of Algiers; 15 miles N. of Tagademt.

MERAUDABAD, or MOORADABAD, a town of Hindoostan, in Oude, once large with a mint, but now decayed; 20 miles N.E. of Sumbul.

MERBAT, a town of Arabia, in the province of Hadramaut, which, as well as Haseh, is only known for the traffic which the inhabitants carry on in incense produced in that neighbourhood; 32 miles N. of Dafar.

MERBES LE-CHATEAU, a town of France, in the department of Jemappe, and chief place of a canton, in the district of Charleroy. The place contains 661, and the canton 6382 inhabitants, on a territory of 122½ kiliometres, in 17 communes.

MERCADAL, the chief town of the Terminos Mercadal in the island of Minorca, situated nearly in the middle of the island on the great road between Mahon and Ciudadella. Its streets are narrow, winding, ill paved and worse repaired. The public edifices consist of the old parish church, which is decaying, and a new one. Its situation is the least salubrious in the whole island. During the extreme heats, the inhabitants are afflicted with obstinate fevers; water is scarce, as the great public cistern is often dry during the summer. The territory of this place is about 5½ leagues in length, and 4½ in breadth. In the same district, about four leagues from Mercadal, is Ferarias, where the English have constructed barracks for 200 soldiers. The territory of Ferarias is five leagues in length and two in breadth. Few of the occupiers are husbandmen, the greater number being employed in hunting, as game is very abundant.

MERCARA, a city of Hindoostan, and residence of the rajah of Coorga; 55 miles W. of Seringapatam.

MERCATI, MICHAEL, in *Biography*, a physician and naturalist, the son of Peter Mercati, a physician of St. Miniato, in Tuscany, was born in April, 1541. After having finished his scholastic education at his native place, he was sent to Pisa, and placed under the tuition of Cesalpini, from whom he derived his taste for the study of nature. Having received his degree of doctor in philosophy and medicine in that university, he went to Rome, where he soon became known to the pope, Pius V., who appointed him superintendant of the botanical garden of the Vatican, at the age of twenty-six. In the following year he obtained the esteem of Ferdinand I., the grand duke of Tuscany, who raised him to the rank of nobility; and soon afterwards the same dignity was conferred upon him by the senate of Rome. He was in great favour with pope Gregory XIII., who honoured him with an appointment about his person, and with his full confidence, as did also his successor Sixtus V., who conferred upon him the honourable office of apostolical prothonotary, and sent him into Poland with cardinal Aldobrandini, that he might enjoy the opportunity of increasing his collections in natural history. During this journey he greatly enriched his mineralogical cabinet, which he had already commenced at Rome. The same cardinal, when elected pope in 1592, under the title of Clement VIII., nominated Mercati his first physician, and had in contemplation higher honours to bestow upon him, when this able physician died, in 1593, in the fifty-third year of his age. His character in private life was universally esteemed, and the regret of the most distinguished persons of Rome followed him to his grave.

Mercati wrote in Italian, at the request of his patron pope Gregory, a work "On the Plague, on the Corruption of the Air, on the Gout, and on Palsy," which was printed at Rome, in 1576, in 4to: and likewise a "Dissertation on the Obelisks of Rome, printed in 1589, 4to. But he is principally remembered for his description of the subjects of natural history, particularly of mineralogy, contained in the museum of the Vatican, which was formed under the auspices of Gregory XIII. and Sixtus V. and was afterwards totally dispersed. He was about to prepare engravings of the principal subjects, when his disease, which terminated his life, interrupted his progress. His manuscript came into the hands of Carlo Dati of Florence, where it remained till the time of Clement XI., who purchased it, and caused it to be splendidly edited by Lancisi, his first physician, in 1717, under the title of "Metallotheca, opus posthumum Authoritate et Munificentia Clementis XI. Pont. Max. è tenebris in lucem eductum; operâ & stud. J. M. Lancisi Archiat. Prat. illustratum," folio. An "Appendix ad Metallothecam" was published in 1719. Eloy Dict. Hist. de la Méd. Gen. Biog.

MERCATOR, GERARD, an eminent Flemish geographer and mathematician, was born at Ruremond, in the year 1512. After he had attained a good degree of classical learning, he studied philosophy at Bois-le-Duc, and removed from thence to Louvain, where he was admitted to the degree of M.A. His studies now laid so fast hold of him, that he frequently forgot the usual periods for refreshment and sleep. At the age of twenty-four he married, and then began to learn the art of engraving. His first production in this way was a description and map of the Holy Land, which he published in 1537, when he was only twenty five years of age. In the year 1541 he made a terrestrial globe, which proved the means of introducing him to the patronage of the emperor Charles V., for whom he executed maps, globes, and a collection of other mathematical instruments. This business was the means of obtaining for him an appointment in the emperor's houshold. About the same time the duke of Juliers and Cleves made him his cosmographer. In 1551, Mercator produced his celestial globe, which was accompanied with a short treatise on the use of that instrument. He now left Louvain, and settled at Duysburg, where he published, at different periods, descriptions and maps of the World, Europe, Germany, France, and the British islands; these he afterwards collected together into an Atlas, to which he prefixed a treatise "On the Creation and Construction of the World." His method of laying down maps, &c. is a projection of the surface of the earth on a plane. (See MAP.) In 1568, Mercator published his "Chronologia" from the beginning of the world to that year, and immediately he gave the public a corrected edition of "The Geographical Tables of Ptolemy." He died of a paralytic stroke in 1594 at a very advanced age, and in the midst of his useful labours, at the same time projecting new works for the improvement of the science of geography. He was author of several other works besides those already noticed.

Of these the principal are as follow, 1. "Ratio scribendarum Literarum Latinarum, quas Italicas cursoriasque vocant:" 2. "De usu Annuli Astronomici:" 3. "Harmonia Evangelistarum." He had a son named Bartholomew, who wrote notes on John Sacrobosco's treatise "De Sphæra Mundi," when he was very young, as he died at the age of eighteen.

Mercator, Nicholas, an eminent astronomer and mathematician, was born in Danish Holstein about the year 1640. He received an excellent education, and his turn for mathematical studies introduced him to public regard and esteem in his country, and facilitated his correspondence with those persons who were eminent in the same sciences, in Denmark, Italy, and England. Receiving an invitation to visit this country, he came, and was so well pleased with the reception he met with, that he spent the remainder of his life in England. He was, soon after his arrival, elected a fellow of the Royal Society, and applied himself very diligently to the improvement of the sciences, but he has been charged with having borrowed the inventions of others, and adopting them as his own; and it appeared upon some occasions that he was not endowed with a very liberal mind in scientific communications. Thus, it had been observed before him, that there was an analogy between a scale of logarithmic tangents and Wright's protraction of the nautical meridian line, which consisted of the sums of the secants, though it did not appear by whom this analogy was first discovered. It seemed, however, that it was first published and introduced into the practice of navigation by Mr. Henry Bond, who mentions this property in an edition of Norwood's "Epitome of Navigation" printed about the year 1645, and he treated of it more fully in an edition of Gunter's works, printed in 1653, where he teaches, from this property, to resolve all cases of Mercator's sailing by the logarithmic tangents, independently of the table of meridional parts. This analogy had been only found to be nearly true by trials, but not demonstrated to be a mathematical property. Such demonstration was probably first discovered by Mercator, who, desirous of making the most advantage of this and another invention in navigation, invited, by a paper in the Philosophical Transactions for June 1666, the public to enter into a wager with him on his ability to prove the truth or falsehood of the supposed analogy. This proposal, not very reputable to a man of science and literature, was not taken up by any one, and Mercator reserved his demonstration: he, however, distinguished himself by many valuable pieces on philosophical and mathematical subjects. Of these we may mention "Cosmographia, sive Descriptio Cœli et Terræ in Circulos, &c.:" "Rationes Mathematicæ subductæ Anno 1653:" "Hypothesis Astronomica nova et consensus ejus cum Observationibus:" "Logarithmotechnia, sive methodus construendi Logarithmos, &c:" "Institutionum Astronomicarum Libri duo." He published also some papers in the Philosophical Transactions.

Mercator's *Chart*, or *Projection*, is a sea-chart, or projection of the surface of the earth in plano.

For the construction, use, advantages, &c. of which, see *Mercator's* Chart.

Mercator's *Sailing*, is that performed loxodromically, by means of Mercator's charts. See *Mercator's* Sailing.

MERCATORUM Festum, among the Romans, a festival kept by the mercantile people on the ides, or 15th of May, in honour of Mercury, to whom they sacrificed a sow; then sprinkling themselves with the water of a fountain, called aqua Mercurii, they prayed the god to prosper their trade.

MERCATUS, or Mercado, Louis, in *Biography*, an eminent physician of the 16th century, was born at Valladolid, in Spain, where he became a medical teacher, and obtained such reputation, as led to wealth and honourable appointments. He was first physician to Philip II. during a period of twenty years; and on the death of that prince, in 1598, was nominated to the same office by his son and successor, Philip III. Mercado lived to the age of 86; but the latter years of his life were rendered painful by the affliction of a stone in the bladder. He was author of a considerable number of works relative to medicine and surgery, written in a better Latin style than most of those composed by the writers of Spain; nevertheless, they are chiefly borrowed from the ancients, and contain nothing that is original. The whole were collected, and printed in three volumes, folio, in 1605, and have been several times reprinted. Eloy Dict. Hist.

MERCED, La, in *Geography*, a town of New Navarre; 90 miles S.W. of Casa Grande.—Also, a town of Chili; 50 miles S.S.W. of St. Yago.

MERCER, a county of Pennsylvania, bounded N. by Crawford, E. by Venango, S.E. by Butler, S. by Beaver, and W. by Ohio state; about 40 miles long, and 27 broad; containing about 642,000 acres, and 3220 inhabitants.—Also, a county of Kentucky, adjoining Woodford, Shelby, and Madison counties: it contains 9242 inhabitants, of whom 2169 are slaves. The chief town is Harrodsburg.

MERCHAB, or Merhab, a fortress of Syria, in the pachalic of Tripoli, on the coast of the Mediterranean, built by the Franks, and long possessed by the knights of St. John; 8 miles N. of Tortosa.

MERCHANT, Mercator, is one who buys and trades in any thing: and as merchandise includes all goods and wares exposed to sale in fairs or markets, so the word merchant formerly extended to all sorts of traders, buyers, and sellers. But every one that buys and sells is not at this day under the denomination of a merchant; only those who traffic in the way of commerce, by importation or exportation, or carry on business by way of barter or exchange, and who make it their living to buy and sell, by a continued assiduity, or frequent negociation in the mystery of merchandising, are esteemed merchants. Those who buy goods, to reduce them by their own art or industry into other forms than they are of, and then to sell them, are artificers, and not merchants. Bankers, and such as deal by exchange, are properly called merchants. Lex. Mercat. on Merch. Com. 23.

The mercantile profession is esteemed noble, and independent. In France, by two arrets of Louis XIV., the one of 1669, the other of 1701, the nobility are allowed to trade, both by land and sea, without derogating from their nobility: and we have frequent instances of merchants ennobled in that country, in regard to the utility of their commerce, and the manufactures they have set up. In Bretagne, even a retail trader does not derogate from nobility.

When the nobles of that province are disposed for commerce, they let their nobility sleep; that is, they do not lose it, but only cease to enjoy the privileges of their noblesse while their commerce continues; and re-assume it on their giving over trade, without any letters or instruments of rehabilitation.

In republics, trading is still more valued; but no where more than in England, where the younger sons and brothers of the best families are frequently bred up to merchandise. Add to this, that many of the Italian princes are the principal merchants of their states; and think it no discredit to make their palaces serve as warehouses; and that many of the kings of Asia, and most of those of the coast of Africa and

and Guinea, traffic with the Europeans, sometimes by their ministers, and sometimes in person.

There are companies of merchants in London for carrying on considerable joint-trade to foreign parts. See Company.

Besides these companies, there are other merchants who are distinguished by the country to which they trade; as Dutch merchants; West India merchants; Canary and Portugal merchants; Italian merchants, who trade to Leghorn, Venice, &c.; French and Spanish merchants.

The law of England, as a commercial country, pays a very particular regard to foreign merchants, in innumerable instances. Thus it is provided by Magna Charta, c. 30, that all merchants, unless beforehand publicly prohibited, shall have safe conduct to depart from, to come into, or tarry in, and to go through England, for the exercise of merchandise, without any unreasonable imposts, except in time of war: and if a war breaks out between us and their country, they shall be attached, if in England, without harm of body or goods, till the king, or his chief justiciary, be informed how our merchants are treated in the land with which we are at war; and if our's are secure in that land, they shall be secure in our's. Upon which Montesquieu remarks, with admiration, that the English have made the protection of foreign merchants one of the articles of their national liberty: and also, that the English know better than any other people upon earth, how to value at the same time these three great advantages, religion, liberty, and commerce. In this respect their disposition is very different from the genius of the Roman people; who, in their manners, their constitution, and even in their laws, treated commerce as a dishonourable employment, and prohibited the exercise of it to persons of birth, rank, or fortune; and equally different from the bigotry of the canonists, who looked on trade as inconsistent with Christianity, and determined at the council of Melfi, under pope Urban II. A.D. 1090, that it was impossible, with a safe conscience, to exercise any traffic, or follow the profession of the law. See Commerce.

If a difference arise between the king and any foreign state, alien merchants are to have forty days notice, or longer time, to sell their effects and leave the kingdom. 27 Ed. III. stat. 2. cap. 17.

The principal qualifications requisite for the profession of a merchant, are, 1. To know how to keep books single or double, *viz.* journals, ledgers, and others. 2. To draw invoices, contracts, charter-parties, policies of assurance, bills of exchange, letters missive, &c. 3. To know the relations between the money, weights, and measures, of several countries. 4. To know the places where the several kinds of merchandise are manufactured, in what manner made, what the materials composed of, and whence; the preparation the materials require before they are wrought; and the merchandises afterwards. 5. The lengths and breadths of stuffs, as silks, wools, hairs, linens, &c.; the regulations of the places where they are manufactured; and their different prices at different seasons. 6. The dyeing and the ingredients for the formation of the different colours. 7. The merchandises that abound or are more rare, in one country than another; their kinds and qualities; and the manner of trafficking in them to the best advantage, whether by land, by sea, or river. 8. The commodities permitted or prohibited, both for the import and export of a state. 9. The price of exchange, according to the course of several places, and what it is that raises or lowers it. 10. The duties to be paid, both at the import and export of wares, according to the usage of the place, the tariffs, regulations, &c. 11. The manner of packing, bailing, and tunning merchandises, to keep them either in magazines, or in voyages, &c. 12. On what terms a merchant vessel may be freighted and insured. 13. The goodness and value of every thing requisite for the construction or refitting of vessels, the prices of woods, cordage, masts, anchors, sails, and other necessaries. 14. The wages ordinarily given captains, officers, and sailors; and the manner of contracting with them. 15. The foreign languages, which may be reduced to four principal ones; *viz.* the Spanish, used almost through all the East, particularly on the coast of Africa, from the Canaries to the Cape of Good Hope; the Italian, used throughout the coasts of the Mediterranean, and many places of the Levant; the Teutonic, or German, used throughout most countries of the North; and the French, which is now become almost universally current. 16. The consular jurisprudence, the laws, customs, companies, colonies, chambers of insurance, consulates in the several countries; and, in general, all the ordinances, regulations, and policies, relating to commerce.

Merchant *Court*, or *Court-Merchant*, a kind of judicatory power, invested in merchants, chosen for that purpose, in several parts of Europe: in order to decide and determine, in a summary way, all differences and litigations among themselves and their dependents.

The affairs of merchants are accompanied with such a variety of circumstances, such new and unusual contingencies, which change and differ in every age, with a multitude of niceties and punctilios; and those again altering, as the customs and usages of countries and states do alter, that it has been found impracticable to make any laws that could extend to all cases: and our law itself does tacitly acknowledge its own imperfection in this case, by allowing the custom of merchants to pass as a kind of law in cases of difficulty. See Custom *of Merchants*.

Merchant, *Law*. See Law.

Merchant-*Ship*. See Ship.

Merchant-*Statute*. See Statute.

Merchant, *Tenant per Statute*. See Tenant.

MERCHENLAGE, Merciorum *Lex*, was the law of the people here called the Mercians. Camden, in his Britannia, says, that in the year 1016 this kingdom was divided into three parts; whereof the West Saxons had one, governing it by the laws called West Saxonlage, which contained these nine shires, *viz.* Kent, Sussex, Surrey, Berks, Hampshire, Wilts, Somerset, Dorset, and Devon; the Danes had the second, containing fifteen shires, *i. e.* York, Derby, Nottingham, Leicester, Lincoln, Northampton, Bedford, Bucks, Hertford, Essex, Middlesex, Norfolk, Suffolk, Cambridge, and Huntingdon, which was governed by the laws called Danelage: and the third part was in possession of the Mercians, whose laws were called Merchenlage, and contained eight shires, Gloucester, Worcester, Hereford, Warwick, Oxford, Chester, Salop, Stafford; from which three, king William I. chose the best, and with the other laws ordained them to be the laws of the kingdom. Camd. Brit. p. 94. See Common *Law*.

MERCIER, Bartholomew, in *Biography*, known under the name of the abbé St. Leger, was born at Lyons in 1784. He entered into the religious society of St. Genevieve, of which he became librarian. Louis XV. gave him the abbey of St. Leger of Soissons, of which he was deprived and reduced to indigence in the revolution. He died in 1799. Mercier was a man of erudition, and one of the first bibliographers in Europe. His works are, 1. "Letters on the Bibliography of Debure," 8vo.; 2. "Letters on the true Author of the Political Testament of Cardinal Richelieu;" 3. "Supplement to Marchand's History of Printing," 4to.; 4. "Letſer concerning the Maid of Orleans;" 5. "Diſſertation on the Author of the Book on the Imitation of Jeſus Chriſt (Kempis);" 6. "Notice of a rare Book, entitled 'Pedis Admirandæ,' by J. d'Artis;" 7. "On the Letters attributed to Pope Ganganelli;" 8. "Letters on different rare Editions of the 15th Century;" 8vo. 9. "Library of Romances," tranſlated from the Greek, 2 vols. &c. He was concerned in the Journal de Trevoux, and the Magazine Encyclopédique.

MERCHET. See MARCHET and BOROUGH-*Engliſh*.

MERCKLEIN, GEORGE ABRAHAM, in *Biography*, a learned phyſician, and ſon of a phyſician of the ſame name, was born at Weiſſemburg, in Franconia, in November 1644. His early education was conducted by his father; but he was afterwards ſent to the univerſities of Nuremberg and Wittemberg, and thence to that of Padua, which was then in the higheſt reputation; he returned, however, to Altorf, where he took his doctor's degree in 1670. He ſucceeded his father, in 1683, in the office of phyſician to the Teutonic order of the houſe of Nuremberg, and was ſubſequently appointed firſt phyſician to two princes palatine, who were grand maſters of this order. He paſſed a life of great activity, and is ſaid to have brought on a conſumption by the extreme ardour with which he purſued his occupations, which terminated his life in April 1702, at the age of fifty-eight. Mercklein was admitted a member of the Academy Naturæ Curioſorum, under the title of Chiron I., and communicated many memoirs on medical ſubjects, which were publiſhed in their Ephemerides. He was alſo author and editor of the following works. "Tractatio Medica curioſa de ortu et occaſu Transfuſionis ſanguinis," Nuremberg, 1679, 1715, in which he gives a hiſtory of this invention, and expreſſes forcibly his diſapprobation of the practice, which he calls cruel and dangerous. "Joſephi Pandolphini à Monte Martiano Tractatus de Ventoſitatis Spinæ, ſæviſſimo Morbo," ibid. 1674. "Lindenius renovatus," an augmented edition of the work of J. Ant. Vander Linden, "De Scriptis Medicis," in two volumes 4to., 1686, and "Sylloge Caſuum Medicorum Incantationi vulgò adſcribi ſolitorum, maximèque præ cæteris memorabilium," ibid. 1698, 1715, 4to.: a curious ſubject, but treated with too little diſcrimination between real and ſuppoſititious facts. Eloy Dict. Hiſt. Gen. Biog.

MERCŒUR, in *Geography*, a town of France, in the department of the Correze, and chief place of a canton, in the diſtrict of Tulles; 18 miles S. of Tulles. The place contains 825, and the canton 6971 inhabitants, on a territory of 225 kiliometres, in 11 communes.

MERCURIAL, ſomething that conſiſts of, or bears a relation to mercury, or quickſilver.

We ſay alſo, a mercurial perſon, to denote a perſon of a briſk, volatile complexion; ſuch perſons being ſuppoſed by aſtrologers to be under the more immediate influence of the planet Mercury. We ſay, mercurial fumes, mercurial ſpirits, &c. with reference to the mineral mercury.

MERCURIAL *Level*. See LEVEL.

MERCURIAL *Medicines*. See MERCURIALS.

MERCURIAL *Phoſphorus*, *Pump*, *Salivation*, *Thermometer*. See the ſubſtantives.

MERCURIAL *Unguents*, *Frictions*, &c. See SALIVATION.

MERCURIAL *Waters*. See WATER.

MERCURIALS, medicines compoſed or prepared of mercury, or quickſilver. See MERCURY in the *Materia Medica*.

MERCURIALI, GIROLAMO, in *Biography*, a learned and eminent phyſician, was born at Forli, in Romagna, in September 1530. The places at which he received his education are not accurately known, but probably were Bologna and Padua, at the latter of which he is ſaid to have received his doctor's degree; but ſome aſſert, that he graduated at Venice in 1555. He ſettled in the practice of his profeſſion at his native town, and at the age of 32 was delegated on ſome public buſineſs to pope Pius IV., at Rome. He evinced ſo much talent, and acquired ſo much eſteem at the pontifical court, eſpecially with cardinal Alexander Farneſe, that he was honoured with the citizenſhip of Rome, and was ſtrongly invited to reſide there. The opportunities which the public libraries and collections of antiquities in that metropolis preſented for the purſuit of his favourite ſtudies, led him to accept the invitation; and during his abode there, he not only employed himſelf in his profeſſional concerns, but ſtudied the claſſical literature, and the monuments of antiquity with great ardour. The reſult of theſe reſearches was a learned and elegant work, which acquired him much celebrity in the literary world, and which was firſt publiſhed at Venice in 1569, under the title of "De Arte Gymnaſticâ Libri ſex," 4to. It was many times reprinted. It is rather to be regarded as a philological than a medical performance; ſince, while it throws much light on the private life and cuſtoms of the ancients, its reaſonings and precepts are almoſt wholly derived from their ſchools. The reputation of this work brought him an invitation, in the ſame year, to the firſt medical chair in the univerſity of Padua, which he accepted, and was ſucceſſor to Anthony Francanzano, a man of ſuch high reputation, that he had been called the Eſculapius of his age. The character of Mercuriali, however, was not diminiſhed by the ſplendour of that of his predeceſſor, and his fame ſoon extended throughout Europe. In 1573 he was called to Vienna by the emperor Maximilian II., to conſult reſpecting a ſevere illneſs under which that perſonage laboured; and his treatment was ſo ſucceſsful, that he returned loaded with valuable preſents, and honoured with the dignities of a knight and count palatine. He had fulfilled the duties of his profeſſorial office during the period of eighteen years, and his ſtipend had been gradually augmented to a greater ſum than had ever been allotted to a medical chair, when, in 1587, he removed to Bologna, where he was attended by a numerous audience. This removal has been partly attributed to a degree of diſſatisfaction or ſelf-accuſation, in conſequence of an error of judgment, which had been committed by him and Capivaccio, ſeveral years before, when they were called to Venice, in order to give their advice reſpecting a peſtilential diſorder, which prevailed in that city. On this occaſion both he and his colleague ſeem to have fallen into the miſtake of ſeveral medical theoriſts, of denying the reality of contagion; and their counſels were ſaid to have been productive of extenſive miſchief. Nevertheleſs his reputation appears to have ſuffered little from this error; for he was invited by Ferdinand, the grand duke of Tuſcany, to ſettle at Piſa in 1599, where he was ordered a ſtipend of eighteen hundred golden crowns, which was ultimately raiſed to two thouſand. He had not reſided long at Piſa, however, before the ſevere calculous affections, under which he laboured, rendered him incapable of attending to his profeſſional and profeſſorial duties, and he retired to his native town. He ſunk under his diſorder in 1606, and was interred, with great honours, in a chapel, which he had himſelf erected at Forli. He left a large property in money and effects, among which was a valuable collection of pictures; and he made a great number of charitable bequeſts.

Mercuriali was a voluminous writer, as the following catalogue of his works will evince. He was a learned commentator on Hippocrates, and edited a claſſified collection of his

his works. Like the learned of his age, however, he was bigotted to the doctrines of the ancients, and fond of hypothetical reasoning, to the disparagement of sound observation; and he strongly imbued his pupils with the same erroneous principles. His first publication was a tract entitled "Nomothesaurus, seu Ratio lactandi Infantes." His second, the work "De Arte Gymnastica" before mentioned. 3. "Variarum Lectionum in Medicinæ Scriptoribus et aliis, Libri iv.," Venice 1571. 4. "De Morbis Cutaneis, et omnibus corporis humani Excrementis," ib. 1572. 5. "Tractatus de Maculis pestiferis et Hydrophobia," Basle, 1577. 6. "De Pestilentia in universum, præsertim verò de Veneta et Patavina," Venice 1577. 7. "Hippocratis Opera Græce et Latinè," ibid. 1578. 8. "De Morbis Muliebribus Prælectiones," Basle, 1582. 9. "De Morbis puerorum Tractatus locupletissimi," Venice, 1583. 10. "De Venenis et Morbis venenosis," ibid. 1584. 11. "De Decoratione liber," ibid. 1585. 12. "Consultationes et Responsa Medicinalia." Four volumes were successively published in 1587, 1590, and 1597; and were republished together after his death. 13. "Tractatus de Compositione Medicamentorum, De Morbis oculorum et aurium," ibid. 1590. 14. "De Hominis Generatione," 1597. 15. "Commentarii in Hippoc. Coi Prognostica, Prorrhetica, &c." ibid. 1597. 16. "Medicina Practica, seu, de cognoscendis, discernendis, et curandis omnibus humani corporis affectibus," Francfort, 1602, folio. All these works have been several times reprinted, and some of them were selected after his death, and printed together, under the title of "Opuscula aurea et selectiora," Venice, 1644, folio. Eloy Dict. Hist. de la Med. Gen. Biog.

MERCURIALIS, in *Botany*, is said to have been so named, in ancient times, after Mercury, its reputed discoverer. This etymology is at least as probable, if not so ingenious, as that preferred by Ambrosinus, who says *Mercurialis* is properly *Mulierculars*, because it is used by young wenches (*mulierculis*) as a laxative, in sallads. If the Linnæan *Mercurialis* be intended, certainly a very small dose would be sufficient, if not dangerous, and we cannot but suspect a confusion of different plants under the name in question. A similar error respecting the English name, Mercury, has crept into our article LINOZOSTIS, without any communication with the writer of the present. The plant called English Mercury is *Chenopodium Bonus-Henricus*, an excellent pot-herb, very nearly akin to Spinach; whereas the *Mercurialis*, or Mercury, properly so denominated, is a virulent poison, from the use of which, by mistake for the former, the most dangerous consequences have followed, as Ray and others relate. Such an error is the more carefully to be guarded against, as this poisonous plant is by far the most common of the two. See LINOZOSTIS and CHENOPODIUM.—Linn. Gen. 527. Schreb. 695. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 1083. Ait. Hort. Kew. ed. 1. v. 3. 408. Juss. 385. Lamarck Dict. v. 4. 116. Illustr. t. 820. Gærtn. t. 107.—Class and order, *Dioecia Enneandria*. Nat. Ord. *Tricoccæ*, Linn. *Euphorbiæ*, Juss.

Gen. Ch. Male, *Cal.* Perianth in three deep, ovato-lanceolate, concave, spreading segments. *Cor.* none, except the calyx be so considered. *Stam.* Filaments from nine to twelve, capillary, straight, the length of the calyx; anthers formed of a pair of globose cells.

Female, *Cal.* Perianth as in the male. *Cor.* none. Nectary of two sharp awl-shaped bodies, one at each side of the germen, and lodged in its furrow, but not always present. *Pist.* Germen superior, roundish, compressed, with a furrow at each side, hispid; styles two, reflexed, horn-like, hispid; stigmas acute, reflexed. *Peric.* Capsule roundish, pouch-like, two-lobed, of two cells. *Seeds* solitary, roundish.

Obs. *M. ambigua* is monoecious, and *M. annua* occasionally so. *M. afra*, mentioned by Schreber, is *Hydrocotyle villosa*, a plant of a totally different nature.

Ess. Ch. Male, Calyx in three deep segments. Corolla none. Stamens from nine to twelve. Anthers of two globes.

Female, Calyx in three deep segments. Corolla none. Styles two. Capsule two-lobed, of two cells. Seeds solitary.

1. M. *perennis*. Perennial Mercury, or Dog's Mercury.—Linn. Sp. Pl. 1465. Curt. Lond. fasc. 2. t. 65. Mill. Illustr. t. 91. Fl. Dan t 400. Engl. Bot. t. 1872. (Cynocrambe; Matth. Valgr. v. 2. 635. Camer Epit. 998, 999. Fuchs. Hist. 444. Ger. em. 333.)—Stem quite simple. Leaves rough. Root creeping. Common and plentiful in bushy places throughout Europe, in the spring, flowering in April or May. The *roots* are perennial, creeping and matted together to a great extent *Herb* fetid, dark green, roughish, 12 or 18 inches high, with a round unbranched *stem*, most leafy about the summit. *Leaves* opposite, stalked, ovate, acute, crenate, hairy, with membranous, reflexed, intrafoliaceous *stipulas*. *Flowers* green, always dioecious, in axillary, stalked, upright clusters. *Capsule* rough with hairs. When dried, the leaves often assume a blue tint, indicating the affinity of the genus to *Croton tinctorium*. This has been observed before, but we know of no experiments that have proved this plant useful in dyeing. That it is the λινόζωστις of Dioscorides, his description leaves no doubt, and he recommends it as a pot-herb, of a purgative quality. Possibly boiling, or the admixture of oily substances, may render it mild, and less dangerous.

2. M. *annua*. Annual, or French Mercury. Linn. Sp. Pl. 1465. Curt. Lond. fasc. 5. t. 68. Engl. Bot. t. 559. (M. mas et fœmina; Matth. Valgr. v. 2. 633, 634. Camer. Epit. 996, 997. Fuchs. Hist. 475, 476. Ger. em. 332. Dod. Pempt. 658.)—Stem cross-branched. Leaves ovate, smooth. Flowers racemose. Root fibrous.—Native of cultivated and waste ground, chiefly in the more temperate parts of Europe. It is common about London, Norwich, and some other towns, but not in the north of England; flowering in autumn. From the former it is readily distinguished by its fibrous annual *root*, and bushy *stem*. The whole *herb* moreover is smooth, of a deep shining green, smelling disagreeably, something like Elder. *Leaves* stalked, ovate, acute, serrated. *Spikes* much as in *M. perennis*, but there are no linear scales at each side of the germen, and the *capsule* is prickly or warty. A few male *flowers* are often found dispersed upon the female plant; and on the other hand, a few female ones upon the male now and then occur. The present species, like the former, is said to have been used as a pot-herb, and to be of an emollient quality. It is, we believe, the least virulent and dangerous of the two, but its nauseous flavour is not promising of any good property. The *seeds* are said by Lamarck to be very fattening to small birds, especially to the delicious Becafico, *Motacilla Ficedula*; which is not unlikely, considering the oily nature of several seeds in this natural order.

3. M. *ambigua*. Intermediate Mercury. Linn. Sp. Pl. 1465. Linn. fil. Dec. 1. 15. t. 8.—Stem cross-branched. Leaves ovate, nearly smooth. Flowers monoecious, in axillary tufts.—Native of Spain. Linnæus cultivated it in the Upsal garden, and found it constant from seed, yet its whole appearance is so like the last, that he was latterly disposed to

to think it a variety. The *flowers* however are not ſpiked, but grow, male and female together, in little axillary tufts, each flower on a ſimple ſtalk, the males moſt numerous.

4. M. *elliptica*. Shrubby Mercury. Lamarck n. 4. (M. luſitanica fruticoſa, amygdali folio; Tourn. Inſt. 534. M. tenuifolia fruticoſa perennis; Griſl. Luſit. 63.)—Stem croſs-branched, ſhrubby. Leaves elliptical, crenate, ſmooth.—Native of Portugal. Gathered near Faro by the abbè Durand. We have ſeen it alſo in Tournefort's herbarium. This is undoubtedly a very diſtinct ſpecies, unknown to Linnæus. The ſhrubby perennial *ſtem*, and the much ſmaller, elliptical, obtuſe, crenate, not ſerrated, *leaves*, at once diſtinguiſh it. The *flowers* are dioecious, axillary; the males in ſhort, denſe, ſolitary, ſtalked ſpikes; the females on ſingle-flowered, ſimple, ſhorter ſtalks, two or three together. *Germen* ſmooth and even, accompanied at each ſide by a ſmall, linear, whitiſh ſcale. The *leaves* and young twigs have often, in the dry plant, a reddiſh or purpliſh hue.

5. M. *longifolia*. Long-leaved Mercury. Lamarck n. 5.—Stem croſs-branched. Leaves oblong, downy, green, with blunt ſerratures. Fruit woolly.—Deſcribed by Lamarck from the herbarium of Thouin. Its native country is unknown. The *ſtem* is about a foot high, branched, ſlender and weak, ſlightly downy. *Leaves* ſtalked, ſpreading, oblong or ſomewhat elliptical, about an inch and half long, and not above five or ſix lines broad, being of a much narrower ſhape than thoſe of any other ſpecies. They are dark green, clothed on both ſides with depreſſed hairs, which render them rather ſilky; the margin ſerrated, with ſhort, blunt, glandular, curved teeth. *Footſtalks* about three lines long, with a pair of lateral glands at the top, and a pair of ſhort downy *ſtipulas* at their baſe. *Flowers* axillary, greeniſh, dioecious; the males in ſolitary, ſlender, ſtalked ſpikes; females ſolitary, on ſimple ſhort ſtalks. *Germen* and *capſule* hoary and woolly, accompanied by a ſlender ſcale at each ſide.

6. M. *tomentoſa*. Downy Mercury. Linn. Sp. Pl. 1465. (Phyllon arrhenogonon, ſive mariſicum; Ger. em. 333. f. 2; and Ph. theligonon, ſive fœminiſicum; f. 3.)—Whole plant finely downy and hoary. Stem ſomewhat ſhrubby. Leaves oblong, more or leſs ſerrated.—Native of Spain and the ſouth of France. Known from all the reſt by its white hoary aſpect, cauſed by the ſoft downy denſe hairs which clothe every part. The *ſtem* is moſt branched in the male plant, the *flowers* of which grow in little round heads, either ſolitary, or ſeveral one above another, on ſimple, ſolitary, axillary ſtalks. The female *flowers* are axillary, ſolitary, on ſimple ſtalks, on a ſeparate plant. Some female *flowers* nevertheleſs are occaſionally interſperſed on the former, as Gerarde's cut, borrowed from Cluſius, well expreſſes. The *leaves* of both are nearly ſeſſile, oblong, acute, veiny, generally more or leſs ſerrated, though ſometimes nearly entire. The ideas of the ancient botaniſts, from whence the above names originated, are truly abſurd. They not only miſtook the female plant for the male, on account of the ſhape of the capſule, in which they were pleaſed to find a certain anatomical reſemblance; but they gratuitouſly ſuppoſed that the herb, on account of ſuch reſemblance, would be efficacious in procuring male children, while the real male plant was preſumed to favour the generation of girls.

7 M. *indica*. Indian Mercury. Loureir. Cochinch. 628.—Stem ſhrubby, branched. Leaves alternate, lanceolate, ſmooth and naked. Styles three.—Native of Cochinchina, according to Loureiro, who ſays the freſh leaves, boiled in broth, have a mildly purging quality, without any bad effects; and that the plant is called *Rau mai*, or *Luc mai*. The *ſtem* is ſhrubby, ſtraight, ſix feet high, with round aſcending branches. *Leaves* alternate, lanceolate, ſerrated, ſmooth and ſhining. *Flowers* dioecious, lateral, of the proper ſtructure of a *Mercurialis*, except that the *germen* is ſaid to be three-lobed, with three *ſtyles*, which, as well as the alternate *leaves*, induces ſome ſuſpicion reſpecting the genus. We have ſeen no ſpecimen.

In the firſt edition of Sp. Pl. 1036, occurs a *Mercurialis procumbens*, not quoted by that name in any ſubſequent work of Linnæus. This however appears by the ſynonyms and his herbarium to be *Croton Ricinocarpus*, Sp. Pl. ed. 2. 1427. See CROTON, n. 90.

MERCURIALIS, in the *Materia Medica*, the ſpecies called French mercury, *Mercurialis annua*, with branched ſtalks, and ſmooth gloſſy leaves, grows wild in gardens and dunghills. This plant is mucilaginous, and was formerly much employed as an emollient. It was eaten like ſpinach, and when uſed in conſiderable quantity it opens the bowels. Accordingly Tournefort informs us, that the French made a ſyrup of it, two ounces of which was given as a purge; and that they uſed it in clyſters and peſſaries. mixing one part of honey with one and a half of juice. In England it is now diſregarded. A cataplaſm of the leaves has been recommended in pains of the limbs, in tumours, and even in ulcers, which it cleanſes and diſpoſes to heal. Poor people in country places uſe it as a cataplaſm for the rheumatiſm, and even for the gout. There is another ſpecies, called cynocrambe, and dog's mercury, *Mercurialis perennis*, which grows wild in woods and hedges: this, though more acceptable to the palate, as an oleraceous herb, than the foregoing, has lately been found to poſſeſs noxious qualities, and to act as a violent narcotic. (See Phil. Tranſ. N° 203.) In drying it turns blue, and ſteeped in water, it affords a fine deep blue colour; but which, Dr. Stokes ſays, is unhappily deſtructible both by acids and alkalies, and recoverable by no means that he hath been able to diſcover. Miller by Martyn.

MERCURIFICATION, in *Metallurgic Chemiſtry*, the obtaining the mercury from metallic minerals in its fluid form. See MERCURY in *Mineralogy* and *Chemiſtry*.

MERCURIO, in *Geography*, a town of Corſica or Golo, and chief place of a canton, in the department of Corté. The canton contains 2378 inhabitants.

MERCURY, ☿, in *Aſtronomy*, the ſmalleſt of the inferior planets, and the neareſt to the ſun.

The mean diſtance of Mercury from the ſun is to that of our earth from the ſun as 38710 to 100000: and his real diſtance from the ſun 36,841,468 miles. The eccentricity 7955.4. The inclination of its orbit, that is, the angle formed by the plane of its orbit with the plane of the ecliptic, is 7 degrees, and the ſecular change of the inclination by the action of the other planets + 20.43. The diameter of Mercury, meaſured by Dr. Bradley in 1723, in its tranſit over the ſun's diſc, with a micrometer to Huygens's teleſcope of 120 feet long, was found to be 10″.75; hence its diameter at the mean diſtance of the earth will be 7″.27. M. de la Lande, from the tranſit in 1753, found it to be 6″.5; and therefore it may be ſtated at 7″. Von Zach ſays, that the mean apparent diameter of Mercury is not ſo much as 7″, probably little more than 5″. Its real diameter to that of the earth is nearly as 0.4 to 1, or 3180 miles. The mean apparent diameter of the ſun at Mercury is = 80′; the denſity of Mercury to that of the earth is as 2.5833 to 1; its quantity of matter to that of the earth as 0.16536 to 1, the quantities of matter in ſpherical bodies being as the cubes of their diameters and denſities conjointly; the weights of equal bodies, or or gravities, on the ſurfaces of Mercury and the Earth, are as 1.0333 to 1, ſuch weights varying as the diameters and denſities conjointly: the place of the aſcending node of Mercury in 1750 $1^s\ 15^\circ\ 20'\ 43''$; ſecular motion of the node $1^\circ\ 12'\ 10''$; the annual motion of the node by the action of the other planets — 8.98; the preceſſion 50.25, and the motion in longitude 41.27. The place of the aphelion $8^s\ 14^\circ\ 22'$; the mean place of the planet $5^s\ 11^\circ\ 54'$; the motion of the aphelion in longitude in 100 years $1^\circ\ 34'$. The tropical revolution of Mercury $87^d\ 23^h\ 14'\ 33''$; the ſidereal revolution $87^d\ 23^h\ 15'\ 44''$. For further particulars ſee DENSITY, DIAMETER, DISTANCE, EXCENTRICITY, and PLANETS. As the intenſities of light and heat, which the planets receive from the ſun, vary inverſely as the ſquares of their diſtances from the ſun; and as the proportional diſtances of Mercury and the Earth are as 4 to 10, we ſhall have the inverſe ſquares $\frac{10^2}{4^2}$ to 1, or 6.25 to 1 for the relative intenſities of light and heat at Mercury and the Earth.

According to ſir Iſaac Newton, the heat and light of the ſun on the ſurface of Mercury, are almoſt ſeven times as intenſe as on the ſurface of the earth in the middle of ſummer: which, as he found by experiments made for that purpoſe by a thermometer, is ſufficient to make water boil. Such a degree of heat, therefore, muſt render Mercury uninhabitable to creatures of our conſtitution. And if bodies on its ſurface be not inflamed, and ſet on fire, it muſt be becauſe their degree of denſity is proportionably greater than that of ſuch bodies is with us. The revolution of Mercury round the ſun, or his year, has been already ſtated; but his diurnal revolution, or the length of his day, is not yet determined; nor is it certain whether he has ſuch a motion round his own axis or not.

What variety of weather or ſeaſons it may be liable to, we are ſtill at a loſs to determine; as not knowing the inclination of his axis to the plane of his orbit.

Mercury changes its phaſes, like the moon, according to its ſeveral poſitions with regard to the ſun and earth; except only that he never appears quite full, becauſe his enlightened ſide is never turned directly towards us, but when he is ſo near the ſun as to be loſt to our ſight in his beams. And as his enlightened ſide is always towards the ſun, it is plain that he ſhines not by any light of his own; for if he did, he would conſtantly appear round. This planet, when viewed with Dr. Herſchel's ten feet reflector, and with other teleſcopes, appeared much darker than any of the ſolar ſpots, and perfectly well defined; no irregularity of form having been perceptible at the moment of contact; but the obſervation appears to have been intermitted at the inſtant of the approach of the planet to the ſun's limb. Dr. Herſchel could not perceive the ſlighteſt degree of ellipticity in the form of the planet's diſc.

The ſituation of this planet proves evidently, that the hypotheſis of Ptolemy is falſe: for Mercury is ſometimes obſerved betwixt the earth and ſun; and ſometimes beyond the ſun. But the earth is never found between Mercury and the ſun; which however muſt happen, if the ſpheres of all the planets encompaſſed the earth, as a centre, according to the Ptolemaic ſcheme.

The diameter of the ſun, viewed from Mercury, would appear between two and three times as big as it appears on our earth; that planet being ſo much nearer to him than we are, and therefore the ſun's diſk would appear ſeven times as large as to us. Mercury's greateſt diſtance from the ſun, with regard to us, never exceeds twenty-eight degrees twenty minutes (ſee ELONGATION); whence it is ſeldom viſible, being commonly either loſt in the ſun's light, or, when the moſt remote from the ſun, in the crepuſculum. The beſt obſervations of this planet are thoſe made when it is ſeen on the ſun's diſk; for, in its lower conjunction, it paſſes before the ſun like a little ſpot, eclipſing a ſmall part of his body, only obſervable with a teleſcope.

The node from which Mercury aſcends northward above the ecliptic, is in the 15th degree of Taurus; the oppoſite in the 15th degree of Scorpio. The earth is in theſe points about the 6th of November, and 4th of May, new ſtyle; and when Mercury comes to either of his nodes at his inferior conjunction about theſe times, he will appear in this manner to paſs over the diſc of the ſun. But in all other parts of his orbit, his conjunctions are inviſible, becauſe he either goes above or below the ſun. The firſt obſervation of this kind was that of Gaſſendi, in November, 1631. Several ſubſequent obſervations of the like tranſits are collected in Du Hamel's Hiſt. of the Royal Acad. of Sciences, p. 470. ed. 2. See Dr. Halley's Accounts of the Tranſits of Mercury and Venus, in Phil. Tranſ. N° 193. See TRANSIT.

To an inhabitant of Mercury, the ſolar ſpots will appear to traverſe his diſc ſometimes in a right line from eaſt to weſt, and ſometimes elliptically. As the other planets are above Mercury, their phenomena will be nearly the ſame there as with us. Venus and the Earth, when in oppoſition to the ſun, will ſhine with full orbs, and afford a noble light to that planet.

TABLE

MERCURY.

TABLE I. Epochs of the Mean Longitude of Mercury.

Years.		Mean Long.				Aphelion.				Node.			
		S.	D.	M.	S.	S.	D.	M.	S.	S.	D.	M.	S.
Nat. J. C.	0	8	24	0	44	7	16	13	21	0	24	17	48
	100	11	8	5	4	7	17	47	6	0	25	29	58
	1400	7	11	1	24	8	8	5	51	1	11	8	8
	1500	9	25	5	44	8	9	39	36	1	12	20	18
B. N. S.	1600	10	28	14	38	8	11	13	21	1	13	32	28
C.	1700	1	8	13	26	8	12	47	6	1	14	44	38
B.	1740	2	7	51	10	8	13	24	36	1	15	13	30
B.	1760	2	22	40	2	8	13	43	21	1	15	27	56
B.	1780	3	7	28	52	8	14	2	6	1	15	42	22
	1786	2	3	52	47	8	14	7	44	1	15	46	42
	1787	3	27	35	50	8	14	8	40	1	15	47	25
B.	1788	5	25	24	26	8	14	9	36	1	15	48	8
	1789	7	19	7	30	8	14	10	32	1	15	48	51
	1790	9	12	50	33	8	14	11	28	1	15	49	35
	1791	11	6	33	37	8	14	12	25	1	15	50	18
B.	1792	1	4	22	13	8	14	13	21	1	15	51	1
	1793	2	28	5	16	8	14	14	17	1	15	51	45
	1794	4	21	48	20	8	14	15	13	1	15	52	28
	1795	6	15	31	23	8	14	16	10	1	15	53	11
B.	1796	8	13	19	59	8	14	17	6	1	15	53	55
	1797	10	7	3	3	8	14	18	2	1	15	54	38
	1798	0	0	46	6	8	14	18	58	1	15	55	21
	1799	1	24	29	10	8	14	19	55	1	15	56	4
C.	1800	3	18	12	13	8	14	20	51	1	15	56	48
	1801	5	11	55	16	8	14	21	47	1	15	57	31
	1802	7	5	38	20	8	14	22	43	1	15	58	14
	1803	8	29	21	23	8	14	23	40	1	15	58	57
B.	1804	10	27	9	59	8	14	24	36	1	15	59	41
	1805	0	20	53	3	8	14	25	32	1	16	0	24
	1806	2	14	36	6	8	14	26	29	1	16	1	8
	1807	4	8	19	10	8	14	27	25	1	16	1	51
B.	1808	6	6	7	46	8	14	28	21	1	16	2	34
	1809	7	29	50	49	8	14	29	17	1	16	3	17
	1810	9	23	33	53	8	14	30	13	1	16	4	1
	1811	11	17	16	56	8	14	31	10	1	16	4	44
B.	1812	1	15	5	32	8	14	32	6	1	16	5	27
	1813	3	8	48	36	8	14	33	2	1	16	6	10
	1814	5	2	31	39	8	14	33	58	1	16	6	54
	1815	6	26	14	43	8	14	34	55	1	16	7	37
B.	1816	8	24	3	19	8	14	35	51	1	16	8	20
	1817	10	17	46	22	8	14	36	47	1	16	9	4
	1818	0	11	29	26	8	14	37	43	1	16	9	47
	1819	2	5	12	29	8	14	38	40	1	16	10	30
B.	1820	4	3	1	5	8	14	39	36	1	16	11	14

Biffextiles.

TABLE II. Mean Motion of Mercury for *Years.*

Years.		Mot. in Long.				Mot. Aphel.				Mot. Node.		
		S.	D.	M.	S.	S.	D.	M.	S.	D.	M.	S.
	1	1	23	43	3	0	0	0	56	0	0	43
	2	3	17	26	7	0	0	1	52	0	1	27
	3	5	11	9	10	0	0	2	49	0	2	10
B.	4	7	8	57	46	0	0	3	45	0	2	53
	5	9	2	40	50	0	0	4	41	0	3	36
	6	10	26	23	53	0	0	5	37	0	4	20
	7	0	20	6	57	0	0	6	34	0	5	3
B.	8	2	17	55	33	0	0	7	30	0	5	46
	9	4	11	38	36	0	0	8	26	0	6	30
	10	6	5	21	40	0	0	9	22	0	7	13
	11	7	29	4	43	0	0	10	19	0	7	56
B.	12	9	26	53	19	0	0	11	15	0	8	40
	13	11	20	36	23	0	0	12	11	0	9	23
	14	1	14	19	26	0	0	13	8	0	10	6
	15	3	8	2	29	0	0	14	4	0	10	49
B.	16	5	5	51	6	0	0	15	0	0	11	33
	17	6	29	34	9	0	0	15	56	0	12	16
	18	8	23	17	12	0	0	16	52	0	12	59
	19	10	17	0	16	0	0	17	49	0	13	43
B.	20	0	14	48	52	0	0	18	45	0	14	26
	40	0	29	37	44	0	0	37	30	0	28	52
	60	1	14	26	36	0	0	56	15	0	43	18
	80	1	29	15	28	0	1	15	0	0	57	44
	100	2	14	4	20	0	1	33	45	1	12	10
	200	4	28	8	40	0	3	7	30	2	24	20
	300	7	12	13	0	0	4	41	15	3	36	30
	400	9	26	17	20	0	6	15	0	4	48	40
	500	0	10	21	40	0	7	48	45	6	0	50
	600	2	24	26	0	0	9	22	30	7	13	0
	700	5	8	30	20	0	10	56	15	8	25	10
	800	7	22	34	40	0	12	30	0	9	37	20
	900	10	6	39	0	0	14	3	45	10	49	30
	1000	0	20	43	20	0	15	37	30	12	1	40
	1100	3	4	47	40	0	17	11	15	13	13	50
	1200	5	18	52	0	0	18	45	0	14	26	0
	1300	8	2	56	20	0	20	18	45	15	38	10
	1400	10	17	0	40	0	21	52	30	16	50	20
	1500	1	1	5	0	0	23	26	15	18	2	30
	2000	1	11	26	40	1	1	15	0	24	3	20

TABLE III.—Mean Motion of Mercury for *Days.*

Days of Month.	January.	Mot. Aph.	Mot. Node.	Days of Month.	February.	Mot. Aph.	Mot. Node.	Days of Month.	March.	Mot. Aph.	Mot. Node.
	Mot. Long.				Mot. Long.				Mot. Long.		
	S. D. M. S.	SEC.	SEC.		S. D. M. S.	SEC.	SEC.		S. D. M. S.	SEC.	SEC.
1	0 4 5 33	0	0	1	4 10 57 22	5	4	1	8 5 32 33	9	7
2	0 8 11 5	0	0	2	4 15 2 54	5	4	2	8 9 38 6	9	7
3	0 12 16 38	1	0	3	4 19 8 27	5	4	3	8 13 43 39	10	7
4	0 16 22 10	1	1	4	4 23 13 59	6	4	4	8 17 49 11	10	8
5	0 20 27 43	1	1	5	4 27 19 32	6	4	5	8 21 54 44	10	8
6	0 24 33 15	1	1	6	5 1 25 5	6	5	6	8 26 0 16	10	8
7	0 28 38 48	1	1	7	5 5 30 38	6	5	7	9 0 5 49	10	8
8	1 2 44 20	1	1	8	5 9 36 10	6	5	8	9 4 11 21	10	8
9	1 6 49 53	2	1	9	5 13 41 42	6	5	9	9 8 16 54	10	8
10	1 10 55 26	2	1	10	5 17 47 15	6	5	10	9 12 22 26	11	8
11	1 15 0 58	2	1	11	5 21 52 47	6	5	11	9 16 27 59	11	8
12	1 19 6 31	2	2	12	5 25 58 20	7	5	12	9 20 33 32	11	9
13	1 23 12 3	2	2	13	6 0 3 53	7	5	13	9 24 39 4	11	9
14	1 27 17 36	2	2	14	6 4 9 25	7	5	14	9 28 44 37	11	9
15	2 1 23 8	2	2	15	6 8 14 58	7	6	15	10 2 50 9	11	9
16	2 5 28 41	3	2	16	6 12 20 30	7	6	16	10 6 55 42	12	9
17	2 9 34 13	3	2	17	6 16 26 3	7	6	17	10 11 1 14	12	9
18	2 13 39 46	3	2	18	6 20 31 35	8	6	18	10 15 6 47	12	9
19	2 17 45 19	3	2	19	6 24 37 8	8	6	19	10 19 12 19	12	9
20	2 21 50 51	3	2	20	6 28 42 40	8	6	20	10 23 17 52	12	9
21	2 25 56 24	3	3	21	7 2 48 13	8	6	21	10 27 23 25	12	10
22	3 0 1 56	4	3	22	7 6 53 46	8	6	22	11 1 28 57	12	10
23	3 4 7 29	4	3	23	7 10 59 18	8	6	23	11 5 34 30	13	10
24	3 8 13 2	4	3	24	7 15 4 51	8	7	24	11 9 40 2	13	10
25	3 12 18 34	4	3	25	7 19 10 23	9	7	25	11 13 45 35	13	10
26	3 16 24 7	4	3	26	7 23 15 56	9	7	26	11 17 51 7	13	10
27	3 20 29 39	4	3	27	7 27 21 28	9	7	27	11 21 56 40	13	10
28	3 24 35 12	4	3	28	8 1 27 1	9	7	28	11 26 2 12	13	10
29	3 28 40 44	4	3					29	0 0 7 45	14	10
30	4 2 46 17	5	4					30	0 4 13 18	14	11
31	4 6 51 50	5	4					31	0 8 18 50	14	11

In the Months January and February of a Biſſextile Year, ſubtract 1 from the given Day of the Month.

TABLE III. Mean Motion of Mercury for *Days*.

Days of the Month.	April. Mot. Long. S. D. M. S.	Mot. Aphelion. SEC.	Mot. Node. SEC.	Days of the Month.	May. Mot. Long. S. D. M. S.	Mot. Aphelion. SEC.	Mot. Node. SEC.	Days of the Month.	June. Mot. Long. S. D. M. S.	Mot. Aphelion. SEC.	Mot. Node. SEC.
1	0 12 24 23	14	11	1	4 15 10 39	19	14	1	8 22 2 29	23	18
2	0 16 29 55	14	11	2	4 19 16 12	19	15	2	8 26 8 1	24	18
3	0 20 35 28	14	11	3	4 23 21 45	19	15	3	9 0 13 34	24	18
4	0 24 41 0	14	11	4	4 27 27 17	19	15	4	9 4 19 6	24	18
5	0 28 46 33	15	11	5	5 1 32 50	19	15	5	9 8 24 39	24	1
6	1 2 52 6	15	11	6	5 5 38 22	19	15	6	9 12 30 12	24	19
7	1 6 57 38	15	12	7	5 9 43 55	20	15	7	9 16 35 44	24	19
8	1 11 3 11	15	12	8	5 13 49 27	20	15	8	9 20 41 17	25	19
9	1 15 8 43	15	12	9	5 17 55 0	20	15	9	9 24 46 49	25	19
10	1 19 14 16	15	12	10	5 22 0 32	20	16	10	9 28 52 22	25	19
11	1 23 19 48	16	12	11	5 26 6 5	20	16	11	10 2 57 54	25	19
12	1 27 25 21	16	12	12	6 0 11 38	20	16	12	10 7 3 27	25	19
13	2 1 30 53	16	12	13	6 4 17 10	20	16	13	10 11 8 59	25	19
14	2 5 36 26	16	12	14	6 8 22 43	21	16	14	10 15 14 32	25	20
15	2 9 41 59	16	13	15	6 12 28 15	21	16	15	10 19 20 5	26	20
16	2 13 47 31	16	13	16	6 16 33 48	21	16	16	10 23 25 37	26	20
17	2 17 53 4	16	13	17	6 20 39 20	21	16	17	10 27 31 10	26	20
18	2 21 58 36	17	13	18	6 24 44 53	21	16	18	11 1 36 42	26	20
19	2 26 4 9	17	13	19	6 28 50 25	21	17	19	11 5 42 15	26	20
20	3 0 9 41	17	13	20	7 2 55 58	22	17	20	11 9 47 47	26	20
21	3 4 15 14	17	13	21	7 7 1 31	22	17	21	11 13 53 20	27	20
22	3 8 20 46	17	13	22	7 11 7 3	22	17	22	11 17 58 52	27	21
23	3 12 26 19	17	13	23	7 15 12 36	22	17	23	11 22 4 25	27	21
24	3 16 31 52	18	14	24	7 19 18 8	22	17	24	11 26 9 57	27	21
25	3 20 37 24	18	14	25	7 23 23 41	22	17	25	0 0 15 30	27	21
26	3 24 42 57	18	14	26	7 27 29 13	23	17	26	0 4 21 3	27	21
27	3 28 48 29	18	14	27	8 1 34 46	23	17	27	0 8 26 35	27	21
28	4 2 54 2	18	14	28	8 5 40 18	23	18	28	0 12 32 8	28	21
29	4 6 59 34	18	14	29	8 9 45 51	23	18	29	0 16 37 40	28	21
30	4 11 5 7	18	14	30	8 13 51 24	23	18	30	0 20 43 13	28	22
				31	8 17 56 56	23	18				

TABLE III. Mean Motion of Mercury for *Days*.

Days of the Month.	July. Mot. Long.	Mot. Aphelion.	Mot. Node.	Days of the Month.	August. Mot. Long.	Mot. Aphelion.	Mot. Node.	Days of the Month.	September. Mot. Long.	Mot. Aphelion.	Mot. Node.
	S. D. M. S.	SEC.	SEC.		S. D. M. S.	SEC.	SEC.		S. D. M. S.	SEC.	SEC.
1	0 24 48 45	28	22	1	5 1 40 35	33	25	1	9 8 32 24	38	29
2	0 28 54 18	28	22	2	5 5 46 7	33	25	2	9 12 37 57	38	29
3	1 2 59 51	28	22	3	5 9 51 40	33	26	3	9 16 43 29	38	29
4	1 7 5 23	29	22	4	5 13 57 12	33	26	4	9 20 49 2	38	29
5	1 11 10 56	29	22	5	5 18 2 45	33	26	5	9 24 54 34	38	29
6	1 15 16 28	29	22	6	5 22 8 17	34	26	6	9 29 0 7	38	30
7	1 19 22 1	29	22	7	5 26 13 50	34	26	7	10 3 5 39	39	30
8	1 23 27 33	29	22	8	6 0 19 23	34	26	8	10 7 11 12	39	30
9	1 27 33 6	29	23	9	6 4 24 55	34	26	9	10 11 16 44	39	30
10	2 1 38 38	29	23	10	6 8 30 28	34	26	10	10 15 22 17	39	30
11	2 5 44 11	30	23	11	6 12 36 0	34	26	11	10 19 27 50	39	30
12	2 9 49 44	30	23	12	6 16 41 33	35	27	12	10 23 33 22	39	30
13	2 13 55 16	30	23	13	6 20 47 5	35	27	13	10 27 38 55	39	30
14	2 18 0 49	30	23	14	6 24 52 38	35	27	14	11 1 44 27	40	31
15	2 22 6 21	30	23	15	6 28 58 11	35	27	15	11 5 50 0	40	31
16	2 26 11 54	30	23	16	7 3 3 43	35	27	16	11 9 55 32	40	31
17	3 0 17 26	31	24	17	7 7 9 16	35	27	17	11 14 1 5	40	31
18	3 4 22 59	31	24	18	7 11 14 48	35	27	18	11 18 6 37	40	31
19	3 8 28 31	31	24	19	7 15 20 21	36	27	19	11 22 12 10	40	31
20	3 12 34 4	31	24	20	7 19 25 53	36	28	20	11 26 17 43	41	31
21	3 16 39 37	31	24	21	7 23 31 26	36	28	21	0 0 23 16	41	31
22	3 20 45 9	31	24	22	7 27 36 58	36	28	22	0 4 28 48	41	32
23	3 24 50 42	31	24	23	8 1 42 31	36	28	23	0 8 34 20	41	32
24	3 28 56 14	32	24	24	8 5 48 4	36	28	24	0 12 39 53	41	32
25	4 3 1 47	32	25	25	8 9 53 36	37	28	25	0 16 45 25	41	32
26	4 7 7 19	32	25	26	8 13 59 9	37	28	26	0 20 50 58	41	32
27	4 11 12 52	32	25	27	8 18 4 41	37	28	27	0 24 56 30	42	32
28	4 15 18 24	32	25	28	8 22 10 14	37	29	28	0 29 2 3	42	32
29	4 19 23 57	32	25	29	8 26 15 46	37	29	29	1 3 7 36	42	32
30	4 23 29 30	33	25	30	9 0 21 19	37	29	30	1 7 13 8	42	32
31	4 27 35 2	33	25	31	9 4 26 51	37	29				

Table III. Mean Motion of Mercury for *Days.*

Days of the Month.	October. Mot. Long.	Mot. Aphelion.	Mot. Node.	Days of the Month.	November. Mot. Long.	Mot. Aphelion.	Mot. Node.	Days of the Month.	December. Mot. Long.	Mot. Aphelion.	Mot. Node.
	S. D. M. S.	SEC.	SEC.		S. D. M. S.	SEC.	SEC.		S. D. M. S.	SEC.	SEC.
1	1 11 18 41	42	33	1	5 18 10 30	47	36	1	9 20 56 47	52	40
2	1 15 24 13	42	33	2	5 22 16 3	47	36	2	9 25 2 19	52	40
3	1 19 29 46	43	33	3	5 26 21 35	47	36	3	9 29 7 52	52	40
4	1 23 35 19	43	33	4	6 0 27 8	47	37	4	10 3 13 24	52	40
5	1 27 40 51	43	33	5	6 4 32 40	48	37	5	10 7 18 57	52	40
6	2 1 46 23	43	33	6	6 8 38 13	48	37	6	10 11 24 30	52	40
7	2 5 51 56	43	33	7	6 12 43 45	48	37	7	10 15 30 2	53	41
8	2 9 57 29	43	33	8	6 16 49 18	48	37	8	10 19 35 35	53	41
9	2 14 3 1	44	34	9	6 20 54 50	48	37	9	10 23 41 7	53	41
10	2 18 8 34	44	34	10	6 25 0 23	48	37	10	10 27 46 40	53	41
11	2 22 14 6	44	34	11	6 29 5 56	49	37	11	11 1 52 12	53	41
12	2 26 19 39	44	34	12	7 3 11 28	49	37	12	11 5 57 45	53	41
13	3 0 25 11	44	34	13	7 7 17 1	49	38	13	11 10 3 17	53	41
14	3 4 30 44	44	34	14	7 11 22 33	49	38	14	11 14 8 50	54	41
15	3 8 36 17	44	34	15	7 15 28 6	49	38	15	11 18 14 22	54	41
16	3 12 41 49	45	34	16	7 19 33 38	49	38	16	11 22 19 55	54	42
17	3 16 47 22	45	35	17	7 23 39 11	49	38	17	11 26 25 28	54	42
18	3 20 52 54	45	35	18	7 27 44 43	50	38	18	0 0 31 0	54	42
19	3 24 58 27	45	35	19	8 1 50 16	50	38	19	0 4 36 33	54	42
20	3 29 3 59	45	35	20	8 5 55 49	50	38	20	0 8 42 5	55	42
21	4 3 9 32	45	35	21	8 10 1 21	50	38	21	0 12 47 38	55	42
22	4 7 15 4	45	35	22	8 14 6 54	50	39	22	0 16 53 10	55	42
23	4 11 20 37	46	35	23	8 18 12 26	50	39	23	0 20 58 43	55	42
24	4 15 26 10	46	35	24	8 22 17 59	51	39	24	0 25 4 16	55	42
25	4 19 31 42	46	35	25	8 26 23 31	51	39	25	0 29 9 48	55	43
26	4 23 37 15	46	35	26	9 0 29 4	51	39	26	1 3 15 21	55	43
27	4 27 42 47	46	36	27	9 4 34 36	51	39	27	1 7 20 53	56	43
28	5 1 48 20	46	36	28	9 8 40 9	51	40	28	1 11 26 26	56	43
29	5 5 53 52	47	36	29	9 12 45 42	51	40	29	1 15 31 58	56	43
30	5 9 59 25	47	36	30	9 16 51 14	51	40	30	1 19 37 31	56	43
31	5 14 4 57	47	36					31	1 23 43 3	56	43

TABLE IV. Mean Motion of Mercury for *Hours*, *Minutes*, and *Seconds*.

Hours.	Mot. Lon. D M S	Hours.	Mot. Lon. D M S	Min. / Sec.	Mot. Lon ′ ″ / ″ ‴	Min. / Sec.	Mot. Lon ′ ″ / ″ ‴	Min. / Sec.	Mot. Lon ′ ″ / ″ ‴	Min. / Sec.	Mot. Lon ′ ″ / ″ ‴	Min. / Sec.	Mot. Lon ′ ″ / ″ ‴
1	0 10 14	13	2 13 0	1	0 10	13	2 13	25	4 16	37	6 18	49	8 21
2	0 20 28	14	2 23 14	2	0 20	14	2 23	26	4 26	38	6 29	50	8 31
3	0 30 41	15	2 33 28	3	0 31	15	2 33	27	4 36	39	6 39	51	8 42
4	0 40 55	16	2 43 42	4	0 41	16	2 44	28	4 46	40	6 49	52	8 52
5	0 51 9	17	2 53 55	5	0 51	17	2 54	29	4 57	41	6 59	53	9 2
6	1 1 23	18	3 4 9	6	1 1	18	3 4	30	5 7	42	7 10	54	9 12
7	1 11 37	19	3 14 23	7	1 12	19	3 14	31	5 17	43	7 20	55	9 23
8	1 21 51	20	3 24 38	8	1 22	20	3 24	32	5 27	44	7 30	56	9 33
9	1 32 5	21	3 34 52	9	1 32	21	3 35	33	5 38	45	7 40	57	9 43
10	1 42 18	22	3 45 5	10	1 42	22	3 45	34	5 48	46	7 51	58	9 53
11	1 52 32	23	3 55 19	11	1 52	23	3 55	35	5 58	47	8 1	59	10 4
12	2 2 46	24	4 5 32	12	2 3	24	4 5	36	6 8	48	8 11	60	10 14

TABLE V. The Equation of the Orbit of Mercury for every Degree of Anomaly, supposing the Mean Distance to be 38710, and Excentricity 79855.4.

Argument. Mean Anomaly of Mercury.

D.	Sig. O. − D. M. S	Differ. M. S.	Sig. I. − D. M. S.	Differ. M. S.	Sig. II. − D. M. S.	Differ M. S.	Sig. III. − D. M. S.	Differ. M. S.	Sig. IV. − D M. S.	Differ. M. S.	Sig. V. − D. M. S.	Differ M. S.	D.
0	0 0 0	19 36	9 34 42	18 14	17 46 53	13 53	22 55 26	5 39	22 45 28	7 38	14 55 11	24 16	30
1	0 19 36	19 35	9 52 56	18 8	18 0 46	13 41	23 1 5	5 17	22 37 50	8 10	14 30 55	24 46	29
2	0 39 11	19 35	10 11 4	18 2	18 14 27	13 29	23 6 22	4 56	22 29 40	8 42	14 6 9	25 16	28
3	0 58 46	19 35	10 29 6	17 56	18 27 56	13 16	23 11 18	4 34	22 20 58	9 15	13 40 53	25 46	27
4	1 18 21	19 34	10 47 2	17 50	18 41 12	13 2	23 15 52	4 11	22 11 43	9 46	13 15 7	26 15	26
5	1 37 55	19 33	11 4 52	17 43	18 54 14	12 49	23 20 3	3 48	22 1 57	10 20	12 48 52	26 43	25
6	1 57 28	19 32	11 22 35	17 37	19 7 3	12 36	23 23 51	3 25	21 51 37	10 53	12 22 9	27 11	24
7	2 17 0	19 31	11 40 12	17 30	19 19 39	12 22	23 27 16	3 2	21 40 44	11 26	11 54 58	27 37	23
8	2 36 31	19 29	11 57 42	17 23	19 32 1	12 7	23 30 18	2 37	21 29 18	11 59	11 27 21	28 4	22
9	2 56 0	19 28	12 15 5	17 16	19 44 8	11 53	23 32 55	2 14	21 17 19	12 33	10 59 17	28 29	21
10	3 15 28	19 26	12 32 21	17 9	19 56 1	11 39	23 35 9	1 48	21 4 46	13 6	10 30 48	28 53	20
11	3 34 54	19 24	12 49 30	17 1	20 7 40	11 23	23 36 57	1 24	20 51 40	13 41	10 1 55	29 16	19
12	3 54 18	19 22	13 6 31	16 53	20 19 3	11 8	23 38 21	0 59	20 37 59	14 14	9 32 39	29 39	18
13	4 13 40	19 20	13 23 24	16 45	20 30 11	10 52	23 39 20	0 33	20 23 45	14 49	9 3 0	30 1	17
14	4 33 0	19 18	13 40 9	16 37	20 41 3	10 37	23 39 53	+0 6	20 8 56	15 23	8 32 59	30 21	16
15	4 52 18	19 14	13 56 46	16 28	20 51 40	10 20	23 39 59	−0 20	19 53 33	15 56	8 2 38	30 40	15
16	5 11 32	19 12	14 13 14	16 20	21 2 0	10 4	23 39 39	0 46	19 37 37	16 31	7 31 58	30 58	14
17	5 30 44	19 9	14 29 34	16 11	21 12 4	9 47	23 38 53	1 14	19 21 6	17 6	7 1 0	31 16	13
18	5 49 53	19 6	14 45 45	16 1	21 21 51	9 30	23 37 39	1 42	19 4 0	17 39	6 29 44	31 32	12
19	6 8 59	19 3	15 1 46	15 52	21 31 21	9 12	23 35 57	2 9	18 46 21	18 14	5 58 12	31 46	11
20	6 28 2	18 59	15 17 38	15 43	21 40 33	8 54	23 33 48	2 37	18 28 7	18 47	5 26 26	32 0	10
21	6 47 1	18 55	15 33 21	15 33	21 49 27	8 37	23 31 11	3 6	18 9 20	19 22	4 54 26	32 11	9
22	7 5 56	18 51	15 48 54	15 23	21 58 4	8 18	23 28 5	3 35	17 49 58	19 55	4 22 15	32 23	8
23	7 24 47	18 47	16 4 17	15 12	22 6 22	7 59	23 24 30	4 4	17 30 3	20 29	3 49 52	32 32	7
24	7 43 34	18 43	16 19 29	15 2	22 14 21	7 41	23 20 26	4 34	17 9 34	21 3	3 17 20	32 41	6
25	8 2 17	18 39	16 34 31	14 51	22 22 2	7 21	23 15 52	5 4	16 48 31	21 35	2 44 39	32 48	5
26	8 20 56	18 34	16 49 22	14 40	22 29 23	7 1	23 10 48	5 34	16 26 56	22 8	2 11 51	32 53	4
27	8 39 30	18 29	17 4 2	14 29	22 36 24	6 41	23 5 14	6 4	16 4 48	22 40	1 38 58	32 57	3
28	8 57 59	18 24	17 18 31	14 17	22 43 5	6 21	22 59 10	6 36	15 42 8	23 13	1 6 1	33 0	2
29	9 16 23	18 19	17 32 48	14 5	22 49 26	6 0	22 52 34	7 6	15 18 55	23 44	0 33 1	33 1	1
30	9 34 42		17 46 53		22 55 26		22 45 28		14 55 11		0 0 0		0
	Sig. XI. +		Sig. X. +		Sig. IX. +		Sig. VIII. +		Sig. VII. +		Sig. VI. +		

TABLE VI. Logarithms of the Diſtance of Mercury from the Sun.

Argument. Mean Anomaly of Mercury.

	Sig. O.		Sig. I.		Sig. II.		
D.	Logarithms.	Differ.	Logarithms.	Differ.	Logarithms.	Differ.	D.
0	9.668993	8	9.661990	476	9.640787	955	30
1	9.668985	23	9.661514	492	9.639832	970	29
2	9.668962	38	9.661022	507	9.638862	987	28
3	9.668924	54	9.660515	524	9.637875	1003	27
4	9.668870	70	9.659991	539	9.636872	1019	26
5	9.668800	85	9.659452	555	9.635853	1034	25
6	9.668715	101	9.658897	571	9.634819	1051	24
7	9.668614	117	9.658326	587	9.633768	1066	23
8	9.668497	132	9.657739	603	9.632702	1083	22
9	9.668365	147	9.657136	619	9.631619	1098	21
10	9.668218	163	9.656517	635	9.630521	1114	20
11	9.668055	178	9.655882	650	9.629407	1130	19
12	9.667877	194	9.655232	667	9.628277	1146	18
13	9.667683	210	9.654565	682	9.627131	1161	17
14	9.667473	226	9.653883	698	9.625970	1177	16
15	9.667247	241	9.653185	714	9.624793	1193	15
16	9.667006	256	9.652471	731	9.623600	1208	14
17	9.666760	272	9.651740	746	9.622392	1223	13
18	9.666478	287	9.650994	763	9.621169	1239	12
19	9.666191	304	9.650231	778	9.619930	1254	11
20	9.665887	319	9.649453	795	9.618676	1269	10
21	9.665568	335	9.648658	810	9.617407	1284	9
22	9.665233	350	9.647848	827	9.616123	1300	8
23	9.664883	366	9.647021	842	9.614823	1314	7
24	9.664517	383	9.646179	858	9.613509	1330	6
25	9.664134	398	9.645321	875	9.612179	1344	5
26	9.663736	412	9.644446	891	9.610835	1358	4
27	9.663324	429	9.643555	908	9.609477	1373	3
28	9.662895	445	9.642647	923	9.608104	1387	2
29	9.662450	460	9.641724	937	9.606717	1401	1
30	9.661990		9.640787		9.605316		0
	Sig. XI.		Sig. X.		Sig. IX.		

TABLE VI. Logarithms of the Distance of Mercury from the Sun.

Argument. Mean Anomaly of Mercury.

	Sig. III.		Sig. VI.		Sig. V.		
D.	Logarithms.	Differ.	Logarithms.	Differ.	Logarithms.	Differ.	D.
0	9.605316	1415	9.557972	1692	9.510077	1330	30
1	9.603901	1429	9.556280	1694	9.508747	1300	29
2	9.602472	1443	9.554586	1696	9.507447	1268	28
3	9.601029	1456	9.552890	1695	9.506179	1236	27
4	9.599573	1469	9.551195	1695	9.504943	1201	26
5	9.598104	1482	9.549500	1693	9.503742	1167	25
6	9.596622	1495	9.547807	1691	9.502575	1130	24
7	9.595127	1507	9.546116	1688	9.501445	1092	23
8	9.593620	1519	9.544428	1685	9.500353	1054	22
9	9.592101	1532	9.542743	1679	9.499299	1014	21
10	9.590569	1543	9.541064	1674	9.498285	972	20
11	9.589026	1554	9.539390	1667	9.497313	930	19
12	9.587472	1566	9.537723	1660	9.496383	887	18
13	9.585906	1577	9.536063	1651	9.495496	842	17
14	9.584329	1586	9.534412	1642	9.494654	797	16
15	9.582743	1597	9.532770	1631	9.493857	750	15
16	9.581146	1607	9.531139	1618	9.493107	703	14
17	9.579539	1616	9.529521	1606	9.492404	655	13
18	9.577923	1625	9.527915	1592	9.491749	605	12
19	9.576298	1634	9.526323	1577	9.491144	555	11
20	9.574664	1642	9.524746	1560	9.490589	504	10
21	9.573022	1649	9.523186	1542	9.490085	453	9
22	9.571373	1656	9.521644	1524	9.489632	402	8
23	9.569717	1663	9.520120	1505	9.489230	350	7
24	9.568054	1668	9.518615	1484	9.488880	296	6
25	9.566386	1674	9.517131	1461	9.488584	243	5
26	9.564712	1679	9.515670	1437	9.488341	189	4
27	9.563033	1684	9.514233	1412	9.488152	135	3
28	9.561349	1687	9.512821	1386	9.488017	82	2
29	9.559662	1690	9.511435	1358	9.487935	28	1
30	9.557972		9.510077		9.487907		0
	Sig. VIII.		Sig. VII.		Sig. VI.		

TABLE VII. Reduction to the Ecliptic both in Longitude and Distance.

Argument. The Longitude of Mercury — the Longitude of the Node.

Degrees.	Sig. O. Sig. VI. — M.	S.	Sub. from Log.	Sig. I. — Sig. VII. — M.	S.	Sub. from Log.	Sig. II. — Sig. VIII. — M.	S.	Sub. from Log.	Degrees.
0	0	0	0	11	7	808	11	9	2432	30
1	0	26	1	11	20	858	10	56	2480	29
2	0	53	4	11	32	908	10	41	2528	28
3	1	20	9	11	43	959	10	26	2574	27
4	1	47	16	11	54	1011	10	9	2621	26
5	2	13	24	12	4	1063	9	53	2665	25
6	2	39	35	12	13	1118	9	34	2708	24
7	3	5	48	12	21	1172	9	16	2749	23
8	3	31	62	12	28	1226	8	57	2789	22
9	3	57	79	12	34	1281	8	37	2829	21
10	4	23	98	12	40	1337	8	17	2867	20
11	4	48	118	12	45	1392	7	56	2903	19
12	5	13	140	12	48	1448	7	34	2937	18
13	5	37	164	12	50	1506	7	12	2969	17
14	6	1	189	12	51	1562	6	50	3000	16
15	6	25	216	12	52	1619	6	27	3030	15
16	6	48	246	12	51	1675	6	3	3058	14
17	7	11	277	12	50	1731	5	39	3084	13
18	7	33	309	12	48	1788	5	15	3108	12
19	7	54	343	12	45	1845	4	50	3130	11
20	8	14	378	12	40	1901	4	25	3151	10
21	8	34	415	12	35	1957	3	59	3169	9
22	8	53	454	12	29	2012	3	34	3186	8
23	9	12	493	12	22	2066	3	8	3201	7
24	9	31	534	12	15	2120	2	41	3213	6
25	9	50	577	12	6	2173	2	15	3224	5
26	10	7	622	11	56	2227	1	47	3233	4
27	10	23	667	11	45	2280	1	21	3240	3
28	10	39	713	11	35	2332	0	54	3245	2
29	10	54	760	11	22	2382	0	27	3248	1
30	11	7	808	11	9	2432	0	0	3249	0
	Sig. XI. + Sig. V. +		Sub. from Log.	Sig. X. + Sig. IV. +		Sub. from Log.	Sig. IX. + Sig. III. +		Sub. from Log.	

TABLE VIII. Heliocentric Latitude of Mercury.

Argument. The Longitude of Mercury — the Longitude of the Node.

Degrees.	Sig. O. N. / Sig. VI. S.	Differ.	Sig. I. N. / Sig. VII. S.	Differ.	Sig. II. N. / Sig. VIII. S.	Differ.	Degrees.
	D. M. S.	M. S.	D. M. S.	M. S.	D. M. S.	M. S.	
0	0 0 0	7 18	3 29 37	6 20	6 3 30	3 37	30
1	0 7 18	7 19	3 35 57	6 15	6 7 7	3 30	29
2	0 14 37	7 18	3 42 12	6 11	6 10 37	3 23	28
3	0 21 55	7 18	3 48 23	6 6	6 14 0	3 18	27
4	0 29 13	7 18	3 54 29	6 1	6 17 18	3 11	26
5	0 36 31	7 17	4 0 30	5 58	6 20 29	3 3	25
6	0 43 48	7 16	4 6 28	5 54	6 23 32	2 56	24
7	0 51 4	7 15	4 12 22	5 49	6 26 28	2 49	23
8	0 58 19	7 14	4 18 11	5 44	6 29 17	2 42	22
9	1 5 33	7 12	4 23 55	5 40	6 31 59	2 35	21
10	1 12 45	7 11	4 29 35	5 35	6 34 34	2 27	20
11	1 19 56	7 10	4 35 10	5 30	6 37 1	2 20	19
12	1 27 6	7 9	4 40 40	5 24	6 39 21	2 13	18
13	1 34 15	7 7	4 46 4	5 19	6 41 34	2 5	17
14	1 41 22	7 5	4 51 23	5 14	6 43 39	1 58	16
15	1 48 27	7 4	4 56 37	5 8	6 45 37	1 50	15
16	1 55 31	7 2	5 1 45	5 3	6 47 27	1 44	14
17	2 2 33	6 59	5 6 48	4 58	6 49 11	1 36	13
18	2 9 32	6 55	5 11 46	4 52	6 50 47	1 28	12
19	2 16 27	6 53	5 16 38	4 46	6 52 15	1 20	11
20	2 23 20	6 50	5 21 24	4 40	6 53 35	1 12	10
21	2 30 10	6 48	5 26 4	4 34	6 54 47	1 5	9
22	2 36 58	6 46	5 30 38	4 28	6 55 52	0 57	8
23	2 43 44	6 42	5 35 6	4 22	6 56 49	0 50	7
24	2 50 26	6 40	5 39 28	4 17	6 57 39	0 44	6
25	2 57 6	6 37	5 43 45	4 11	6 58 23	0 36	5
26	3 3 43	6 33	5 47 56	4 4	6 58 59	0 27	4
27	3 10 16	6 30	5 52 0	3 57	6 59 26	0 19	3
28	3 16 46	6 27	5 55 57	3 50	6 59 45	0 11	2
29	3 23 13	6 24	5 59 47	3 43	6 59 56	0 4	1
30	3 29 37		6 3 30		7 0 0		0
	Sig. XI. S. / Sig. V. N.		Sig. X. S. / Sig. IV. N.		Sig. IX. S. / Sig. III. N.		

As a ſpecimen of the uſe of the preceding tables, we ſhall give the following example from the Aſtronomy of Profeſſor Vince, whoſe polite compliance with our wiſh to extract the preceding tables from his valuable work, demands our reſpectful acknowledgment.

To compute the Heliocentric Latitude and Longitude of Mercury, and Logarithm of his Diſtance from the Sun.—From Table I. of the epochs, take out the epochs of the mean longitude of the aphelion and node, for the given year, and place them in an horizontal line. But if the given year be not found in that table, take the neareſt year preceding the given year, as an epoch, and take out as before; under which (Table II.) place the mean motion, in longitude, of the aphelion and node, anſwering to the number of years elapſed ſince the epoch to the given year.

Under theſe, write down (Table III.) the mean motions of the ſame, for the given day of the month.

Under theſe, write down (Table IV.) the mean motions of the ſame, for the given hours, minutes, and ſeconds.

Add together the numbers in the ſeveral columns, rejecting 12 *S*, or any multiple thereof, if they occur; and you get the mean longitude, places of the aphelion, and node for the given time.

Subtract the longitude of the aphelion from the mean longitude, and the remainder is the mean anomaly.

With the mean anomaly enter Table V., and take out the equation of the orbit, making proportion for the minutes and ſeconds, if there be any, correcting the reſult of the proportion for ſecond differences.

Apply the equation, with its proper ſign, to the mean longitude, and you get the longitude on the orbit, from the mean equinox.

From the longitude of Mercury in his orbit, ſubtract the longitude of the node, and you get the argument, called the *argument of latitude.*

To the longitude on the orbit thus found, apply the reduction (Table VII.) with its proper ſign, and you have the longitude upon the ecliptic, reckoned from the mean equinox.

To the longitude thus found, apply the nutation, or equation of the equinoxes in longitude with its proper ſign, and you get the true longitude of Mercury on the ecliptic, from the true equinox.

With the argument of latitude enter Table VIII., and take out the heliocentric latitude, making proportion for the minutes and ſeconds, if neceſſary, correcting the reſult of the proportion for ſecond differences, and this is the true heliocentric latitude of Mercury.

With the mean anomaly of Mercury enter Table VI., and take out the logarithm of the diſtance, making proportion for the minutes and ſeconds, if neceſſary.

With the argument of latitude enter Table VII., and in the column *Sub. Log.* take out the number, making proportion for minutes and ſeconds, if neceſſary; and ſubtracting it from the logarithm of the diſtance laſt found, you have the logarithm of the curtate diſtance.

Example.—What is the heliocentric Latitude and Longitude of Mercury on June 3, 1793, at $5^h\ 17'\ 19''$, mean Time at Greenwich, and the Logarithm of his Diſtance from the Sun?

	Longitude.	Aphelion.	Node.
	s ° ′ ″	s ° ′ ″	s ° ′ ″
Epoch for 1793 - -	2 28 5 16	8 14 14 17	1 15 51 45
Mean Motion to June 3	9 0 13 34	24	18
———— for 5^h -	51 9		
———— for $17'$ -	2 54		
———— for $19''$ -	3		
Mean Long. - -	11 29 12 56	8 14 14 41	1 15 52 3
Equation Table V. -	— 23 39 59	11 29 12 56	11 5 32 57
Long. on Orbit - -	11 5 32 57	3 14 58 15	9 19 40 54
Reduct. Table VII. -	+ 8 10	Mean Anom.	Arg. of Lat.
Long. from mean Equin.	11 5 41 7	Hence, Tab. VI.	Hence, Tab. VIII.
Nutation - - -	— 6	Log. diſt. 9.582789	*Hel. lat.* 6° 35′ 21″ S.
True Long. on Ecl. -	11 5 41 1	Reduct. - 2878	
		9.579911 Log. of curtate diſtance from the Sun.	

Mercury, in *Botany*, &c. See Mercurialis.

Mercury, *Engliſh.* See Chenopodium.

Mercury is a metal of a ſilvery-white colour, and fluid at the uſual temperature of the atmoſphere. It is known under a variety of denominations: the common name among the ancients was *hydrargyrum*, q. d. water of ſilver. The moderns commonly call it *mercury*, from ſome ſuppoſed relation it bears to the planet of that name. In Engliſh it is popularly called *quickſilver*, from its appearance. Many of the chemiſts call it *Proteus*, from the variety of forms, colours, &c. it paſſes through in their preparations.

§ 1. *Ores of Mercury.*

1. *Native Mercury; Gediegen queck-ſilber*, Wern.; *Mercure natif*, Haüy.

Its colour is that of ſilver.

It

It is found as globules in the cells of other ores of mercury, and as large maſſes in druſed cavities, &c.

When pure it is perfectly fluid; it feels very cold, and as if wet, but does not adhere to the finger. It has neither ſmell nor taſte.

Its luſtre is metallic ſplendent. Sp. gr. 13.568, Cavendiſh, Briſſon; 13.581, Haüy; 13.600, Klapr.

Native mercury is generally pure, but ſometimes it is amalgamated with ſome ſilver, though not ſufficiently ſaturated to be referrible to the following ſpecies, into which a tranſition is thus formed.

There are only a few places where native mercury has been found in abundance, ſuch as Idria, the Palatinate, and Spain; but in ſmall quantities it occurs almoſt always together with cinnabar and other mercurial ores, in fletz-rocks, which appear to be ſubordinate to ſome coal formation. See the ſequel of this article, and MINIUM.

For the uſe, and chemical and phyſical properties of mercury, ſee the ſequel of this article.

2. *Native Amalgam; Natürliches amalgam*, Wern.; *Mercure argental*, Haüy.

Its colour varies between that of tin and ſilver.

It is ſeldom found maſſive; oftener diſſeminated, in ſuperficial laminæ, and ſometimes cryſtallized. The cryſtals hitherto obſerved are: 1. The regular octahedron with all its edges truncated, mentioned by Romé de l'Iſle (Mercure argental *émarginé*, Haüy, pl. 65, fig. 24.) 2. The rhomboidal or garnet dodecahedron (Mercure argental *dodécaèdre*, Haüy, ib. fig. 25.) This occurs more frequently than the others, and is by Cordier conſidered as the primitive cryſtal. 3. The preceding truncated on the edges (Mercure arg. *triforme*, Haüy, ib. fig. 26.) Alſo the leucite cryſtal, or the double eight-ſided pyramid, flatly acuminated on each extremity by four planes ſet on the alternate lateral edges, is mentioned among the modifications of this ſubſtance.

The cryſtals are never large, generally of the ſize of a ſmall pea: they are uſually imbedded, ſeldom ſeveral of them grouped together.

Externally it is ſhining and ſplendent, but leſs ſo than native mercury: luſtre metallic. When ſcraped it becomes dull.

Fracture conchoidal. It is more or leſs ſoft, ſometimes approaching to fluid; not particularly brittle. Spec. grav. 14.1192, as a mean of ſeveral experiments by Cordier.

Beſides this paſty ſemifluid amalgam, there is a more ſolid variety, the fracture of which is more imperfectly flat conchoidal, ſometimes paſſing into fine-grained uneven, and which, when preſſed between the fingers, or cut with a knife, gives out a more creaking ſound than the other variety.

Expoſed to the fire the mercury is volatilized, and a button of ſilver remains.

The variety analyſed by Heyer contained 74 parts of mercury and 25 of ſilver: that examined by Klaproth 64 parts of mercury and 36 of ſilver; laſtly, Cordier found 72.5 of mercury and 27.5 of ſilver in the cryſtallized amalgam.

The native amalgam is of rare occurence; it has been found at Salberg in Sweden, at Roſenau and Niederſlana in Hungary, at Mörsfeld in the Palatinate, and principally at Moſchellandſberg and Stahlberg in Deuxponts, in a yellowiſh and reddiſh ferruginous clay, mixed with other mercurial ores, and accompanied with ſpathoſe iron, lithomarge, limeſtone, barytes, hornſtone, iron pyrites, &c.

Nothing exact is known reſpecting the mode of its occurrence; but probably it is confined to beds in fletz mountains.

The more ſolid variety reſembles ſilver, but may eaſily be known by the property it poſſeſſes of whitening gold and copper when rubbed on them.

3. *Mercurial Horn-Ore; Queck-ſilber horn-ertz*, Wern.; *Mercure muriaté*, Haüy.

Its uſual colour is aſh-grey, more or leſs deep; it often paſſes into yellowiſh-grey and greyiſh-white, and alſo inclines to greeniſh-grey.

It is ſeldom found maſſive or diſſeminated; but generally in thin cruſts formed by tubercular or ſmall globular maſſes, which are often compoſed of minute cryſtals. The form of theſe cryſtals is generally a dodecahedron like that of zircon, or rectangular four-ſided priſm, acuminated by four planes ſet on the lateral edges. (Mercure muriaté *dodécaèdre*, Haüy.) Beſides this the following modifications are mentioned by authors: a rectangular four-ſided priſm, acuminated like the preceding by four planes, but which are ſet on the lateral planes; a ſix-ſided priſm bevelled at both extremities, the bevelling planes ſet on the two largeſt oppoſite lateral planes; and the octahedron with ſummits and edges truncated.

Theſe cryſtals are always minute and irregular, often gibbous, whence the difficulty of determining their figure with exactneſs. Externally they are ſplendent, internally ſplendent with a complete diamond luſtre, ſometimes approaching metallic luſtre.

It appears to be compoſed of fine-grained diſtinct concretions. It is generally faintly tranſlucent, ſometimes only on the edges; ſoft; may be cut with a knife, and is eaſily frangible.

Its ſpecific gravity and other characters remain yet undetermined, on account of the ſmallneſs and ſcarcity of the fragments that have hitherto been found.

Before the blowpipe it is volatilized, without decompoſition. It is ſoluble in water. Woulfe found it compoſed of 64 parts of ſulphat of mercury, and 36 muriat of mercury; Kirwan of 70 parts of mercury, and 30 of muriatic and ſulphuric acids.

The Horn mercury, the ſcarceſt of all mercurial ores, was firſt diſcovered by Mr. Woulfe in the quickſilver mines of Moſchellandſberg and Mörsfeld, in ferruginous clayey ſand-ſtone, accompanied with other ores of mercury, ochrey-brown iron-ſtone, malachite and blue copper ore, calcareous ſpar, lithomarge, &c. It has alſo been found at Idria, generally in the cavities of an indurated clay, and of ſlate-clay accompanied with cryſtallized cinnabar; at Horzowitz in Bohemia, with dark red cinnabar in a vein of brown ironſtone, and at Almaden in Spain.

4. *Mercurial Liver-Ore; Queck-ſilber-Lebererz*, Wern.; *Liver-coloured mercurial ore*, Aik. *Mercure ſulfuré lituminifère*, Haüy.

It is divided by Werner into compact and ſlaty liver-ore.

a. *Compact.*—Its colour is intermediate between dark lead-grey and cochineal red.

Occurs maſſive and rarely diſſeminated. Internally it is gliſtening and glimmering, with ſemi-metallic luſtre.

Fracture even, paſſing ſometimes into fine-grained uneven, and imperfect large and flat conchoidal: fragments indeterminately angular, more or leſs blunt-edged; opaque. Streak ſhining, and of a deep cochineal red colour. It is ſoft, may be cut with a knife, and is eaſily frangible. Specif. grav. 7.186—7.352, Kirwan; 7.937, Gellert.

b. *Slaty.*—Its colour nearly the ſame as the preceding, only now and then more of the red obſervable on the principal fracture. It is found only maſſive. Its fracture in the direction of the laminæ is curved and thick ſlaty; it is ſhining, and its luſtre approaches the metallic; croſs fracture

 even

even and compact, and but little shining or only glimmering. Fragments more or less slaty. It is opaque, and uncommonly easily frangible.

The mercurial liver-ore affords upwards of 80 *per cent.* of pure mercury. Klaproth, who analysed the compact variety from Idria, obtained the following results:

Mercury	818
Sulphur	137.50
Charcoal	23
Silex	6.50
Alumine	5.50
Oxyds of copper	2
Copper	0.20
Water which served to form the sulphurated hydrogen gas, and other loss	7.30
	1000

This analysis, Klaproth adds, may serve to rectify the erroneous notions which have been adopted concerning the composition of this mixed mineral. By shewing that the sulphur is combined with the metal in the same proportion as in cinnabar, namely, as 1 to 6 in round numbers, we are taught how little foundation there is for the opinion of those who, like Sage and Kirwan, think that a part only of the mercury is in the state of sulphurated mercury, and that the other is in the state of a simple oxyd. If that were the case, the non-sulphurated part would certainly be soluble in the nitric acid; but experiment shews that this is not the case, because the acid cannot dissolve any part even when boiling, the mineral powder remaining unchanged at the bottom of the vessel. See Nichol's Journ. vol. 15. p. 231.

Both varieties of mercurial liver-ore occur together at Idria in Friaul, to which they appear exclusively to belong, though Spain, Siberia, and other places have been mentioned by authors among their localities. They are found in large masses, in and with slate-clay, and a kind of bituminous shale, and accompanied with cinnabar, and sometimes small quantities of native mercury and iron pyrites. Two ores of mercury, supposed to belong to the liver-ore, are at Idria distinguished by particular names. One is the *Brandertz*, which appears to be a kind of coarse coal impregnated with cinnabar; the blackish-grey variety contains only from 1 to 18 *per cent.*, the red from 30 to 40 *per cent.* of mercury. The other is called *Corallen-ertz*, (bead or coral-ore); it consists of reddish-black oblong beads of the size of a large coffee bean, of a foliated structure, imbedded in a blackish bituminous shale, and also in sand-stone. The richest affords about 40 *per cent.* of mercury.

5. *Cinnabar; Zinnober*, Wern; *Mercure sulfuré*, Haüy. This species may conveniently be subdivided into two varieties, *viz* dark red cinnabar and bright red cinnabar.

Dark red cinnabar; Dunkel-rother zinnober, Wern.

Its colour is cochineal red, which in some varieties inclines on one side to carmine red, on the other to lead grey.

It is found massive, disseminated, in superficial coatings and membranes, amorphous, cellular, dendritic, and crystallized.

Its primitive form is the regular hexahedral prism; integrant molecule, the triangular equilateral prism. The following, according to Werner, Emmerling, and Estner, are the principal secondary forms: 1. The rhomboid rather flattened, truncated in the two diagonally opposite obtuse angles. 2. The six-sided table, formed by the increase of the truncating planes of the preceding figure. 3. The regular six-sided prism, either perfect or acuminated by three planes set on the alternate lateral planes. 4. The three-sided pyramid, either double or single, in which the angles are sometimes more or less deeply truncated. 5. The regular octohedron, sometimes terminating in an edge at the summit.

Haüy, on the other hand, has observed only two distinct modifications in the crystals of cinnabar; the one is the primitive form, or the regular six-sided prism (Mercure sulfuré *primitif*, pl. 65. fig. 27.), in which the divisions parallel with the lateral planes are very distinct; the other (Merc. sulf. *bibisalterne*, fig. 28.) a similar short prism, with six marginal planes at each extremity placed alternately with regard to the lateral planes and to the planes of the other extremity.

These crystals, whose real form is often difficultly determinable, are generally small and very small; they are grouped together without order, generally lining the cavities of massive cinnabar. Externally they are splendent; internally both the crystallized and amorphous varieties are shining, which sometimes passes into glistening, and likewise into glimmering; with diamond lustre approaching to semi-metallic. The foliated varieties have the strongest lustre.

Fracture either more or less perfectly lamellar, the crystalline varieties with laminæ sometimes rather curved; or fine-grained uneven, with a tendency to conchoidal. Fragments indeterminately angular, rather blunt-edged. The lamellar varieties present granular distinct concretions; sometimes there is a tendency to thick and straight lamellar distinct concretions.

Massive cinnabar is opaque, seldom translucent on the edges; but the crystals are sometimes translucent and even approach transparent.

It becomes shining in the streak, affording a scarlet red powder. It is soft and easily cut with the knife, and very heavy. Spec. gr. varies from 4.500 to 10.218, which latter was determined by Brisson on a pure crystal from Almaden: 7.710, Klapr. (the Japanese in grains): 8.116, Ki. (the massive from Neumärktel).

The constituent parts of dark red cinnabar, were found by Klaproth to be

	The Japanese.	From Neumärktel.
Mercury	84.50	85.0
Sulphur	14.75	14.25
	99.25	99.25

Bright red cinnabar; Hochrother zinnober, Wern.

Colour bright scarlet red. It is found massive, disseminated, and coating. Internally it is glimmering, of rather a pearly lustre; sometimes, especially on the cross fracture, it is dull; principal fracture between earthy and fibrous; cross fracture earthy, fine-grained; fragments indeterminately angular, blunt-edged. It is opaque. Streak scarlet red, shining. It is very soft, passing into friable; and soils. It is very heavy.

This sub-species, which is much scarcer than the preceding, is found in the quicksilver mines of the Palatinate, particularly at Wolfstein and at Deuxponts, where it is accompanied with brown iron-stone, iron-ochre, quartz, calcareous spar, and dark red cinnabar. The other localities assigned to light red cinnabar are not well authenticated.

Some authors, as Estner, are said to have mistaken the red iron-

iron-ochre, which is found with bright red cinnabar, for this latter variety; whence the other shades of red they mention are not applicable to the substance in question.

Werner adopts two distinct formations of cinnabar, contemporaneous with the mountains in which they occur in beds. These latter, in the older formations, consist of a kind of chlorite slate, quartz, &c; in the newer, of slate clay, &c. It is also found in veins, the relative age of which is not ascertained. To the newer formation, which is far more abundant than the old, belong the repositories in the Palatinate, in Deuxponts, Spain, Idria, &c.; to the older, those of Hartenstein in Saxony, of Carinthia, &c. In veins it occurs at Horzowitz in Bohemia, in Lower Hungary, &c., where it is accompanied with some other mercurial ores, with iron-stone, galena, and other geognostically related species, which, in this case, are always indications of venigenous origin. When occurring in beds, it is generally accompanied (besides with other ores of mercury) with compact lime-stone, calcareous spar, barytes, quartz, and sometimes traces of copper ores; the beds themselves are principally formed by slate clay, a kind of sand-stone, and rocks of a similar nature. Some of the older beds are found in clay slate mountains, and contain the cinnabar in contemporaneous small veins or trums. The newer beds are supposed partly to belong to the coal-formation. Mohs.

The geognostic relations of the Japanese dark red cinnabar are not known. It is brought to us in small grains, being mostly fragments of flattened six-sided prisms, which partly contain finely disseminated iron pyrites, and are also found adhering to particles of a quartzy substance.

The principal quicksilver mines in the Palatinate are at the following places, *viz.* Mörsfeld, where the cinnabar traverses quartz, which is often completely coloured by it; the native quicksilver, formerly found at this place, was so abundant, that, according to Ferber, it was observed in the very streets of the town: Spitzenberg near Mörsfeld, where cinnabar occurs mixed with brown iron-stone; also small veins of asphaltum are sometimes found here in the masses of cinnabar: Carlsglück, which furnishes a mercurial sand ore, being cinnabar in a grey fine-grained and partly slaty sand-stone, mixed with more or less clay; also native mercury has sometimes been found here included in geodes of brown iron-stone: Wolfstein, where there is the mine *Theodors Erzlust*, in a mountain called the Königsberg; it was formerly uncommonly rich in mercurial ores, such as the light red cinnabar both earthy and fibrous, which is almost exclusively found here, accompanied with brown iron-stone, &c.: at Potzberg, in the principality of Veldentz, cinnabar occurs in a kind of pudding-stone.

In the territory of Deuxponts, the most remarkable mine is that in the Schlossberg of Obermoschel or Moschellandsberg, where both cinnabar and native mercury are found in great abundance.

The quicksilver mines of Idria were discovered in 1497. The richest ores, according to Ferber's account, occur in a considerable bed of clay slate. The roof and hanging side of the veins consist of limestone; they are very much rent, and travesed by dykes or ridges of other calcareous rocks and of a hard clay slate, which produce slips and faults in the mercurial vein. The clay slate of Idria is generally soft at some depth under ground, but harder and more distinctly slaty towards the surface: its principal colour is black. This slate is traversed and penetrated in all directions by veins of cinnabar and disseminated native mercury, which are also found in nests. It is in the softer part of the slate that the richer ores are generally found; they are firm, compact, and commonly marle-like, and when unmixed with other soft earthy substances, are susceptible of polish. These richer ores contain from 40 to 70 and even 80 pounds of quicksilver in the hundred weight.

The different rock-stones at Idria containing mercury are, 1. Grey and black lime-stone, improperly called horn-stone by the miners; it constitutes only the roof and sides of the slaty vein and the bars, which latter sometimes contain much disseminated cinnabar. 2. Varieties of clay of various colours, white, grey, yellow, red, and blackish, some pure others marly, and of various degrees of hardness: the blackish-grey variety yields from five to ten *per cent.* of quicksilver. 3. Grey clay slate, either pure or mixed with lime: it contains from two to three *per cent.* of quicksilver; the more its colour increases in depth the richer it becomes, so that the darkest, or blackish-grey variety, yields sometimes eight pounds in the hundred weight. 4. Black soft clay slate, called *Mildzeug*, of a more or less marly nature, and containing from ten to fifteen, and sometimes even from thirty to forty pounds in the hundred. 5. A black hard clay slate, called *Spiegel*, or looking-glass slate, on account of its shining surface: it sometimes produces from forty to fifty pounds in the hundred weight; but very little when purely argillaceous, and very hard. 6. Druses, or aggregations of calcareous, gypseous, and barytic crystals, which are sometimes found coated with cinnabar.

The following are the principal mercurial ores known at Idria: 1. Pure cinnabar, massive and crystallized. 2. Red ore, or impure cinnabar, of a tile-red colour, mixed with marle and pyrites; producing about thirty pounds in the hundred. 3. *Schnürl-erz*, or bead-ore, because the cinnabar traverses the matrix in small veins similar to strings of beads. 4. Mercurial liver-ore, a very rich ore, yielding from fifty to eighty pounds in the hundred weight. 5. Mercurial brand ore. 6. Coral ore, which contains from one to forty pounds. Vide supra *Mercurial liver-ore*.

The Spanish quicksilver mines are the most ancient we are acquainted with. Pliny informs us that no other cinnabar was made use of at Rome than that from Spain, particularly that of the *Regio Sisaponensis* in Bœtica, which appears to have been the territory of the present Almaden. This latter name is of Saracenian origin, signifying the shaft or gallery of a mine. According to Theophrastus' and Pliny's account, the cinnabar brought to Rome was a kind of sand; a term which is applicable to those small fragments of cinnabar mixed with quartz, which are still found in considerable quantity in the old mine de las Cuebas, near Almaden, from the size of a hazel-nut to that of a hemp-seed.

The prevailing mountain-rock at and near Almaden is a grey clay slate, traversed in many places by considerable beds of a breccia, which is composed of pieces of a similar clay slate, with white calcareous spots, and fragments of the same black bituminous shale, which is the usual concomitant of the quicksilver mines of Almaden. This breccia is here known under the name of *Frailesque*, on account of its prevailing colour, which resembles that of the habit of the Franciscan monks.

The most important mines are at the south side of Almaden, in the immediate neighbourhood of the town; there are six of them, running, within the space of about fifty fathoms, nearly from east to west: some of them, especially that of San Diego, deviate from this course, describing part of a large circle. Their dip is from sixty to upwards of eighty degrees; they frequently intersect each other, and are also traversed by the above-mentioned breccia and a black bituminous

minous ſhale; but at a certain depth (ſuch as in the mine Franciſco, which is 100 fathoms deep), they generally continue their courſe without interruption. They are all very rich in ore: where the veins meet, particularly thoſe of San Julian and San Diego, the repoſitories of ore are from four to five fathoms in thickneſs: theſe conſiſt of a quartz, richly intermixed with cinnabar, yielding from twenty to thirty pounds in the hundred.

The other quickſilver mines belonging to the territory of Almaden are, 1. That of Almadenejos, where veins of quartz, from one to half a fathom in thickneſs, richly penetrated by cinnabar, traverſe the grey clay ſlate above-mentioned. 2. That of Guadalperal, half a Spaniſh league N.W. from Almadenejos: this mine, which is very ſuperficial, was wrought by the Romans. The rock it traverſes is the ſame clay ſlate with that of Almaden, only that the breccia contains no fragments of the black bituminous ſhale, which is one of the component parts of that ſeen at Almaden. The ores of this mine conſiſt of cryſtalline cinnabar, moſtly in very narrow veins or trums. 3. The mine de las Cuebas, about three Engliſh miles from Almaden, in the ſame direction with that of Guadalperal. The quickſilver ores are here found in ſhort interrupted veins of quartz traverſing bituminous ſhale.

For a complete account of the quickſilver mines of Almaden, ſee Hoppenſack über den Bergbau in Spanien. Weimar, 1796.

Mercury, *Aſſay and Analyſis of the Ores of.*—Mercury is frequently combined with ſilver and biſmuth in the form of an amalgam. The mercury may be ſeparated by diſtillation in a retort of iron, or of glaſs coated with ſand and clay. The reſiduum, which is generally ſilver and biſmuth, may be diſſolved in nitric acid. When the ſolution is complete, a large quantity of water muſt be added, by which the greateſt part of the biſmuth will be ſeparated in the ſtate of ſubnitrat. If oxymuriatic gas be paſſed through the ſolution of ſilver and the remaining biſmuth, the former will be precipitated in the ſtate of muriat of ſilver, while the biſmuth will be held in ſolution in the ſtate of oxymuriat of biſmuth. When the muriat of ſilver is ſeparated, the biſmuth may be precipitated by potaſh, and the oxyd collected and dried. The ſubnitrat of this metal firſt ſeparated muſt be boiled with potaſh, to ſeparate the nitric acid. This oxyd, being waſhed and dried, may be added to the other. For every 100 of this oxyd, allow 90 of the metal. The muriat of ſilver contains, in the 100, 77.77 of the metal.

A ſpecimen of the native amalgam of ſilver and mercury, analyſed by Klaproth, gave 64 mercury and 36 ſilver in the 100.

Should any gold be preſent, it will be left undiſſolved when the reſidual metals are taken up by the nitric acid.

Native cinnabar may be analyſed by diſſolving it in nitro-muriatic acid. The mercury will be diſſolved in the ſtate of oxymuriat of mercury, while the ſulphur will be ſeparated. If much heat be employed, ſome of the ſulphur will be converted into ſulphuric acid, and ſome of the mercury, in conſequenee, will be thrown down in the ſtate of ſulphat: the ſolution, therefore, muſt be made in the cold.

The ſulphur being ſeparated, waſhed, and dried, may be weighed.

The mercury may be ſeparated in the metallic form by a clean piece of iron. This is almoſt the only inſtance in which a metal is precipitated by another in a ſtate of purity, ſince iron does not in any degree combine with mercury. The mercury may alſo be thrown down by the green ſulphat of iron. This ore, according to Klaproth, conſiſts of 84.5 mercury, and 14.75 ſulphur. The hepatic ore may be analyſed by a proceſs ſimilar to the laſt. This, however, is apt to abound with other ſubſtances beſides ſulphur and mercury. A ſpecimen from Idria was analyſed by Klaproth, and the reſult is given under the article *Ores* of Mercury, ſupra.

The native muriat of mercury conſiſts of a mixture of ſulphuric and muriatic combined with the oxyd of mercury. This ore muſt be reduced to a fine powder, and mixed with twenty-four parts of water; oxymuriatic gas muſt then be paſſed through it for a length of time, till the whole of the powder be diſſolved. The ſulphuric acid may be precipitated by muriat of barytes. The mercury may be precipitated from the muriatic acid by a bright piece of iron.

The ſulphat by this proceſs becomes oxyſulphat of mercury. In the ore it may be conſidered as the ſulphat: for every 100, therefore, of ſulphat of barytes precipitated, allow 211.76 of ſulphat of mercury in the ore. The reſt may be conſidered muriat of mercury. For 100 of mercury allow 4 of oxygen, and 11.2 muriatic acid.

For the aſſay of mercurial ores in the dry way, let the ſpecimen be pulverized, and accurately mixed with one-fourth its weight of quicklime, and an equal portion of iron filings, and then let it be pretty ſtrongly ignited in an iron or earthen retort, as long as any mercury comes over into the receiver.

The modes of extracting the metal from the ores of mercury are very ſimple. Meſſrs. Aikin, in their valuable Dictionary of Chemiſtry and Mineralogy, have given an account of the proceſs for this purpoſe at the mines of Deuxponts and of Idria, and alſo at Almaden in Spain. The former is the beſt and moſt ſcientific, and it is as follows: when the ore is brought out of the mine it is accurately ſorted, thoſe pieces being rejected which appear to be deſtitute of metal. The ſorted ore, being pulverized, is mingled with one-fifth, more or leſs, according to the proportion of cinnabar contained in the ore, of quicklime powdered by expoſure to the air. This mixture is then put into iron retorts, about forty or fifty in number, capable of holding about 60lbs. weight, which, thus charged, are fixed in a long furnace; a glaſs receiver is then attached to each retort, but not luted, and a gentle fire is applied in order to expel all the moiſture: when this is effected, the juncture of the veſſels is cloſely ſtopped with tempered clay, and a full red heat is applied for ſeven or eight hours, at the expiration of which time all the mercury will have been volatilized and condenſed in the receiver. The common produce varies between ſix and ten ounces of metal from 100lbs. of the ore.

The proceſs at Almaden is more rude and inartificial: it is deſcribed by Meſſrs. Aikin (*ubi ſupra*); and to their account of it the reader, deſirous of further information, is referred.

The conveyance of mercury from place to place requires, on account of its fluidity, extraordinary precautions. It is packed in the following manner. A freſh found ſheep-ſkin, the hair of which has been taken off, is laid over a wooden bowl, and a quantity, from 50lbs. to 75lbs. of mercury is poured into it: the ends of the ſkin are then gathered up, and tied together with great care, thus forming a ſort of bag in which the metal is incloſed: this bag is incloſed in a ſecond ſkin, and the ſecond in a third; and, laſtly, theſe bags are put into very tight barrels, capable of holding from two to four of them, and in this ſtate are brought into the market.

Chemical and Phyſical Properties of Mercury.—It is a white

white metal reſembling tin. Its ſpecific gravity is 13.568. It is liquid at the greateſt cold of this climate, but becomes ſolid at $-39°$, or $71°$ below the freezing point of water. It has frequently been reduced to the ſolid form in this country by the aid of freezing mixtures, and lately, by Mr. Leſley, in the vacuum of the air-pump. In this ſtate it poſſeſſes ſome of the characters of tin, as far as regards its appearance and malleability. It is ſaid to undergo a rapid decreaſe of volume immediately before congelation, a property the reverſe of what is obſerved in the freezing of water; and in the congelation of all bodies, the liquids of which are of greater ſpecific gravity than their ſolids, will it not be found that ſolid mercury is of greater ſpecific gravity than the liquid? The boiling point of mercury, or the temperature at which it aſſumes the elaſtic form, is 650°, or, as ſome ſay, 660°; ſo that the number of degrees between its freezing and boiling points is 689°, or 699°. This property admits of its being diſtilled, which furniſhes a ſimple method of ſeparating it from ſubſtances which are not volatile. Hence we may conclude, that if our natural temperature were more than 650°, mercury would be preſented to us in the form of a permanently elaſtic fluid: while, in a temperature leſs than $-39°$, it would be a ſolid malleable metal.

Mercury does not decompoſe water at any temperature, and hence it may be kept under that fluid without undergoing any change.

When expoſed to the air it ſoon tarniſhes, and becomes covered with a dark grey powder. If it be agitated with the fingers for a ſhort time, they become ſoiled with the ſame powder. This ſubſtance is produced by the mercury combining with the oxygen of the atmoſphere. It may be formed in greater quantity by a ſtronger agitation in contact with oxygen. This has been effected by putting a ſmall quantity of mercury into a large bottle, and tying it to the ſpoke of a coach-wheel. The change of ſurface, from the motion of the wheel, induces the rapid oxydation of the mercury. The oxyd ſo obtained is the firſt or protoxyd of mercury, and was called by the old chemiſts *Ethiops per ſe*. If, according to Dalton, the atom of mercury be 167, hydrogen being 1, and oxygen 7, the protoxyd will be $\frac{167 \times 7}{7} = \frac{100}{4}$, or four *per cent*. This is exactly what Fourcroy makes it by experiment. In taking a general view of the combinations of mercury with other bodies, it would appear that Mr. Dalton has rated the atom of mercury too high. The analyſis of the ſulphuret appears to be the moſt perfect. It may with much confidence be admitted, that 85 of mercury combines with 15 of ſulphur for the ſecond ſulphuret. Hence we ſhall have $\frac{15}{85} = \frac{26}{147\frac{1}{3}}$. We ſhall find, therefore, in treating of the other compounds, that it will be nearer the truth, to call the atom of mercury 147. This number will give the protoxyd 4.5 *per cent*. When mercury is diſſolved in nitric acid with a boiling heat, and the oxyd precipitated by lime water, the precipitate will be formed of a yellow colour. This is in all probability the ſecond oxyd, which ſhould be conſtituted as follows: $\frac{147 + 14}{14} = \frac{100}{8.7}$, or 8.7 oxygen, and 81.3 mercury. Chenevix makes it 10.7. It is likely, however, that as he expelled the acid by heat, the oxyd might abſorb more oxygen, or the acid might not be all driven off.

The third oxyd of mercury may be formed by expoſing the metal or the protoxyd in ſmall quantity in a large glaſs matraſs, the neck being drawn out to a ſmall point. When the mercury is heated in this veſſel to a boiling heat, 650°, the ſmallneſs of the aperture does not admit of its eſcape in vapour, while it is completely expoſed to the oxygen of the atmoſpheric air. By this means the mercury becomes converted into a red powder, which is the third oxyd. The ſame may alſo be procured by adding lime-water to a ſolution of the oxymuriat of mercury (corroſive ſublimate), when a beautiful red powder is precipitated, which is the oxyd in queſtion. The proportions will be $\frac{147 + 21}{21} = \frac{100}{12.5}$ or 87.5 mercury, and 12.5 oxygen.

This oxyd is of a beautiful red colour: it poſſeſſes ſome of the qualities of an acid, inaſmuch as it has a decided taſte, is corroſive to the ſkin, and when heated with the filings of tin or zinc, it cauſes them to inflame by yielding with facility its oxygen to them. Chenevix makes the proportions to be 85 mercury and 15 of oxygen, but for the reaſons given in the ſecond oxyd it is, doubtleſs, rated too high.

Mercury does not combine with carbon, hydrogen, or nitrogen, but it combines with ſulphur and phoſphorus.

When two parts of ſulphur and one of mercury are rubbed together in a mortar, the mercury combines with a portion of ſulphur. The whole maſs appears of a black colour, and conſiſts of the ſulphuret of mercury mixed with an exceſs of ſulphur. This ſubſtance was formerly called *Ethiops mineral*. If this maſs be expoſed to a heat ſufficient to ſublime the ſulphur, the exceſs of the latter ſubſtance eſcapes, leaving behind a ſubſtance of a deep violet colour. If this heat be continued the ſulphuret is ſublimed, which, if collected by a proper veſſel, will form a red cake, which, when reduced to powder and waſhed, conſtitutes the factitious cinnabar, known in the arts by the name of *Vermilion*. There appears to be two ſulphurets of mercury, *viz.* cinnabar, and one containing leſs ſulphur. The firſt will conſiſt of 8 of ſulphur and 92 of mercury, for $\frac{147 + 13}{13} = \frac{100}{7.1}$. The ſecond ſulphuret conſiſts of 15 ſulphur and 85 mercury, from what has been before ſtated. The ſecond ſulphuret of mercury has a beautiful ſcarlet colour, for which it is eſteemed in the arts as a pigment: it does not diſſolve in water and is perfectly taſteleſs. It does not change on expoſure to the air. When expoſed to a ſtrong heat the ſulphur combines with oxygen, and burns with a blue flame. Iron has a ſtronger attraction for ſulphur than mercury. Hence, if the red ſulphuret be mixed with iron filings and introduced into a retort, the iron combines with the ſulphur, and if the heat be ſufficiently raiſed, the mercury comes over in a ſtate of tolerable purity. This method is employed in the large way to ſeparate mercury from native cinnabar.

A method of preparing artificial cinnabar has been diſcovered by Mr. Kirchoff. To 300 grains of mercury add 68 grains of ſulphur, which being moiſtened with a ſolution of potaſh, muſt be rubbed together in a mortar which is not of metal. By this means the ethiops mineral is produced. To this ſubſtance 160 grains of potaſh, diſſolved in its own weight of water, muſt be added. Let the maſs now be transferred into a porcelain diſh and heated over a chemical lamp, adding water from time to time to ſupply the loſs by evaporation, in order to keep the ſolid ingredients covered.

covered. During this process it should be constantly triturated with a glass pistil. At the end of two hours the colour will begin to change from black to brown, and soon passes through different shades to a red. As the mass assumes the form of jelly, the red colour increases in brightness, and soon acquires its maximum of tint, at which time it will be proper to withdraw the heat, otherwise the colour declines to a dirty brown. It is recommended, that after it has acquired a tolerable good colour, it should be exposed for a few days to a low and uniform temperature, by which means the colour gradually improves and ultimately becomes exquisite. If the cinnabar thus obtained be exposed to a strong heat, it becomes brown and ultimately of a violet colour. It is highly probable, that this violet-coloured sulphuret is the first sulphuret produced from the second, from some of the sulphur being volatilized.

Phosphorus does not easily combine with mercury. Pelletier, however, succeeded in uniting these bodies by distilling a mixture of red oxyd of mercury and phosphorus. He observed that the red oxyd assumed a black colour before it combined with the phosphorus. Dr. Thomson, partly from this fact and from his own experience, is of opinion, that it is not the metal which unites with the phosphorus, but the black oxyd. In reasoning from analogy we might be apt to doubt this fact. We know that when sulphur is heated with an oxyd of mercury, the oxygen of the latter combines with a portion of sulphur, and is carried off in the state of sulphurous acid gas. Then since phosphorus has a stronger attraction for oxygen than sulphur, it would seem likely that the mercury would be reduced to its metallic form before it combined with the phosphorus. This, however, is not a fair conclusion, since none of the compounds of phosphorus are volatile. The circumstance of sulphurous acid being elastic, is doubtless a strong reason why the metals in the metallic sulphurets are generally free from oxygen.

The phosphuret above alluded to is a solid of a black colour: its consistency is such as to be cut with a knife. When exposed to the air it exhales a vapour smelling like phosphorus.

Mercury combines with most of the metals forming alloys, which have been called amalgams. Many of these compounds are of great use in the arts.

Gold unites with mercury with such facility, that if a piece of pure gold be singly dipped into it, it comes out completely covered with mercury. When the gold is divided into small grains and heated red-hot, the mercury being heated near to its boiling point, the gold almost instantly dissolves. A considerable proportion of gold may be added in this way without materially altering its liquidity. If, however, this liquid amalgam be squeezed through sheep's leather, an alloy will be obtained of almost any degree of consistence. The amalgam of gold used for gilding is about the consistency of paste. The substance to be gilt, which is copper, brass, or silver, is first covered with mercury, in order to form a medium for covering the surface with the amalgam. When the surface of silver is clean, the mercury combines with it with great facility. Copper or brass do not take the mercury by the same mode of application. A dilute nitric acid is added to the mercury, by which a portion of the metal is dissolved. If a small quantity of this solution be applied to the brass or copper surface, the mercury becomes precipitated upon it, and is instantly made fit to receive the amalgam. A small quantity of the amalgam, more or less, according to the thickness of the gilding required, is laid upon the quicksilvered surface, and uniformly spread about with a brush. The substance is then held over a clean coke or charcoal fire, and thus alternately heated and brushed till all the mercury is evaporated, leaving the gold firmly and uniformly adhering to the surface.

Mercury does not combine easily with platina in masses. If, however, the precipitate from nitromuriatic acid by muriat of ammonia be exposed to a strong heat, the acid and oxygen are expelled, leaving pure platina in a state of minute division. If the mercury be mixed with this powder and heat applied, an alloy will be formed, from which an amalgam of any degree of consistence may be obtained by squeezing through leather. This amalgam may be employed for coating metals, such as silver, brass, and copper. The metallic precipitate of platina above-mentioned, might be obtained at little expence, probably not more than the price of silver. Vessels of copper might, therefore, be covered with platina without much increasing their intrinsic value.

We hope, therefore, that artists in this line will take the hint. Even if no other end should be gained than preventing the deleterious effects of copper, the object is worth attention.

Silver easily amalgamates with mercury. When the proportion is eight of mercury to one of silver, the mass is capable of assuming a crystalline form. The specific gravity of this compound is greater than an arithmetical mean, a proof of considerable affinity between the two metals. This amalgam, like the two last, may be employed to coat copper and brass with silver.

Copper is capable of combining with mercury. The alloy, however, is not of any use, and has been little examined.

Mercury does not combine with iron. This circumstance presents many advantages. Iron vessels are well calculated for conveying mercury from place to place, and iron retorts are well fitted for distilling that substance. There are some disadvantages in mercury not uniting with iron. If the surface of iron could be covered with mercury like copper, &c. it might be gilt with as much facility as those metals. Although it is generally considered as incapable of uniting with mercury, it is stated in Crell's Journal, that Mr. Vogel has succeeded by the following process. Take half an ounce of iron-filings and one ounce of alum, and rub them together to a very fine powder; add to this from an ounce to an ounce and a half of mercury, and triturate till the amalgam begins to be formed; then pour in a little water, and continue the agitation for an hour: the alum is now to be dissolved out and the amalgam of iron will remain behind.

Tin combines easily with mercury. It is this alloy which constitutes the silvering of glass reflectors. A piece of tinfoil is first cut to the size of the glass plate to be silvered. This sheet is spread upon a smooth and perfectly flat stone, at first truly horizontal, but capable of being placed in an inclined position. The sheet of tinfoil is then covered with mercury, till the whole of the surface appears perfectly bright and liquid. The plate of glass, perfectly clean, is then laid upon the tinfoil. A number of weights are also laid upon the glass-plate, and the stone put into an inclined position by a lever, and held in that situation by temporary props. By this means the excess of mercury is squeezed out, and runs off by a groove in the edge of the stone. As much mercury is left with the tinfoil as will form a tolerably hard alloy.

Mercury unites with zinc in any proportion. This alloy is employed in a friable state for the purpose of laying on the

the cushions of electric machines, which much increases their exciting power.

It is also employed in the process called *similoring*. An amalgam of the consistency of that used for gilding is applied, in a manner similar to the gilding amalgam, to the surface of copper. The mercury evaporates by heat, leaving the zinc behind. The latter, however, does not appear in its pure state, but combines a portion of copper, and by that means produces a fine yellow surface, little inferior to gold, but in fact it is nothing more than brass formed by the union of the copper with the zinc. This process is employed by the button-makers. Some sorts of buttons are first covered all over with this yellow coating. The upper surface of the button is afterwards really gilt.

Mercury is readily alloyed with lead, bismuth, and antimony: the second of these is frequently used to adulterate mercury. It may contain a considerable portion of bismuth without sensibly losing its liquidity.

Salts of Mercury.—The salts of mercury are generally distinguished by their nauseous taste. Those that constitute the greatest part are insoluble in water. They form several varieties from the oxyd of mercury, assuming different states of oxydation, and also from their aptness to exist in the state of sub and super-salts.

Sulphat of Mercury.—Sulphuric acid does not act upon mercury without the assistance of heat. The acid is then partly decomposed. An atom of oxygen is separated, which combines with the mercury. The acid flies off in the state of sulphurous acid. Indeed this is the best way of getting this gaseous acid in a state of purity. The oxyd of mercury unites with another portion of the acid, forming the sulphat of mercury which separates in the form of white powder. In this experiment the sulphuric acid should not be in excess, since in that case the super-sulphat of mercury would be obtained. This salt dissolves in 500 parts of water at 60°, and in 287 at 212°. On evaporation it affords small prismatic crystals. It is not changed by exposure to the air, but is decomposable by heat. According to the analysis of Fourcroy, it is composed of 12 acid, 83 of the second oxyd of mercury, and 5 water. If we consider the atom of mercury 147, oxygen 7, and sulphuric acid 34, the atom of the second oxyd will be $147 + 2 \times 7 = 161$: then for the sulphat we have $\frac{161 + 34}{34} = \frac{100}{17.4}$, or 17.4 acid, and 82.6 of the second oxyd of mercury.

Super-sulphat of Mercury.—When an excess of sulphuric acid is boiled upon mercury, the oxyd combines with two atoms of acid, constituting the super-sulphat of mercury. It has a disagreeable acrid taste. It is not changed by exposure to the air. It changes vegetable blues to red. Fourcroy says that when the acid amounts to $\frac{1}{12}$th of its weight, it is soluble in 157 of cold, and 33 of boiling water, and observes that it is differently soluble with different proportions of acid. This is the first instance in which we have heard of the acid of a salt being so unlimited, and we cannot help doubting the accuracy of the above fact. In all the instances in which super-salts have been analysed, they have been found to contain a double dose of acid. Considering it therefore as such, we have $\frac{161 + 2 \times 34}{2 \times 34} = \frac{100}{29.7}$, or 29.7 acid, and 70.3 base.

Super-oxysulphat of Mercury.—This salt is described by Dr. Thomson as the oxysulphat, but the proportion of acid given by the analysis of Messrs. Braumcamp and Sigueira-Oliva, shews it to be a super-salt. When mercury is boiled with an excess of acid, and the heat continued longer than in the formation of the last salts, some of the excess is decomposed, giving another atom of oxygen to the mercury, while sulphurous acid gas is disengaged. The oxyd, therefore, combines with an excess of oxygen, and then this oxyd combines with an excess of acid, which constitutes the super-oxysulphat. This salt is sparingly soluble in water, and affords small crystals of the shape of prisms.

According to the chemists above-named, it is composed of 31.8 acid, and 63.8 peroxyd, and 4.4 water. According to hypothesis it will consist as follows: $\frac{168 + 68}{78} = \frac{100}{28.9}$, which gives 28.9 acid, and 71.1 peroxyd.

Oxysulphat of Mercury.—The salt which has been called *Turbith mineral*, has been supposed to be a sub-oxysulphat of mercury. If, however, we can depend upon the analysis of Braumcamp and Sigueira-Oliva, we can only consider it an oxysulphat. It is in the state of a yellow powder, and was formerly much used in medicine. It has, however, been laid aside on account of its extreme severity of operation. According to the above chemists it is composed of 15 acid, 84.7 peroxyd, and 0.3 water. If we consider it as a sulphat, we shall have $\frac{168 + 34}{34} = \frac{100}{16.8}$, which gives 16.8 acid, and 83.2 of the peroxyd. If such a salt exists as the sub-oxysulphat, it will be found to consist of 9.2 acid, and 90.8 peroxyd; for $\frac{168 \times 2 + 34}{34} = \frac{100}{9.2}$. It does not appear likely that such a mistake could be made in an analysis. The difference between the sub and the neutral salt is nearly six *per cent* of acid. It may, therefore, with some confidence be concluded, that *Turbith mineral* is the oxysulphat of mercury, and not a sub-salt, as has been supposed.

Nitrat of Mercury.—When nitric acid of a mean strength is poured upon mercury, a brisk effervescence ensues, induced by the disengagement of nitrous gas. When the acid is much diluted, and the mixture kept cool by placing the vessel in a large mass of cold water, the solution goes on very slowly. By this means every atom of mercury decomposes an atom of nitric acid, taking an atom of oxygen, by which an atom of nitrous gas is evolved. The atom of oxyd so found unites with two atoms more of nitric acid, forming the salt in question. It will be proper to observe here, that there is a seeming anomaly as well in this as in most of the soluble nitrats, and in a great number of carbonats. Although we call them indiscriminately nitrats and carbonats, they are, strictly speaking, super-nitrats and super-carbonats. We may almost generally conclude, that those salts which have been called nitrats are super-nitrats; while those which have been denominated sub-nitrats will prove, on analysis, to be nitrats simply. We cannot, however, at present make this distinction without some further experiments.

When the above solution is carried to a certain extent, or the dilute solution evaporated, the salt very easily affords

crystals,

cryſtals, which are in the form of four-ſided pyramids, baſe to baſe.

When ſulphuretted hydrogen is paſſed through a ſolution of nitrat of mercury, the hydrogen combines with the oxygen of the mercury, forming water, while the ſulphur combines with the mercury, and falls down in the form of ſulphuret.

A ſolution of muriat of tin added to this ſalt precipitates the mercury by combining with its oxygen. The cryſtals of nitrat of mercury detonate upon burning coals, and explode with phoſphorus by the blow of a hammer. No analyſis of this ſalt has been given by chemiſts, but from the weight of its conſtituent atoms it will be as follows: $\frac{147 + 7 + 2 \times 19}{2 \times 19} = \frac{100}{19.3}$; which gives 19.3 of acid, and 80.7 of the protoxyd.

Oxynitrat of Mercury.—When mercury is diſſolved in nitric acid with the aſſiſtance of heat, an atom of mercury decompoſes two atoms of the acid, while two other atoms of acid unite with the oxyd ſo formed, conſtituting what is called the oxynitrat, but which is in fact a ſuper-oxynitrat. If this action goes on with a little water the ſalt ſoon forms into a yellow cryſtalline maſs, which ſhews a marked difference in the character of the two ſalts, ariſing from the baſe of this ſalt having a larger proportion of oxygen. If water be added in conſiderable quantity to the ſolution of this ſalt, a portion of it loſes one atom of acid, and is converted into a yellowiſh powder, which falls to the bottom of the veſſel. This has been improperly called a ſub-oxynitrat. From the analyſis it appears to be a nitrat.

On paſſing ſulphuretted hydrogen gas through a ſolution of the oxynitrat, it becomes reduced to the nitrat, and is ſaid, by Zaboada, to combine with ſulphur. It is more likely, however, that the ſulphur would be converted into ſulphuric acid, and that the precipitate is a ſulphat of mercury. When muriat of tin is added to a ſolution of this ſalt, inſtead of reducing it to the metallic form, which is the caſe with the nitrat, it reduces it merely to the ſtate of the protoxyd, which combines with the muriatic acid to form muriat of mercury. Its components will be known from the following analogy: $\frac{161 + 38}{38} = \frac{100}{19.1}$, which gives 19.1 of acid, and 80.9 of the ſecond oxyd.

The ſalt which has been called ſub-oxynitrat, but which from its analyſis muſt be the oxynitrat, was formerly called *nitrous turbith*, from its reſemblance to the ſulphat. It has been analyſed by Meſſrs. Braumcamp and Sigueira-Oliva, who make it to conſiſt of 12 acid, and 88 ſecond oxyd.

By treating this ſalt as the oxynitrat ſimply, we ſhall ſee that the proportions by hypotheſis agree nearly with the above analyſis: for $\frac{161 + 19}{19} = \frac{100}{10.5}$, or 10.5 acid, and 89.5 of the ſecond oxyd.

Beſides the oxynitrat already deſcribed, which contains the ſecond oxyd, a ſalt may be formed with the third oxyd, ſo that we have three ſalts formed with the three oxyds; namely, the nitrat, the oxynitrat, and, for the ſake of diſtinction, the laſt might be called the hyper-oxynitrat. This laſt ſalt cannot be formed by boiling the nitric acid with mercury, but by directly diſſolving the third oxyd in nitric acid. Muriat of ſoda cauſes no precipitation from a ſolution of this ſalt, ſince the oxyd is at a maximum of oxydation, and is all employed in forming the ſuper-oxymuriat.

Muriat of Mercury.—Muriatic acid has no action upon mercury, but readily combines with its oxyds, forming with the firſt a muriat of mercury, and with the third or peroxyd an oxymuriat, or rather, as we ſhall ſhew, a ſuper-oxymuriat. The old method of making the muriat was by triturating four parts of the oxymuriat with three parts of metallic mercury, till the latter totally diſappeared. By this proceſs the peroxyd in the oxymuriat gives up as much oxygen to the metal as makes the whole into the protoxyd, which, with the exceſs of acid in the oxymuriat, forms the whole into a ſimple muriat. The maſs ſo produced is put into a matraſs capable of holding about four times the quantity of matter which is put into it. This being ſet in a ſand bath, and the heat raiſed, the muriat of mercury ſublimes into the upper part of the matraſs. The veſſel is now broken, and the ſublimed matter carefully ſelected. This, however, is frequently mixed with a little of the oxymuriat, which is to be ſeparated by repeated ſublimations, or by waſhing in water, the oxymuriat being ſoluble while the muriat is not ſo. It would appear that this method was invented long before the component parts of the ſalts were known. The metallic mercury added to the oxymuriat is much too little. If we conſider the oxyd in the muriat as being the protoxyd, the metal ought to be to the oxymuriat as 294 to 212. If the running mercury were leſs there would be an exceſs of oxymuriat. This experiment is very important in ſhewing that the oxyd of mercury in the muriat is the protoxyd. If it were the ſecond oxyd, 212 parts of the oxymuriat ought only to take up 73.5 of running mercury. The above proceſs, however, ſhews that 212 of the oxymuriat takes up 159 of mercury, and ſtill ſome of the oxyſalt is found in exceſs after ſublimation. Although in this proceſs 212 parts of the oxymuriat, by trituration with 294 of mercury, would form 462 of the protoxyd; the acid in the oxymuriat will not be ſufficient to form the whole into a muriat. The acid in 212 parts of the oxymuriat is 44, which will combine with 308 of the protoxyd, to form 352 of the muriat. This quantity ought to be ſublimed, leaving behind 154 of the protoxyd. If, inſtead of employing 212 of the oxymuriat to 294 of mercury, we make their proportions as 212 to 192, we ſhould get 352 parts of the muriat, as before; but the reſiduum will conſiſt of 52 parts of the peroxyd. The Edinburgh form for calomel, or muriat of mercury, is four parts of corroſive ſublimate (oxymuriat of mercury) to 3.5 of running mercury.

In the above proportions of 212 to 192, in which the reſiduum is 52 of peroxyd, the proportions reduced to their loweſt terms, are 4 to 3.6; for $\frac{212}{192} = \frac{4}{3.6}$. If, however, this proceſs were carried on with the greateſt economy, 212 parts of the oxymuriat ſhould be triturated with 294 of mercury, and 22 of real muriatic acid. The whole of the matter will, in this caſe, be ſublimed in the ſtate of muriat, which will be 528 parts, while in the common way only 352 of this ſalt is obtained.

Muriat of mercury may be formed in the humid way with much more convenience, and probably cheaper. This proceſs was firſt propoſed by Scheele. He diſſolved the mercury in nitric acid, with heat, and then added to the ſolution a ſolution of muriat of ſoda. A precipitate was formed, which, when well waſhed with hot water, was the muriat of mercury, which has been called by the names of *calomel* and *mercurius dulcis*.

This proceſs has been much improved by diſſolving the mercury in a dilute nitric acid, without heat. In Scheele's proceſs

process the mercury was converted into the second oxyd, which, when the muriat of soda was added, about three-fourths of the muriat were formed, and one-fourth of oxymuriat of mercury. By dissolving the mercury slowly, nothing but the protoxyd is formed, and not the least proportion of oxymuriat will be left in the solution, after the muriat is precipitated.

The oxyd of mercury in the muriat, as we have before shewn, is the protoxyd, that of oxymuriat being the peroxyd; but the oxyd of the oxynitrat is, in all probability, the second oxyd. It will appear, therefore, from theory, and experience confirms it, that one part of the second oxyd in the nitrat gives up an atom of oxygen to the other part, and thus dividing the resulting salts into muriat and oxymuriat, the former being precipitated, while the latter remains dissolved in the liquid. This idea is strongly confirmed by experiment. If lime-water be added to the oxynitrat a yellow oxyd is precipitated, which is the second oxyd. If lime-water be added to the muriat precipitated from the oxynitrat, the black or first oxyd is obtained; but if the same be added to the liquor from whence the muriat has been precipitated, the red or third oxyd will fall down. If the mercury be dissolved in dilute nitric acid in the cold, the simple nitrat will always be formed, in which the oxyd is a protoxyd. The whole of this oxyd will combine with the muriat, when the muriat of soda is added to form the muriat of mercury. This is by far the most simple and safe process for making calomel. If the mercury be dissolved with heat, the oxyd of the nitrat will be the second oxyd, which constitutes the oxynitrat. When muriat of soda is added to this, one-half of the mercury combines with an extra atom of oxygen, at the same time the other loses an atom, reducing one-half to the protoxyd, and the other to the peroxyd; the former combines with the muriatic acid to form muriat of mercury, the other combines with another portion of acid to form the oxymuriat. This latter salt is then divided into a super and a salt, the former remaining in solution, the latter falling down with the muriat. Hence it will appear, that when the oxynitrat is used, we do not obtain a pure muriat. An improved method of subliming calomel has been invented, which may be considered a valuable discovery. Instead of subliming it into a cake, as in the old way, it is sublimed into water. By this means the salt is completely freed from any soluble matter. The muriat of mercury, when pure, is in the state of white powder. It is nearly insoluble in water, requiring 1152 parts of boiling water to dissolve 1 of this salt. By exposure to the air it becomes of a deeper colour. It sublimes at a heat less than that required to sublime the oxymuriat. Hence it happens, that the latter salt is always attached to the under side of the sublimed cake of the former, when the two salts are sublimed together. This affords the means of their separation, by detaching the oxymuriat and subliming again. When the muriat is mixed with water, and oxymuriatic gas passes through it, it is converted into oxymuriat of mercury. Nitric acid dissolves it with the disengagement of nitrous gas. The result becomes a mixture of oxymuriat and oxynitrat. The last fact furnishes an easy method of analysing the salt, and has been taken advantage of by Chenevix and Zaboada. When it is dissolved in nitric acid, nitrat of silver precipitates the muriatic acid. The former chemist by this means found 100 parts of the salt or calomel to consist of 11.5 parts of muriatic acid, and 88.5 protoxyd, or 79 of mercury, and 9.5 of oxygen. The latter chemist, from 100 grains of the salt, obtained 10.6 of acid; he then precipitated the mercury with muriat of tin, which amounted to 85 grains: the rest was oxygen, which was 5 *per cent.*, very nearly agreeing with that above given, which was 4.5 *per cent.* By the latter, therefore, we have 10.5 muriatic acid, and 89.5 of protoxyd of mercury. By hypothesis $\frac{147 + 7 + 22}{22} = \frac{100}{12.5}$. This gives 12.5 muriatic acid, and 87.5 of protoxyd.

Calomel nine times sublimed forms what some have called the "Mercurial Panacea."

Oxymuriat of Mercury.—This salt is generally known by the name of *corrosive sublimate.* It has long been known for its dreadful effects on the animal system when taken on the stomach in too large a quantity, and as a medicine in moderate doses. It was understood by the alchemists, and has been tolerably well described by Albertus Magnus.

A great variety of processes has been invented for preparing it, most of which are complicated and uncertain. We shall, therefore, give the direct method only, which is simple and economical.

We have seen in the formation of the muriat of mercury, by triturating it with running mercury, that if the oxymuriat had not an extra dose of acid, as well as an extra dose of oxygen, the proportion of acid in the oxymuriat ought to be less than that in the muriat, because no addition of acid is employed with the running mercury. We must consider the salt in question, therefore, not as the oxymuriat of mercury, but the super-oxymuriat. It was some time ago assumed by Gay Lussac, as a principle, that in all salts in which the bases combined with an extra dose of oxygen, the acid was increased in a proportionate degree. The present salt and some others seem to countenance such an opinion, but the principle is far from being general. We have many instances of super-salts without an increase of oxygen in the base. There are also oxy-salts without an increase of acid. In the oxysulphats of mercury above treated, one of them has merely an excess of oxygen in the base of the salt. The other has both an excess of oxygen and an excess of acid, the first being a sulphat, and the second a super-oxysulphat. The oxysulphat of iron has no extra dose of acid; since the nitric acid alone, when too great a heat is not applied, is sufficient to convert the green sulphat into the red or oxysulphat. This salt, however, is frequently resolved into two distinct salts, *viz.* the super-oxysulphat and a sub-salt, a proof that an excess of base is as common to the oxy-salts as an excess of acid. The oxymuriat of mercury may be prepared by directly adding muriatic acid to the red or peroxyd of mercury. The solution affords crystals by evaporation. It may also be formed by passing oxymuriatic gas through a solution of the nitrat of mercury, or through a mixture of water with any of the oxyds of mercury, and then evaporating the solution to obtain the salt in crystals. In making the muriat by adding muriat of soda to the solution of oxynitrat of mercury, it has been shewn that the second oxyd is divided into the protoxyd and the peroxyd, the former combining with one atom of acid, forming the muriat, which falls down; the other portion combining with two atoms of acid, forming the salt in question, and remaining dissolved in the liquid. It would appear that this latter salt could not be formed if an excess of muriatic acid were not present, in order to give to the oxymuriat its double dose of acid. The solution of mercury in the nitric acid has generally an excess of acid, which disengages muriatic acid from the muriat of soda, to make up for this demand. It would be worth while to make the experiment with a saturated solution of nitrat of mercury, and with a neutral solution of muriat of soda. Would an oxymuriat of mercury, strictly speaking, be formed? Or would this salt be resolved into a sub-oxymuriat of mercury, and a super-oxymuriat? Experiment must decide

cide

cide this point. The oxymuriat of mercury has generally been employed in medicine and the arts in the ſtate after ſublimation. It is then a white ſemitranſparent maſs in needle-formed priſmatic cryſtals. Its aggregation is very great, on which account it is ſcarcely ſoluble in cold water. If, however, it be rubbed in a mortar with boiling water, it diſſolves nearly $\frac{1}{3}$d of its weight. When cold, however, it does not retain more than $\frac{1}{19}$th. The oxymuriat, therefore, made by ſublimation, ſhould not be attempted to be diſſolved in cold water, becauſe of its great aggregation.

When this ſalt is formed by evaporation, or when its cryſtals are formed in the humid way, it is more to be depended upon. Theſe cryſtals will immediately diſſolve in three or four parts of boiling water, and in about 20 of cold water. The form of the humid cryſtals is that of quadrangular priſms, rather rhomboidal. An analyſis of this ſalt has been made by Chenevix, by Zaboada, and by Meſſrs. Braumcamp and Sigueira Oliva. The firſt makes it

18	Muriatic acid
82	Peroxyd, *i. e.* 69.7 mercury, and 12.3 oxygen.
100	

The ſecond	19.5	Acid
	80.5	Peroxyd
	100	

The latter	18.8	Acid
	81.2	Peroxyd
	100	

We ſhall ſee from the following calculation, that this ſalt is ſuper-oxymuriat of mercury; the acid 2×22, the oxygen 3×7, and the mercury 147; $\frac{147 + 21 + 44}{44} = \frac{100}{20.7}$, which gives 20.7 acid, and 79.3 of peroxyd.

The neutral oxyſulphat would be $\frac{147 + 21 + 22}{22} = \frac{100}{11.6}$, or 11.6 acid, and 88.4 of peroxyd; ſo that the near agreement in the above analyſis, and their great difference from this laſt ſtate, leave no doubt of the ſalt in queſtion being a ſuper-ſalt.

It is frequently a matter of much importance to be able to detect the preſence of this ſalt, particularly when it has been adminiſtered as a poiſon. The life of an individual ſometimes depends upon the reſult of a chemical teſt, many of which are very ambiguous. How very neceſſary, therefore, it is to be able to detect the preſence of very ſmall portions of this ſubſtance by ſome method which will be ſo ſimple and certain as to be uſed by any individual. We ſhall here give the common methods which have been recommended by different chemiſts.

If the fluid containing the corroſive ſublimate be colourleſs and clear, ſuch as water, ſulphuretted hydrogen gas paſſed through the fluid will change it to firſt a yellow colour, which gets deeper, and if the quantity of ſublimate be conſiderable, it will become black. This gas may be obtained as follows. Heat a bar of iron to a bright red, and rub the heated part with a roll of ſulphur. A ſulphuret of iron will be formed, which will fall off in drops. Let this ſubſtance be put into a common phial, to which a cork muſt be fitted, through which is paſſed a bended glaſs tube. Then to one part of the ſulphuret of iron add one of ſulphuric acid, and five of water. Inſert the cork with its tube as quick as poſſible, and let the gas which eſcapes paſs through the fluid ſuppoſed to contain the ſublimate, which, if that ſubſtance be preſent, will change colour in a few minutes. It muſt be obſerved, that the ſame gas would give a yellow colour if the fluid contained arſenic. The latter, however, is more of a golden yellow, and remains permanent, while the former changes to a dark brown. Pure potaſh or lime water is an excellent teſt for the oxymuriat of mercury. When ſolutions of the above ſubſtances are dropped into a fluid containing the ſmalleſt portion of corroſive ſublimate, the potaſh produces a bright orange coloured precipitate, which is the peroxyd of mercury. The lime water produces a ſimilar precipitate, but rather more inclining to a brick-red colour.

A very ſenſible teſt for corroſive ſublimate was ſome time ago propoſed by Dr. Boſtock of Liverpool, which was the muriat of tin. When a few drops of a ſolution of tin in muriatic acid are added to any fluid containing the ſmalleſt portion of oxymuriat of mercury, a very conſpicuous milky whiteneſs inſtantly appears. This is occaſioned by the oxyd of tin ſeizing the exceſs of oxygen in the oxymuriat of mercury, by which a quantity of the oxyd of tin, or rather, perhaps, the ſubmuriat, is inſtantly ſet free, and at the ſame time the oxymuriat of mercury is converted into muriat, which is alſo precipitated. Hence this very conſpicuous phenomenon ariſes from the joint precipitation of the above ſubſtances. Senſible as this may be, it is not to be relied upon, except in the hands of very accurate obſervers. When muriat of tin is dropped in water, it becomes milky by the precipitation of the ſubmuriat of tin, even where no corroſive ſublimate is preſent. Hence, if more water be preſent with the ſuſpected matter, than will be calculated to keep the tin ſuſpended, the reſult will be ambiguous and uncertain.

From what has been ſaid of the properties of this ſalt, it will appear that any ſubſtance will form a teſt of ſalt which will either precipitate the oxyd, or deprive it of ſome of its oxygen. In the firſt caſe the high coloured red oxyd becomes very conſpicuous: in the ſecond, the oxymuriat of mercury is reduced to the ſtate of muriat, which renders the fluid turbid and milky, from the inſolubility of the latter ſubſtance.

The moſt ſatisfactory appearance of the preſence of corroſive ſublimate would be the mercury itſelf, ſince this ſalt is the only ſoluble muriat to be purchaſed in the ſhops. If the mercury be made to appear in its metallic ſtate, it may almoſt be deemed impoſſible for it to have originated from any other ſubſtance than the oxymuriat of mercury. Fortunately we have it in our power to recommend a method to the public which will anſwer this purpoſe completely. It is ſo ſimple as to be practiſed by any perſon unacquainted with chemiſtry, and it is ſo ſenſible, at the ſame time, that it is impoſſible to ſay how minute a quantity of mercury can be detached.

It is founded upon the principle by which the precipitation of one metal by another, under the influence of electricity, takes place. In order to make the apparatus as ſimple as poſſible, we ſhall uſe, in lieu of a piece of gold wire, a common wedding ring, and when a piece of zinc wire cannot be had, a piece of iron wire will do very well. Let the zinc or iron wire be bent into the ſhape of a parallelogram about two inches long, and about the width of the gold ring. Let this conſiſt of three ſides, two long ſides and one ſhort ſide, fide, that it may have the appearance of a fork or a ftaple. Tye the ends of the wire to the ring with a bit of thread, fo that the fame may be oppofite to each other, feparated by the diameter of the ring. When this is done, the ring and the wire, when laid upon a flat furface, will touch the furface in two places; the ring in one place, and the fhort fide of the parallelogram in another, the touching points being about two inches diftant: then take a flat piece of window glafs, or a fmall looking glafs, and lay it in a horizontal pofition, fo that any liquid dropped upon it may not run to any fide. This being done, prepare a fmall quantity of dilute fulphuric or muriatic acid, about four of water to one of acid, and alfo get fome of the liquid fuppofed to contain the corrofive fublimate. Let the dilute acid be dropped upon the plate, till it fpreads to the breadth of about one inch and a half. Then, at about half an inch diftance from it, let the fufpected liquid be dropped, till the peripheries of the two circles join. After this, let the apparatus above defcribed be fo laid, that the iron wire may touch the dilute acid, and the gold ring the other liquid. If the latter contain corrofive fublimate, the ring will become covered with mercury on the part which touches the liquid. This appearance will be fooner in taking place, as the quantity of corrofive fublimate is greater. When the liquid contains two parts of this fubftance, the mercury will be very perceptible upon the ring in five minutes from the time of the connection being made.

Mr. Chenevix, in afcertaining that corrofive fublimate was not oxymuriat of mercury, but merely muriat of mercury highly oxydated, has difcovered a falt which is truly the oxymuriat of this metal. By paffing a current of oxymuriatic gas through water, in which there was fome red oxyd of mercury, after a time the red oxyd became of a very dark brown colour, and part of it was diffolved. The liquor was then evaporated nearly to drynefs, and a mixed falt was obtained, confifting partly of corrofive muriat, and partly of another falt which cryftallized later than the former, and on being rediffolved and cryftallized appeared nearly pure. This falt, which has not been much examined, poffeffes the effential quality of an oxymuriat, in giving out vapours of oxymuriatic acid by the effufion of the fulphuric or any ftronger acid.

Phofphat of Mercury.—Phofphoric acid does not act upon mercury, becaufe of the great affinity of phofphorus for oxygen. This acid, however, combines with the oxyds of mercury, forming phofphat of mercury. The beft method of forming this falt is by adding phofphat of foda in folution to nitrat of mercury: the phofphoric acid leaves the foda to combine with the oxyd of mercury; the compound falling down in the ftate of white powder. It fhould be obferved, that if the phofphat of foda is not made from the acid which is obtained by burning phofphorus, the refult will not be correct; fince the acid obtained from bones is a fuper-phofphat of lime: and Mr. Dalton has lately found, that the fubftance at prefent ufed in medicine as phofphat of foda, is a triple falt, being a phofphat of foda and lime.

Phofphat of mercury becomes phofphorefcent when rubbed in the dark. Like the phofphat of lead, it affords phofphorus by diftillation with charcoal. It is faid to anfwer as a fubftitute for fome other mercurials in medicine. It appears from its analyfis to be a fuper-oxyphofphat: this, however, does not appear plaufible, from the manner of preparing it. If the nitrat of mercury be fully faturated with acid, the mercury cannot unite with more acid than will form a fimple phofphat, except the phofphat of foda be a fuper-falt, or that the phofphat of mercury on its formation, be refolved into fub and fuper-falts; both of which fall down together. If the folution of mercury employed in the preparation of the falt does not contain the fecond oxyd, the falt cannot be an oxy-falt, nor can any portion of it become fo, but at the expence of two falts being formed; the one confifting of the acid united to the protoxyd, as in the cafe of forming the muriat; and the other confifting of the acid united with the peroxyd, forming an oxy-falt. There is at prefent fo much ambiguity in the facts given of this falt, that we cannot be warranted at prefent in propofing any thing conclufive. The neutral phofphat with the protoxyd, if fuch a falt exift, will be as follows: $\frac{147 + 7 + 23}{23} = \frac{100}{13}$, or 13 acid, and 87 bafe. The oxyphofphat will be $\frac{147 + 21 + 23}{23} = \frac{100}{12}$, or 12 acid and 88 bafe. The fuper-oxyphofphat is $\frac{147 + 21 + 46}{46} = \frac{100}{21.5}$, or 21.5 acid, and 78 5 bafe. According to the analyfis of Braumcamp and Sigueira, it confifts of 28 5 acid, and 71.5 of the peroxyd. The fub-oxyphofphat of mercury, which in all probability may exift, will confift as follows: $\frac{(147 + 21) \cdot 2 + 23}{23} = \frac{100}{6.1}$, or 6.1 of acid, and 3.9 of peroxyd.

Fluat of Mercury.—Fluoric acid has no action upon mercury. When an alkaline fluat is added to a folution of nitrat of mercury, an infoluble powder falls down, which is the fluat of mercury. Nothing more is known of this falt.

Borat of Mercury.—This falt may, like the laft, be formed by adding borat of foda to nitrat of mercury, the boracic acid having no action upon the metal. It falls down in the form of infoluble powder, like the laft falt.

Carbonat of Mercury.—Carbonic acid does not act upon mercury. This falt is formed by adding carbonat of potafh to nitrat of mercury. The falt is precipitated in the ftate of powder of a white colour, and is known in medicine by the name white precipitate of mercury. According to the analyfis of Bergman, it confifts of 90.9 mercury, and 9.1 of oxygen and carbonic acid. By hypothefis it is $\frac{147 + 14 + 19}{19} = \frac{100}{11}$, or 11 of acid, and 89 of the fecond oxyd. When this falt is expofed to heat, the carbonic acid flies off, and leaves the yellow oxyd.

The precipitate formed by adding the carbonat of potafh to oxynitrat of mercury is feldom a true carbonat. At the moment it is precipitated, it appears of a beautiful white; but upon fhaking the mixture fome carbonic acid efcapes, and the precipitate affumes a yellowifh hue. It is therefore certain, that the precipitate becomes ultimately a fub-carbonat. If it were to remain a carbonat, no carbonic acid ought to efcape. The proportions under thefe circumftances are $\frac{2 \cdot (147 + 14) + 19}{19} = \frac{100}{5.5}$, or 5.5 of carbonic acid, and 94.5 of the yellow oxyd. The oxygen in this falt is 4.1 *per cent.* This, added to the acid, gives 9.6 of oxygen and acid together, which very nearly agrees with the analyfis of Bergman above given. Hence it will appear that this was the falt which he analyfed, and not the carbonat.

nat. The ſub-carbonat obtained from the nitrat, which gives the protoxyd, is perfectly white.

Acetat of Mercury.—The acetic acid does not act upon mercury; but it diſſolves its oxyds, forming ſeveral ſpecies of ſalts. When a ſolution of the acetat of potaſh is added to a ſolution of the nitrat of mercury, the acetic acid combines with the protoxyd, and is precipitated in the form of flat ſcaly cryſtals, reſembling boracic acid, which is the true acetat of mercury. If the oxynitrat be employed which contains the ſecond oxyd, in all probability a change takes place ſimilar to that in the formation of the muriat, by adding muriat of ſoda. The oxyd is equally divided into the prot and peroxyd, by which an acetat, with ſome ſub-oxyacetat, is formed, while a ſuper-oxyacetat will remain diſſolved. This ſalt is inſoluble in alcohol, and nearly ſo in water.

Oxyacetat.—This ſalt may be formed by diſſolving the peroxyd in the acetic acid. When evaporated it does not cryſtallize, but forms a yellow coloured maſs, which is deliqueſcent. When water is added to it, the ſalt is changed into a ſub-oxyacetat, which precipitates in the ſtate of a yellow powder, and a ſuper-oxyacetat, which remains diſſolved. When the oxyacetat is heated, the acetic acid deprives the mercury of ſome oxygen, and cryſtals of the acetat are formed.

Oxalat of Mercury.—Oxalic acid, as well as the other vegetable acids, has no action upon mercury. It combines with the oxyd of mercury, forming an oxalat which is nearly inſoluble in water. This ſalt turns black by the action of light; and, according to the authority of Klaproth, it detonates when heated. Dr. Thomſon thinks this ſalt a conſtituent of the fulminating mercury of Howard.

Tartrat of Mercury.—If tartrat of potaſh be added to a ſolution of nitrat of mercury, the tartrat of mercury will be precipitated in the ſtate of white powder. It is changed to a yellow colour by expoſure to light.

Citrat of Mercury.—This ſalt is ſcarcely ſoluble in water. It is decompoſed by diſtillation; the oxyd being reduced by the carbon and hydrogen of the acid.

The *Succinat of Mercury* is ſlightly ſoluble.

The *Benzoat of Mercury* is inſoluble in water: it ſublimes by heat, and is decompoſed by the ſulphuric, nitric, and muriatic acids.

The *Malat* of this metal is an inſoluble powder.

Pruſſiat of Mercury.—This ſalt may be formed by boiling the red oxyd of mercury with Pruſſian blue in water. It is ſoluble in water to a certain extent, and the ſolution affords cryſtals of a priſmatic form. It is generally employed to get pure pruſſic acid, by diſtillation with ſulphuric acid.

Arſeniat of Mercury.—When arſenic acid and mercury are heated together in a retort, the mercury is oxydized, and oxyd of arſenic is volatilized, leaving the arſeniat of mercury. This ſalt may alſo be formed by adding the arſeniat of potaſh to nitrat of mercury in ſolution. The arſeniat of mercury is precipitated in the form of yellow powder.

Molybdat of Mercury, with the protoxyd, is inſoluble, but ſoluble with the peroxyd, which forms an oxymolybdat.

Chromat of Mercury is formed by an alkaline chromat with nitrat of mercury. It falls down in the ſtate of powder of a purple colour. Several triple ſalts of mercury have been noticed by chemiſts.

Nitro-oxymuriat of Mercury has been pointed out by Berthollet. It is formed by adding a ſolution of muriat of ſoda to oxynitrat of mercury. A ſalt is obtained by evaporation in rhomboidal cryſtals. May not this ſalt be merely a mixture of muriat of ſoda and ſuper-oxymuriat of mercury cryſtallized together on account of the ſimilarity of their form?

Oxymuriat of Soda and Mercury.—This is no doubt the ſuper-oxymuriat of mercury cryſtallized with muriat of ſoda, ſince it is formed by adding four parts of ſuper-oxymuriat of mercury to one of muriat of ſoda.

Sub-oxymuriat of Mercury and Ammonia.—When ammonia is poured upon the ſuper-oxymuriat of mercury, the ammonia takes up as much of the acid as leaves the remainder in a ſtate of ſub-ſalt. The two ſalts fall down together in the ſtate of white powder. The analyſis of Fourcroy ſhews it to conſiſt of certain proportions of the two ſalts; which is 16 acid, 81 oxyd, and 3 of ammonia. This gives 14 of muriat of ammonia, and 86 of the ſub-oxymuriat of mercury.

This compound ſalt is ſoluble in muriatic acid. In this ſtate it has been called *ſal alembroth*. In modern nomenclature, it has been denominated the *ammoniaco-mercurial muriat.*

Tartrat of Potaſh and Mercury.—This ſalt is formed by boiling tho oxyd of mercury with ſuper-tartrat of potaſh. The oxyd of mercury takes the exceſs of acid from the ſuper-tartrat to form a tartrat. By evaporation the two cryſtallize together.

Mercury combines with the ſulphuret and ſuper-ſulphuret of hydrogen, forming black inſoluble precipitates. The firſt is called hydro-ſulphuret, and the ſecond a hydroguretted ſulphuret.

Mercury is very valuable in the arts on account of ſome of its phyſical properties, principally for conſtructing barometers and thermometers.

For the firſt of theſe uſes the mercury ſhould be perfectly free from air, which it mechanically contains in common with other liquids, and which leaves it when the preſſure of the atmoſphere is removed. If, therefore, a barometer be made with mercury not freed from air, the column conſtituting the barometer will be depreſſed by the ſpring of the air which riſes into the upper part of the tube.

In order to purify mercury for the uſe of barometers and thermometers, it ſhould firſt be diſtilled in a retort of iron or Wedgewood ware. After this, however, it does not acquire its greateſt degree of fluidity, nor does it appear perfectly bright. This is principally owing to its being mechanically mixed with ſome oxyd of mercury. This is completely removed by digeſting it a little time with very dilute nitric acid. It becomes very brilliant and fluid. It muſt now be well waſhed with water, and the water dried up clean. After this it muſt be boiled in the tube it is intended to fill. If, while the tube is hot, it be placed, with the open end upwards, under the receiver of an air-pump, and is ſhaken frequently, a ſtill greater quantity of air is ſet free, and the mercurial column will ſtand higher in conſequence. We can have little dependence upon the abſolute height of the barometer, where this precaution is not taken. See Barometer and Thermometer.

Mercury is extenſively uſed in gilding, but has been productive of great miſchief to the workmen, from their inhaling the vapour which muſt of neceſſity be formed.

We have already given ſome account of this proceſs, ſufficient to ſhew, that if the mercury, when it evaporates, could be forced into ſome channel, without coming near to the workman, and without mixing with the ſmoke of the chimney, its deleterious effects would not only be avoided, but the greateſt part of the mercury would be ſaved, which would be of very great importance to the proprietors of ſuch manufactures as employ gilding on a large ſcale.

We have long been in poſſeſſion of the means of remedying

ing this evil, at an expence which would speedily be reimbursed by the saving of the mercury alone.

The furnace to produce the heat should be a common air-furnace, but so constructed as to contain a vessel of the nature, though not of the shape, of a muffle. Its form would be determined by the size and figure of the articles to be gilt. It should have such an opening in front, and be so spacious within, as just to allow the workman to turn the articles freely about during their exposure to evaporate the mercury. The upper part of the muffle should have a chimney connected with it of earthenware, of the same kind as that of the muffle. This chimney must pass for some distance up the main chimney, in order to be heated for the purpose of rarefying the enclosed air, to cause a rapid current. The earthen chimney, being carried about a yard high, should now branch out of the main chimney, and be continued with an iron pipe to the height of about twenty feet. This iron pipe should communicate with the earthen tube, by a perpendicular branch from it, within about six feet of the bottom of the former, so that one part of the iron pipe ascends to the height of twenty feet, and the other descends about six feet into a cistern of water. By this means a current of air will constantly be entering the mouth of the muffle, which must of necessity carry with it the vapour of mercury, unmixed with any other extraneous matter. The mercurial vapour will be condensed long before it reaches the top of the iron tube, and will fall into the cistern of water below. The water will prevent the oxydation of the mercury between the times of removing it.

Another advantage attending this apparatus, will be the uniform heat to which the evaporable surface will be exposed. The greatest heat of the fire will be much less in this contrivance, and consequently less annoying to the face and eyes of the workman. This evil, however, may be still made less, by interposing a screen of glass between the face and the fire.

MERCURY, or *Hydrargyrus*, in the *Materia Medica*. This fluid, supposed by the Greeks to be poisonous and corrosive, was introduced into medicine, by the Arabians, as an ingredient in external applications, against different cutaneous maladies. The practice was followed by some physicians in Europe towards the end of the thirteenth century; but was not established or looked upon in general to be safe, till about the beginning of the sixteenth, when the venereal distemper, then lately received from America, was found to yield to mercurial applications alone: and now also the internal use of mercury began to be ventured on, in this and in other diseases. Crude and fluid mercury taken internally produces no effect on the body; because the adhesion of its integrant parts to each other hinders their division and distribution, or solution, without which it cannot have any effect. In its crude state, therefore, it does nothing but load the stomach and intestines. It falls downwards by its weight, and goes out of the body with the fæces, in the same state in which it entered. Hence some have been induced to give a pound or more in violent constipations, in order to open obstructions that had resisted the common methods of cure by purgatives, relaxants, and emollients. But the practice has been attended with no remarkable success.

Dr. Dover, in his "Physician's Legacy to his Country," having recommended crude mercury or quicksilver as a most beneficial medicine for several diseases, it had for some time a great run in London, which occasioned the writing a great many pamphlets for and against it. Dr. Cheyne also greatly recommends this medicine in his treatise, entitled "The Rational Method of curing Diseases."

The authors of the Medical Essays of Edinburgh assure us, that though some they knew had taken an ounce or two of crude mercury each morning for several weeks, yet they were not apprized of any instance of its increasing any of the sensible evacuations; but they have been told, that some who used it thus, had passed some of it with their urine, and that the hands of others, taking this medicine, had tinged their snuff-boxes, &c.

But we have an account of the effects of crude mercury on a person who had the advice of his physician for the taking it, in a remarkable case, recorded in the Philosophical Transactions, about the time when Dr. Dover had brought it into such general use; and as the effects of it, in this case, may serve to caution people as to the use of it, it may be proper to give the substance of it, which is this: a person had long been subject to great difficulty in going to stool, for which he at length took several ounces of crude mercury at different times, but without relief. Upon the opening of the abdomen there issued out a great quantity of wind, before the stomach or guts were wounded. The stomach was empty, and its inner coat violently inflamed. The small guts were, in many places, fouled with a black powder, resembling æthiops mineral, and in several parts of them were found small globules of quicksilver. The black powder was doubtless the quicksilver altered into a sort of æthiops in the body. The colon was inflamed and distended, and contained six quarts of liquid excrement, among which was a great deal of crude mercury, and of the same black powder. This gut also was inflamed on the outside, and had formed an abscess where it adhered to the omentum; the other guts in contact with this part also shared this disorder. On the lower part of the colon the coats became schirrous, and the passage was very small. Some of the valves were also become schirrous, and obstructed the passage, and a small plum-stone was found buried in the villose coat of this intestine. This had also formed a small abscess, which discharged itself into the pelvis. What part of these symptoms was owing to the taking the quicksilver is easily seen, and such effects may be guarded against for the future, by observing the state of the patient before it is given. Phil. Transf. N° 442. p. 295.

But when mercury is much divided, so that its molecules cannot again unite and form fluid mercury by the interposition of proper substances, it operates with great power, and extends its action through the whole habit. In these forms, whether taken internally, or introduced into the blood from external applications, it seems to liquefy all the juices of the body, and may be so managed as to promote excretion through all the emunctories. The salutary effects of mercurials have, in many cases, very little dependence on the quantity of sensible evacuation. Venereal maladies and chronical distempers, proceeding from a viscidity of the humours and obstructions of the small vessels, are often successfully cured by mercurials taken in such doses as not to produce any remarkable discharge: especially if assisted by diaphoretics, and a warm diluting regimen. In this view, camphor, and the resin or extract of guaiacum, are frequently joined to the mercury; and to the more active preparations, a little opium; which not only promotes the diaphoresis, but prevents the mercury from irritating the first passages, and running off by the grosser emunctories. Mercurials are always pernicious in the true scurvy, and in constitutions inclined to this disease, whose humours are disposed to a putrescent state; and a long continued use of mercury colliquates the whole mass of blood, and tends to weaken the nerves, so as to bring on tremors and paralyses. Mercurials are destructive to insects, perhaps of every kind: they are sometimes given internally against worms; and Van

Helmont ſays, that water in which mercury has lain ſome time, though inſipid, will deſtroy worms; and Mr. Boyle ſeems to recommend it as an innocent and uſeful coſmetic. Works Abr. vol. iii. p. 345.

Although mercury in its native metallic ſtate is a perfectly inert ſubſtance with reſpect to any operation on the animal ſyſtem, it may be rendered active by ſome changes in its chemical ſtate, or ſome addition to its ſubſtance. When rendered thus active, it ſeems to be a ſtimulus to every ſenſible and moving fibre of the body to which it is applied; and it is particularly a ſtimulus to every excretory of the ſyſtem, to which it is externally or internally applied. Beſides its noted effects upon the excretories of the ſaliva, it ſeems to operate upon the whole of thoſe of the alimentary canal. It proves often diuretic; and Dr. Cullen ſays, that he has met with particular proofs of its reaching and acting upon the organs of perſpiration. Whilſt it is known to operate more upon certain excretions than upon others, it may be preſumed, that when any tolerable quantity is thrown into the body, it is in part diſtributed over the whole; and therefore its medicinal effect is, that it is the moſt univerſal aperient and deobſtruent known. Dr. Cullen, however, contends, in oppoſition to the common opinion, that the effects of its producing evacuations depend entirely upon the ſtimulus given to the excretories, and not at all to any change produced in the ſtate of the fluids. Upon many occaſions of mercury thrown into the body very largely, this author has found no difference in the appearance of the ſtate of the blood drawn out of the veins. From the ſtimulus given by mercury to the whole ſyſtem, he has always found the blood putting on the ſame appearance that it does in inflammatory diſeaſes, nor has he obſerved any circumſtance that implies any diminution of its ordinary conſiſtence. Although it has been the common opinion, that mercury diminiſhes the conſiſtence of the blood, and very much increaſes its fluidity, no evidence or proof of this as a fact, known to Dr. Cullen, has been produced; and he thinks, that it has been taken up upon miſtaken facts, and ſupported by a theory which is without foundation. Upon the whole, our author concludes, that the chief effects of mercurial medicines are to be aſcribed to their general ſtimulus of the ſyſtem, and eſpecially to their ſtimulating the various excretories of it. Concerning its medical effects in the diſeaſe to which it has been moſt generally and moſt efficaciouſly applied, we refer to the article LUES VENEREA. But the various operations of mercury are modified, in a very remarkable degree, by the different preparations of it which have been propoſed and employed. In conſequence of the changes which it undergoes by its numerous preparations, ſo that it is become one of the moſt conſiderable articles in the chemical pharmacy, and a remedy of the moſt extenſive application, it is not only a powerful ſtimulant, but it enters into the circulation, quickens the vaſcular action, and excites powerfully the whole of the glandular ſyſtem, increaſing all the ſecretions and excretions. Hence it happens, that its various preparations produce different effects, operating ſometimes as ſtimulants, aſtringents, cathartics, or emmenagogues, and locally as errhines; and hence it becomes uſeful in a great variety of diſeaſes; ſuch as febrile affections, ſpaſms, cachectic diſeaſes, glandular obſtructions, and cutaneous eruptions. Since Paracelſus, counteracting ancient authority and practice, evinced that it might be exhibited internally, not only with ſafety, but with advantage, during a period of almoſt 300 years, experience has fully ſanctioned its uſe; and as Mr. Pearſon juſtly obſerves, "not one medicine beſides, derived from the animal, vegetable, or mineral kingdom, has maintained its credit, with men actually employed in extenſive practice, during a tenth part of that period." Although it is a medicine capable of being abuſed, to the diſappointment of the patient, and to the injury of the conſtitution, yet under the direction of cautious and judicious practitioners, it may rank as one of the moſt uſeful of the articles of the Materia Medica.

The chemical changes which have been propoſed, in order to render mercury active and uſeful, have been many and various; but Dr. Cullen, in his "Materia Medica," refers them to four heads; 1ſt, by being converted into vapour; 2dly, by calcination; 3dly, by triture with viſcid fluids; and, 4thly, by being combined with acids of different kinds. The firſt mode of employing mercury, may perhaps (he ſays) be the beſt adapted to ſome local complaints; but its application to the whole body is attended with ſo much hazard and uncertainty in the adminiſtration, as hardly ever to be an eligible practice. The preparation by calcination is not, as had been formerly ſuppoſed, of any peculiar power or advantage; and is therefore as he believes, little employed in the preſent practice; this operation ſerving merely to put the mercury in a condition to be acted upon by the acids of the ſtomach, and the preparation not differing from others made by a combination with acids. The preparations by triture ſeem to be milder than thoſe formed by a combination with acids; but imperfect triture renders the practitioner often uncertain in their uſe. The triture with unguinous ſubſtances gives the advantage of its being introduced by unction upon the ſkin; and when it has been properly prepared, and is properly adminiſtered, it affords a mode of introducing mercury, which is often leſs liable to purging, and therefore more convenient than the employment of the ſaline preparations. Theſe latter are different according to the acid employed.

Thoſe made by the vegetable acid are milder and more manageable than thoſe formed with any of the foſſil acids. Of theſe, the combination with the muriatic acid, when the acid is in its full proportion to the mercury, as it is in the corroſive ſublimate, is certainly more active and powerful than any other ſaline preparation. The uſe of it has been often convenient and effectual; but its operation is ſo different in men of different conſtitutions, that the employment of it requires much management and diſcretion. It is rendered much milder in the preparation of the Mercurius dulcis, which has given occaſion to the frequent employment of this, which, according to Dr. Cullen, does not ſeem to be a very eligible preparation. It does not ſeem to be ſo readily diffuſible in the ſyſtem as many others, becauſe it is more ready than many others to operate upon the inteſtines, and run off by ſtool. This may give it ſome advantages for its being combined with purgatives; but for that reaſon it is leſs fit for being employed to act upon the ſalivary glands, or upon the other excretions of the ſyſtem. Dr. Duncan, in the "Edinburgh New Diſpenſatory," has given a table of officinal preparations of mercury, of which Mr. A. T. Todd has availed himſelf in the valuable "London Diſpenſatory," lately publiſhed. We ſhall take the liberty of inſerting his table for the ſatisfaction of our medical readers, recommending the work itſelf to their peruſal.

Officinal Preparations of Mercury.

I. By diſtillation to purify the metal.
  1. Hydrargyrus purificatus. L. D.

II. By trituration; (ſuboxidized).

a. With animal fat.
  2. Unguentum Hydrargyri fortius. L. Ung. Hydrargyri. D.
  3. Unguentum Hydrargyri. E.

4. Ungu-

4. Unguentum Hydrargyri mitius. L. D.
5. Linimentum Hydrargyri. L.
6. Emplaftrum Ammoniaci cum Hydrargyro. L. D.
——— - Hydrargyri. L. E.

b. With faccharine fubftances.
7. Pilulæ Hydrargyri. L. E. D.

c. With carbonate of lime.
8. Hydrargyrus cum Cretâ. L. D.

d. With carbonate of magnefia.
9. Hydrargyrum cum Magnefiâ. D.

III. By the action of heat and air: (oxidized).
10. Hydrargyri Oxydum rubrum. L. Oxydum Hydrargyri. D.

IV. By the action of acids.

a. With fulphuric acid; (fuboxidized).
11. Subfulphas Hydrargyri flavus. E. Oxydum Hydrargyri fulphuricum. D.

b. With nitric acid; (fuboxidized).
12. Unguentum Hydrargyri nitrati. L. E. Unguentum Supernitratis Hydrargyri. D.
13. Unguentum Nitratis Hydrargyri mitius. E.
——— ——— (oxidized).
14. Hydrargyri Nitrico-oxydum. L. Oxidum Hydrargyri rubrum per Acidum nitricum. E. Oxydum Hydrargyri nitricum. D.
15. Unguentum Hydrargyri nitrico-oxydi. L. Unguentum Oxidi Hydrargyri rubri. E. Unguentum Subnitratis Hydrargyri. D.

c. With muriatic acid.
† fublimated; (oxidized).
16. Hydrargyri Submurias. L. E. Submurias Hydrargyri fublimatum. D.
17. Pilulæ Hydrargyri Submuriatis. L.
——— ——— (oxidized and acidified).
18. Oxymurias Hydrargyri. L. Murias Hydrargyri. E. Murias Hydrargyri corrofivum. D.
19. Liquor Hydrargyri Oxymuriatis. L.
†† precipitated; (oxidized).
20. Submurias Hydrargyri præcipitatus. E. D.

d. With acetous acid; (fuboxidized).
21. Acetis Hydrargyri. E. Acetas Hydrargyri. D.

V. By precipitation with earths and alkalies from acid folutions.

a. By lime-water from the nitric folution; (fuboxidized).
22. Hydrargyri Oxydum cinereum. L.

b. By ammonia from the nitric folution; (fuboxidized).
23. Oxydum Hydrargyri cinereum. E. Pulvis Hydrargyri cinereus. D.

c. By ammonia from the muriatic folution; (oxidized).
24. Submurias Hydrargyri ammoniatum. D. Hydrargyrus Præcipitatus albus. L.
25. Unguentum Submuriatis Hydrargyri ammoniati. D. Ung. Hydrargyri Præcipitati albi. L.

VI. Combined with fulphur.

a. By trituration.
26. Sulphuretum Hydrargyri nigrum. E. D.

b. Sublimated.
27. Hydrargyri Sulphuretum rubrum. L. D.

We fhall here fubjoin a more particular account of thefe different preparations, as they occur in the London, Edinburgh, and Dublin difpenfatories, annexing to the modern names the appellations by which they have been diftinguifhed in former, now fuperfeded, nomenclatures.

Hydrargyrus purificatus. Argentum vivum purificatum, P. L. 1745.

Rub together 6lbs. of mercury, by weight, with 1lb. of iron filings, and diftil the mercury from an iron retort, by the application of heat to it. The E. D. directs four parts of mercury, and one part of filings of iron, to be rubbed together and diftilled from an iron retort. The Dub. D. procures it by diftilling off flowly 4lbs. from 6lbs. of mercury.

Hydrargyri Acetis, acetite of mercury, is prepared, according to the E. D., by mixing 3 oz. of purified mercury with 4½ oz. or a little more than may be neceffary for diffolving the mercury, of diluted nitrous acid; and having diffolved 3 oz. of acetite of potafs in boiling water, by adding to this folution, while hot, the former, and mixing them by agitation. When the mixture has been fet afide to cryftallize, the cryftals are wafhed in a funnel with cold diftilled water, and then dried with a gentle heat.

Hydrargyri Acetas, acetate of mercury, is obtained, according to the directions of the Dub. D., by adding three fluid-ounces of diluted nitrous acid to 3 oz. of purified mercury, and digefting, when the effervefcence ceafes, upon hot fand, for the complete diffolution of the metal: then mixing this folution with eight pints of boiling diftilled water in which 3 oz. of acetate of kali have been previoufly diffolved, and paffing the mixture immediately through a double linen cloth: afterwards cooling it that cryftals may be formed, wafhing thefe with cold diftilled water, and drying them upon paper with a very gentle heat.

All the veffels in thefe two proceffes muft be of glafs.

The acetate of mercury is antifyphilitic, and alterative; but it is fcarcely ever ufed, except as an active ingredient in Keyfer's pills. In fome cutaneous affections a folution of it, in the proportion of two grains in f.℥ii of rofe water, is externally applied. The internal dofe is 1 gr. night and morning.

Hydrargyri oxymurias, oxymuriate of mercury, Hydrargyrus muriatus, P. L. 1787, Mercurius corrofivus fublimatus, P. L. 1745, P. L. 1720, is prepared, according to the L. D. 1809, by boiling 2lbs. by weight of purified mercury with 30 oz. by weight of fulphuric acid in a glafs veffel until the fulphate of mercury is left dry: then, rubbing this, when cold, with 4lbs. of dried muriate of foda, in an earthenware mortar, and afterwards fubliming it in a glafs cucurbit, gradually increafing the heat. The corrofive fublimate is denominated *Murias hydrargyri,* or muriate of mercury, in the E. D. and prepared much in the fame manner. In the Dub. D. it is denominated *Murias hydrargyri corrofivum.* It is prepared by diffolving 2lbs. of purified mercury in 3lbs. of fulphuric acid, gradually increafing the heat until the matter becomes almoft dry; when cold, rub it with 2½lbs. of dried muriate of foda in an earthenware mortar, and then fublime it, in a proper veffel, with a gradually increafed heat. Mr. Chenevix found, that if a bit of copper be put into a folution of corrofive fublimate, a white powder ufually falls to the bottom, and that powder is "calomel." When wafhed, it does not contain an atom of copper, nor of corrofive fublimate.

This falt is a powerful ftimulant and alterative; and in large dofes it is one of the moft violent of the metallic poifons. It was formerly much extolled as an antifyphilitic; but Mr. Pearfon obferves, that even in checking the progrefs of the fecondary fymptoms, relieving venereal pains, and healing ulcers of the throat, it never confers permanent benefit.

It is faid to be ufed with greater advantage in old ulcers, chronic rheumatifm, and cutaneous difeafes, particularly *lepra.* (See LEPROSY.) The fenfible operation of this falt is by urine, but fometimes it occafions the moft violent naufea, griping, and purging; in which cafe it fhould be combined with opium; and during the ufe of it, it is neceffary to take fome mucilaginous fluid, in order to allay its irritation. It is alfo ufed

ufed as an external application. The dofe is from ⅛th to ¼th of a grain, twice a day, formed into a pill with a crumb of bread or extract of poppies. Van Swieten brought this falt into more general ufe for the cure of venereal maladies: he diffolves a grain of the fublimate in 2 oz. of proof fpirit, but rectified fpirit diffolves it more perfectly, and gives of this folution from one to two fpoonfuls twice a day, continuing the medicine fo long as any of the fymptoms remain, with low diet, and plentiful dilution. There are many inftances in the London Med. Obf. and Enq. of the fuccefs of this method.

Hydrargyri oxymuriatis Liquor, folution of oxymuriate of mercury, is prepared by diffolving eight grains of oxymuriate of mercury in fifteen fluid-ounces of diftilled water, and adding to it a fluid-ounce of rectified fpirit. This folution is directed (P. L. 1809) in order to facilitate the adminiftration of divifions of the grain of this active medicine. Each fluid-drachm contains $\frac{1}{16}$th of a grain of the falt. This may be given as an antifyphilitic in dofes of from f.ʒfs to f.ʒij, in f.℥ij of linfeed infufion, or water and fyrup, and in more minute dofes, when its effects as an alterative only are required. As a local application, this folution diluted with two parts of water forms an ufeful gargle in venereal fore-throat, and without dilution it ferves as a gargle for breaking the abfcefs in cynanche tonfillaris, when fuppuration takes place. Diluted with an equal quantity of water, it is employed as a wafh againft tetters and pfora; and very largely diluted, it may be ufed as an injection in gonorrhœa, or given in the form of enema, when the ftomach will not bear it. This fublimate is a violent efcharotic, and eats away proud flefh: half a drachm of it diffolved in a pint of lime-water turns it yellow; it is then called "phagedænic water," and is ufed to wafh ulcerous and tetterous eruptions. A ftrong folution, made by boiling the fame quantity of powdered fublimate with equal its weight of alum in a pint of common water, until half the liquor is wafted, is the "alluminous water" applied to the fame purpofe.

Hydrargyri fubmurias, fubmuriate of mercury, Calomelas, Hydrargyrus muriatus mitis, P. L. 1787, Mercurius dulcis fublimatus, P. L. 1745, Aquila alba, Manna metallorum, Sublimatum dulce, is prepared, according to P. L. 1809, by rubbing together 1lb. of oxymuriate of mercury with 9 oz. by weight of purified mercury, until the metallic globules difappear, then fubliming, taking out the fublimed mafs, pulverizing it, and fubliming it in the fame manner twice more fucceffively; and, laftly, bringing it into the ftate of very fine powder, by the fame procefs which is directed for the preparation of chalk. A very elegant and ufeful modification of this procefs has lately been adopted by Mr. Howard, chemift, who fublimes the fubmuriate into water, with the vapour of which it mixes as it arifes in its gafeous form, and fubfides at once as a fine impalpable precipitate to the bottom of the water. Formerly preparations of mercury analogous to this were diftinguifhed according to the number of fublimations they had undergone. After three fublimations it was mercurius dulcis, after fix, calomelas, and after eight, panacea mercurialis; but, according to Beaumè, a fmall portion of oxymuriate is formed by each of thefe repeated fublimations, probably from the abforption of oxygen by the heated preparation from the air of the veffels, and hence no advantage, but rather the contrary, muft arife from an increafed number of the operations. The Pharmacopeia of 1745 had fix fublimations; that of 1787, as the directions feem to exprefs it, five; and now they are reduced to three, which are, in fact, fully fufficient, efpecially with that fubfequent application of water which the mode adopted for reducing it to a fine powder requires.

Hydrargyri fubmurias, five *Calomelas*, Edinb. D. Submuriate of mercury, or calomel; is obtained by rubbing together 4 oz. of muriate of mercury pulverized in a glafs mortar with 3 oz. of purified mercury, in a glafs mortar with a little water, to prevent the acrid powder from rifing, until the mercury be extinguifhed; putting the dried powder in an oblong phial, one-third full, and fubliming it in a fand-bath. When the fublimation is completed the phial is broken, and the red powder round its bottom, and the white at its neck, are rejected; the reft of the mafs is fublimed, and reduced to a fine powder, which is, laftly, to be well wafhed with boiling diftilled water.

Hydrargyri, Submurias fublimatum, five *Calomelas*, Dub. D. is prepared much in the fame manner with that of the Lond. Pharmac. The final trituration and levigation are intended to feparate any corrofive muriate that may have been formed; and in order to afcertain this, the Dublin college prefcribes the following teft; the fublimed matter is pulverized and repeatedly wafhed with diftilled water, until the folution poured off, no longer lets any fediment fall on the addition of a few drops of carbonate of kali.

Calomel is the moft ufeful and the moft frequently employed of all the preparations of mercury. It is antifyphilitic, antifpafmodic, alterative, deobftruent, purgative, and errhine. As a remedy in fyphilis, it can be fully confided in, when its difpofition to run off by the bowels is counteracted by opium; and in the fame ftate of combination it is alfo found efficacious in feveral convulfive affections, as epilepfy, trifmus, and tetanus; and in that fpecies of fpafmodic ftricture which occurs in virulent gonorrhœa. As an alterative and deobftruent, it is employed with advantage in cutaneous eruptions, as lepra, fcabies, and pfora, in which cafes it is combined with antimonials and guaiacum; and in hepatitis, and glandular obftructions; in dropfies it affifts the action of fquill and foxglove; and as a purgative it may be employed with fafety in almoft every form of difeafe not attended with vifceral inflammation, or where there are not great irritability and delicacy of habit. Calomel, however, does not act with certainty as a purgative even in large dofes, and hence it is generally combined with fcammony, jalap, or fome other active cathartic. The ufual dofe to affect the habit and produce ptyalifm is from gr. j to grs. ij, in a pill with opium, given night and morning; and from grs. iij to grs. viij act in general as a purgative: but in fome complaints, as yellow fever and croup for example, in which it is fuppofed to exert a fpecific effect, this dofe has been repeated every two or three hours, until upwards of 100 grains have been taken in a very fhort fpace of time.

On account of its infolubility and great fpecific gravity, it can be given only in the form of pills.

Hydrargyri Submurias precipitatus, precipitated fubmuriate of mercury, Edinb. is prepared by mixing 8 oz. of purified mercury with the fame quantity of diluted nitrous acid, and towards the end of the effervefcence digefting with a gentle heat, the veffel being frequently fhaken; at the fame time let 4½oz. of the muriate of foda be diffolved in 8lbs. of boiling water; and to this let the other folution be added while it is warm, and let them be mixed very quickly together. After the precipitate has fubfided, pour off the faline fluid, and wafh the fubmuriate of mercury by frequent affufions of warm water, which are to be poured off each time after the precipitate fubfides, until the water comes off taftelefs.

Hydrargyri Submurias precipitatum is obtained by pouring five fluid-ounces of diluted nitrous acid on 7 oz. of purified mercury in a glafs veffel, and at the termination of the effervefcence digefting with a gentle heat for fix hours, with frequent agitation. The heat fhould then be fomewhat raifed raiſed that the ſolution may boil a little, which being poured off from the reſidual mercury, ſhould be quickly mixed with 10lbs. of boiling water, in which 4 oz. of muriate of ſoda have been previouſly diſſolved; the ſubſiding powder is waſhed with warm diſtilled water, as long as the fluid poured off from it yields a precipitate on the addition of a few drops of the ſolution of ſubcarbonate of kali; and laſtly, it is to be dried. In reference to theſe proceſſes of the two colleges, we may here note, that Mr. Murray has aſcertained, that the quantity of mild muriate obtained from a ſolution of ℥j of mercury in the diluted nitric acid in the cold is a little more than ℥j; while from the ſame quantity diſſolved with the application of heat, the precipitate did not exceed ℥ſs, while the liquor held diſſolved much more corroſive muriate than the other. Hence it may be inferred, that the greateſt proportion of pure mild muriate of mercury by precipitation may be obtained, by preparing the nitrat ſlowly, and without the aid of heat, which ought not to be employed in any part of the proceſs.

The properties of this ſubſtance are eſſentially the ſame with thoſe of common calomel, and therefore it may be regarded as ſuperfluous.

Hydrargyrus precipitatus albus, white precipitated mercury, Calx hydrargyri alba, P. L. 1787, Mercurius precipitatus albus, P. L. 1745, is prepared, according to the directions of the London college, P. L. 1809, by firſt diſſolving ¼lb. of muriate of ammonia, and then the ſame quantity of oxymuriate of mercury, in four pints of diſtilled water, and adding to it half a pint of the ſolution of ſubcarbonate of potaſs; then waſhing the precipitated powder until it becomes taſteleſs, and afterwards drying it.

Hydrargyri Submurias ammoniatum, ammoniated ſubmuriate of mercury, Dub. is obtained by adding to the fluid which has been poured off from the precipitated ſubmuriate of mercury a quantity of water of cauſtic ammonia ſufficient to precipitate the whole of the metallic ſalt; then waſhing the precipitate with cold diſtilled water, and drying it upon bibulous paper. This preparation is only uſed, in combination with lard, as an ointment for the cure of the itch, and ſome other cutaneous eruptions. See Unguentum *Hydrargyri præcipitati albi.*

Hydrargyrus cum Creta, mercury with chalk, Mercurius alkalizatus, P. L. 1745, is prepared by rubbing together 3 oz. by weight of purified mercury with 5 oz. of prepared chalk, until the metallic globules diſappear. As this preparation is milder than any other mercurial one, and does not ſo eaſily act upon the bowels, it is very much uſed by many practitioners. It appears to be ſlightly oxydized by the trituration, as it contains, according to Fourcroy, only $\frac{4}{100}$ of oxygen.

Hydrargyrum cum Creta, mercury with chalk, of the Dublin college, is prepared in the ſame manner as the mercury with magneſia, employing precipitated chalk inſtead of magneſia. This ſubſtance is alterative, and occaſionally preſcribed in tinea capitis, and other cutaneous affections; but it merits very little attention. The doſe may be from 5 gr. to ℈ſs, given twice a day, mixed in any viſcid ſubſtances.

Hydragyrum cum magneſia, mercury with magneſia, of the Dublin college, is prepared by triturating an ounce of mercury with the ſame quantity of manna in an earthen mortar, adding as many drops of water as will give to the mixture the thickneſs of ſyrup, and continuing the rubbing until the metallic globules diſappear; then adding, whilſt the trituration is continued, a drachm of magneſia, and after the whole is well mixed, a pint of hot water, agitating the mixture. When it has remained ſome time at reſt, that the ſediment may ſubſide, decant from it the fluid, repeat the waſhing a ſecond and a third time, that the whole of the manna may be removed; and add the remainder of the magneſia to the ſediment, while it is ſtill moiſt: and laſtly, dry the powder upon bibulous paper. The addition of the manna in this and the former proceſs is intended only to facilitate the oxydizement of the mercury; and it is afterwards removed by the ſubſequent waſhings, ſo that the product remains a grey or black oxyd of mercury mixed with magneſia. This preparation is of no great importance.

Hydrargyri nitrico-oxydum, nitric oxyd of mercury, Hydrargyrus nitratus ruber, P. L. 1787, Mercurius corroſivus ruber, P. L. 1745, Mercurius precipitatus corroſivus, P. L. 1720, is prepared by the directions of the Lond. Pharm. by mixing in a glaſs veſſel 3lbs. by weight of purified mercury, 1½ lb. by weight of nitric acid, in two pints of diſtilled water, and boiling the mixture in a ſand-bath until the mercury being diſſolved and the water evaporated, a white maſs remains. Rub this into powder, and put it into another ſhallow veſſel, then apply a moderate heat, and raiſe the fire gradually until the red vapour ceaſes to ariſe. The component parts of this oxyd are, according to Fourcroy, mercury 92, and oxygen 8; according to Chenevix, mercury 85, oxygen 15.

Hydrargyri Oxydum rubrum per acidum nitricum, olim, *Mercurius precipitatus ruber*, Edinb. red oxyd of mercury by nitric acid, formerly red precipitate of mercury. Diſſolve a pound of purified mercury in 16 oz. of diluted nitrous acid; and evaporate the ſolution over a gentle fire to a dry white maſs, which being rubbed to a powder, is to be put into a glaſs cucurbit, and covered with a thick plate of glaſs: then adapt a capital to the veſſel, and having placed it in a ſand-bath, let the contained matter be roaſted with a fire gradually raiſed until it paſs into very red ſmall ſcales.

Hydrargyri Oxydum nitricum, Dub. nitric oxyd of mercury. Mix 10 oz. of purified mercury, and ten fluid-ounces of diluted nitrous acid in a glaſs, and diſſolve the mercury with a gradually raiſed heat: then increaſe the fire until the reſiduary matter in the bottom of the veſſel be converted into red ſcales.

Nitric oxyd of mercury is ſtimulant and eſcharotic. It is merely uſed externally, when rubbed into a fine powder, as a ſtimulant to old ſores, and for deſtroying fungus. As a powder, in the proportion of gr. ſs. to grs. iv of ſugar, it is blown into the eye to remove ſpecks in the cornea; and formed into an ointment with lard, it is an uſeful application to ulcerations of the eye-lids, and to chancres. See Unguentum *Hydrargyri nitrico-oxidi.*

Hydrargyri oxydum rubrum, red oxyd of mercury, Hydrargyrus calcinatus, P. L. 1787, Mercurius calcinatus, P. L. 1745, is prepared by pouring *e. g.* 1lb. by weight of purified mercury into a glaſs matraſs with a very narrow mouth and broad bottom: apply a heat of 600° to this veſſel, without ſtopping it, until the mercury has changed into red ſcales; then reduce theſe to a very fine powder. The whole proceſs may probably require an expoſure of ſix weeks.

Hydrargyri oxydum, Dubl. oxyd of mercury, is obtained by taking any quantity of purified mercury, and proceeding as in the laſt article.

According to Lavoiſier 100 parts of this oxyd contain 7 of oxygen; Fourcroy makes the proportion of oxygen 8, and Chenevix, 15 parts.

This is a very active preparation of mercury, and has been employed by ſome eminent practitioners, *e. g.* John Hunter, as an internal remedy in ſyphilis. See Lues Venerea. Its effects, however, are violent, ſo that it is now ſcarcely ever

ever employed internally, or as an antiſyphilitic. The doſe may be gr.j combined with gr.ſs of opium, in the form of pill, night and morning. It is chiefly uſed as an external ſtimulant and eſcharotic in the ſame caſes as the nitric oxyd; being previouſly rubbed to a fine powder, and either ſprinkled over the ulcers, or united with lard, and applied as an ointment.

Hydrargyri oxydum cinereum, grey oxyd of mercury, is formed, according to the inſtructions of the Lond. Pharm., by boiling an ounce of ſubmuriate of mercury in a gallon of lime-water, conſtantly ſtirring until a grey oxyd of mercury is ſeparated; waſh this with diſtilled water, and then dry it. The ſame preparation of the Edinb. Diſp. is formed of four parts of purified mercury, five parts of diluted nitrous acid, 15 parts of diſtilled water, and a ſufficient quantity of water of carbonate of ammonia. Diſſolve the mercury in the acid; add gradually the diſtilled water, then pour in as much water of carbonate of ammonia as may be ſufficient for precipitating the whole of the oxyd of mercury, which is to be afterwards waſhed with pure water, and dried.

Hydrargyri Pulvis cinereus, Dubl. grey powder of mercury, is formed by diſſolving 2 oz. of mercury in two fluid-ounces of diluted nitrous acid, in a ſlow heat, and diluting the ſolution with eight fluid-ounces of cold water; then dropping into it $1\frac{1}{2}$ oz. of the water of carbonate of ammonia, or as much as may be ſufficient for precipitating the whole of the metal, which is to be waſhed with boiling diſtilled water, until the fluid, poured off, yields no ſediment, when water of ſulphuret of ammonia is dropped into it: laſtly, let the precipitate be dried. The conſtituents of the grey oxyd of mercury are ſuppoſed to be 96 parts of mercury, and 4 of oxygen, in 100 parts.

The grey oxyd of mercury, when well prepared, may be uſed as a ſubſtitute for the oxyd prepared by trituration; and as it is more likely to be always of an uniform ſtrength, it may of courſe be more depended on than thoſe preparations. It has been objected to for forming ointment, in order to ſerve the purpoſes of mercurial frictions (ſee UNGUENTUM *Oxydi hydrargyri cinerei*); but the objection may have been owing to the uſe of that form of preparation which contains the triple ſalt. It has been uſed with advantage for fumigation, both locally applied towards the healing of venereal ulcers, and, generally, to bring the habit under the influence of mercury, when it could not be introduced by the ordinary mode. The doſe of this oxyd is from gr. i. to grs. iii. given in the form of pill twice a day.

Hydrargyri, Sulphuretum nigrum, olim, *Æthiops mineralis*, Edinb. Dubl. black ſulphuret of mercury, formerly æthiops mineral. This is prepared by rubbing together equal weights of purified mercury and ſublimed ſulphur in a glaſs mortar with a glaſs peſtle, until the globules of mercury altogether diſappear. It may alſo be made with double the quantity of mercury.

This mercurial preparation is alterative and anthelmintic; it is chiefly employed againſt ſcrophulous ſwellings, and in cutaneous affections; and has been found uſeful as an antidote to aſcarides. It muſt be long uſed to produce any ſenſible effects. The doſe is from grs. v. to f.ʒſs., given twice or three times a day. See ÆTHIOPS *Mineral*.

Hydrargyri ſulphuretum rubrum, red ſulphuret of mercury, Hydrargyrus ſulphuratus ruber, P. L. 1787, Cinnabaris factitia, P. L. 1745, is prepared by melting 8 oz. of ſublimed ſulphur over the fire, and mixing in 40 oz. by weight, of purified mercury; and as ſoon as the maſs begins to ſwell, removing the veſſel from the fire, and covering it with conſiderable force, to prevent inflammation; then rubbing the maſs into powder and ſubliming.

Hydrargyri, Sulphuretum rubrum, Dubl. red ſulphuret of mercury, is prepared as in the laſt proceſs. Red ſulphuret of mercury is alterative and deobſtruent. It was formerly much uſed in cutaneous diſeaſes, gouty and rheumatic affections, and in caſes of worms, but it is now ſcarcely ever employed. It has been recommended for fumigations in ſyphilis; but on account of the ſulphurous vapours it is leſs fit for this purpoſe than the grey oxyd. The doſe for internal uſe is from grs. x. to ʒſs. made into an electuary or bolus.

Hydrargyri Subſulphas flavus, olim, *Turpethum minerale*, Edinb. yellow ſubſulphate of mercury, formerly, Turbith mineral, Hydrargyrus vitriolatus, P. L. 1787; alſo Mercurius emeticus flavus. For preparing it, take of purified mercury 4 oz.; ſulphuric acid 6 oz.; put them into a glaſs cucurbit, placed in a ſand-bath, and boil them to dryneſs; pulverize the white maſs which is left at the bottom of the veſſel, and throw it into boiling water; it will be immediately converted into a yellow powder, which is to be waſhed with frequent affuſions of warm water.

Hydrargyri Oxydum ſulphuricum, Dubl. ſulphuric oxyd of mercury, is prepared by diſſolving in a glaſs veſſel 1lb. of purified mercury, in $1\frac{1}{2}$lb. of ſulphuric acid, with a ſufficient degree of heat, and gradually raiſing the fire until the maſs be completely dried. This, by the affuſion of a large quantity of hot water, will immediately become yellow and fall into powder, which is to be well triturated with the water in an earthenware mortar. After pouring off the ſupernatant fluid, waſh the powder with repeated affuſions of hot diſtilled water, as long as any precipitate is produced in the decanted liquor on the addition of a few drops of water of ſubcarbonate of kali; and, laſtly, dry it.

This preparation is emetic, diſcutient, alterative, and errhine; but as its operation is violent, it is ſeldom adminiſtered as an internal remedy. As an errhine, it has been uſeful in chronic ophthalmia, and diſeaſes of the head; but in this caſe its acrimony ſhould be ſheathed by ſome bland powder, as ſtarch, or liquorice-root powder, in the proportion of grs. v. to gr. i. of the ſubſulphat. In doſes of gr. v. it operates as a very powerful emetic.

MERCURY, *Coralline*. See ARCANUM *Corallinum*.

MERCURY, *Fulminating*. This curious compound was diſcovered by Mr. Howard, who has given us the following proceſs for preparing it. Diſſolve 100 grains of mercury in $1\frac{1}{2}$ ounce, by meaſure, of nitric acid, of the ſpecific gravity of 1.3, with the aſſiſtance of heat. When this ſolution is cold, pour it upon two ounces, by meaſure, of alcohol: let this mixture be expoſed to heat till an efferveſcence takes place, when the heat muſt be withdrawn. The efferveſcence continues with violence for ſome time, accompanied by the evolution of a denſe white vapour, which Mr. Howard conceived to be the etherized nitrous gas combined with oxyd of mercury. During this proceſs a white powder gradually ſubſides, which muſt be well waſhed, filtered, and dried on a ſand-bath heated by ſteam, as a temperature a little higher would cauſe its exploſion. The powder thus obtained is rather cryſtalline in its appearance. When it is heated to 368°, it explodes with great violence, producing a vivid flaſh of light, with but little heat. The ſame exploſion takes place by the blow of a hammer, by an electric ſpark, and by flint and ſteel. The ſurface of the body on which it is exploded becomes always covered with a white film, which is the reduced mercury. This indicates that the oxygen of the oxyd has had ſome ſhare in producing the effect. The exploſion by means of a blow is ſo violent, as frequently to indent

indent the face of the hammer and the anvil. When concentrated fulphuric acid is added to fulminating mercury, it inftantly explodes. The dilute acid decompofes it without explofion. A gafeous fubftance is given out, which confifts of carbonic acid mixed with an inflammable gas, which burns with a greenifh flame. A white powder is at the fame time precipitated, which is the oxalat of mercury mixed with a little running mercury. The compofition of fulminating mercury is, therefore, found to be oxalat of mercury combined with the etherized nitrous gas. This fubftance has been fince examined by other chemifts. Fourcroy is of opinion that it may be varied in its properties by varying the procefs. When heat is continued during the whole time of the effervefcence, a fubftance is produced of a greenifh colour, which detonates with lefs force, and emits a blue flame when laid on hot coals. In this cafe, Fourcroy fuppofes it to contain ammonia, and more of the vegetable matter of the alcohol. We have before noticed that the oxalat of mercury has the property of exploding with the blow of a hammer. Hence it would appear, that any fubftance holding oxygen with flight affinity, and at the fame time combined with inflammable matter, particularly fuch as contains hydrogen, may conftitute an explofive compound. It is faid by Brugnatelli, that a nitrat of filver with excefs of acid being heated with alcohol, affords a fulminating fubftance more violent in its effects than the fubftance in queftion. This no doubt arifes from the oxygen of the filver giving up lefs of its fpecific caloric when it combines with that fubftance, and of courfe has more to give up when it combines with the inflammable matter derived from the alcohol. Notwithftanding the myftery fo much talked of in the firing of gunpowder, it might no doubt be proved that the light and heat given out when the explofion takes place, is the difference between what would be afforded by the combuftion of nitrogen, and the carbon and fulphur of the gunpowder. See Nitric *Acid*.

M. Bayen was the firft chemift who obferved the fulminating property of the oxyds of mercury when heated with fulphur; and hence mixtures of this kind have been denominated "Bayen's fulminating mercury." The moft powerful of thefe mixtures is thus prepared; to a folution of nitrat of mercury add lime-water, as long as any precipitate falls down; decant the clear liquor, and wafh the pulverulent oxyd with repeated portions of water, after which dry it on a water bath, and then grind it carefully in a mortar, with $\frac{1}{6}$th of its weight of flower of fulphur. This powder, when laid on a hot iron, explodes with confiderable force, undoubtedly in confequence of the fudden oxydation of the mercury, and the rapid combuftion of part of the fulphur; for if it is performed in a clofe veffel, to prevent the diffipation of the powder, the refult of its decompofition will be a reddifh violet-coloured fulphuret, fimilar to that procured in the ufual manner. Aikin's Dict.

Mercury, *Incalefcent*. See Incalescent.

Mercury, *Ointment of*. See Unguent.

Mercury, *Pills of*. See Pills.

Mercury, *Plafter of*. See Emplastrum and Plaster.

Mercury, or *Mercury of Bodies*, has been ufed by alchemifts to denote the third of the principles or elements of natural bodies, called alfo fpirit.

In this fenfe, mercury is defined the moft fubtile, light, volatile, penetrating, and active part of all bodies. See Spirit.

Mercury *of Life*, *Mercurius vitæ*, may, according to Mr. Boyle, be moderated in its evacuating quality, by continually ftirring it in a flat glazed earthen veffel, over a fire, till it emits no fumes, and turns of a grey colour; and he thinks this is the *mercurius vitæ furgans* fo often mentioned by Riverius. Boyle, Works abr. vol. i. p. 74.

Mr. Godfrey obferves, that what is called *mercurius vitæ*, prepared of fublimate mercury and antimony, has no mercury in it, but is the reguline part of the antimony, with the acid of the fublimate; and what remains is the mercury formed into cinnabar by the fulphur of the antimony. See Algarot.

Mercury *of Metals*, or of the *philofophers*, is a pure fluid fubftance in form of common running mercury, faid to be found in all mercury, and capable of being extracted from the fame.

The notion of mercury of metals is founded on the common fyftem of the alchemifts, that mercury or quickfilver is the bafis or matter of all metals; and that metals are only mercury fixed by a certain fulphur.

Mr. Boyle affures us, he had a way of drawing a true running mercury, or quickfilver, from antimony.

Mercury alfo ferves as a title for books, and papers of news; fo called from the heathen deity Mercury, fuppofed the meffenger of the gods.

In the like fenfe, Mercury is always figuratively applied to perfons who make it their bufinefs to collect news, or to run about and diftribute it.

Mercury, in *Heraldry*, denotes the purple colour in the coats of fovereign princes. See Colour.

Mercury, in *Mythology*, the fon of Jupiter and Maia. He was the god of merchandize, and therefore was fometimes painted with a wand in his left hand, and a bag of money in his right. He was alfo the god of eloquence, and the meffenger of the gods; and, as fuch, concerned in all treaties of peace and alliance. He is pictured, therefore, with a herald's ftaff in his hand, entwined with two fnakes; wings on his feet, to fhew his fpeed; and a broad-brimmed beaver with wings. He had a general power delegated to him by Jupiter, of conducting the fouls of men to their proper place, after their parting from the body; and re-conducting them to our world again, when there was any particular occafion for it. He was, moreover, the god of all gainful arts; whence the proverb κοινὸς ἑρμῆς, i. e. *commune lucrum*; efpecially of things found by chance, the inventor of the lyre, and of the exercife of wreftling. He was the patron of thieves, having himfelf been expert that way; and the guide of travellers, for which reafon he had ftatues four-fquare fet up to him in crofs-roads. (See Terminus.) There are feveral marks whereby Mercury may be known; among which we may reckon the lightnefs and agility of his perfon as the chief; but the moft remarkable of his diftinguifhing attributes are his petafus, or winged cap; the talaria, or wings to his feet; and his wand, with two ferpents about it, which they call his caduceus. Sometimes he is alfo reprefented with the chlamys, faftened over his fhoulders on his breaft, and floating behind him in the air. He is likewife diftinguifhed by his fword, with which he killed Argus, called Harpé. As the form of Mercury feems to be all intended for lightnefs and difpatch, the ancients might borrow this idea of him from his planetary character: thus Lucan, Pharfal. i. v. 663, in fpeaking of Mercury as the guiding intelligence of a planet, marks the fwiftnefs of its motion.

It has been faid, and not without reafon, that the Mercury of the Latins was the fame deity with the Hermes of the Greeks, the Theutat of the Gauls, and the Thot or Thaut of the Egyptians, from whom fome have thought they were derived. His name Hermes fignified Interpreter, or, or, according to Proclus, Meſſenger, or, if we trace it to a Celtic original, it was the ſame with *arines*, which ſignifies divination, a character which belonged by way of eminence to Mercury, who was diſtinguiſhed by his knowledge and practice of this art. The Latin appellation was derived, according to Feſtus, from a term denoting merchants, or rather merchandize, *i. e. Mercurius a Mercibus;* and among the Celts he obtained the name of Merk-ur, on account of his introduction of traffic among them. Lactantius, the grammarian, reckons four of this name, and according to Cicero there were five. Banier allows of none but the ancient Mercury, the Thot, Thaut, or Taautus of the Egyptians, and the Mercury, who, according to Heſiod, was the ſon of Jupiter and Maia. To this deity temples were built, and altars erected. There is no perſonage in profane antiquity more famous than the Egyptian Mercury. Being the ſoul of Oſiris's counſel, he was employed as his agent in the moſt important offices; and during his abſence in India, he aſſiſted Iſis, the queen, with his advice, and exerted himſelf with great aſſiduity and zeal in cauſing arts and commerce to flouriſh through the whole country of Egypt. As he was a proficient in various ſciences, he communicated his knowledge to the Egyptians, and eſtabliſhed among them a variety of inſtitutions, which contributed to their reputation and proſperity. Such is the account which is given of him by Herodotus and Diodorus Siculus. The ſecond Mercury, or the ſon of Jupiter and Maia, became famous among the Titan princes, and took poſſeſſion of Italy, Gaul, Spain, and Mauritania in Africa. This prince is ſaid to have travelled more than once into Egypt, in order to acquaint himſelf with the arts and ſciences, the manners and cuſtoms, and particularly the theology and magic of that country. He was thus enabled, upon his return, to inſtruct his own ſubjects, and to acquire that high reputation for which he was diſtinguiſhed, by exhibiting thoſe qualities and performing thoſe ſervices, which we have above recited. After various conteſts with the other ſons of Jupiter, by whom he was repeatedly vanquiſhed, he is ſaid to have retired into Egypt, where he died; though others ſay he ended his days in Spain, where his tomb was to be ſeen. Such, ſays Banier, is the hiſtory of Mercury, the Titan prince, which has been much diſguiſed by the Greeks, and blended with ſeveral fables. Mercury was worſhipped by the Gauls, as Cæſar informs us, but, as we learn from Kircher, (Œd. Ægypt.) in Egypt, where the prieſts conſecrated to him the ſtork, the animal moſt renowned among them next to the ox. It was chiefly in the month of May that his feſtival was celebrated, and the moſt ſolemn parts of his worſhip were performed.

The learned Bochart (Phaleg. l. i. c. 2.) traces the hiſtory of Mercury to that of Canaan. Both, he ſays, were the ſons of Jupiter, or Ammon, who was the ſame with Ham; one taking his name from *Mercatura*, merchandize, and Canaan, he ſays, had in Hebrew the ſame ſignification. As Canaan was the ſervant of his brethren, Mercury was the meſſenger of the gods. This deity had the charge of the highways, becauſe the Phœnicians or Canaanites of the race of Canaan were great travellers, and ſettled colonies whereever they migrated. The wings of this god are the ſails of the Phœnician veſſels. He was the god of eloquence, and the inventor of letters, becauſe the Phœnicians brought the uſe of them into the Weſt. Others repreſent Mercury as the ſame with Moſes, and compare the miraculous rod of that legiſlator to the caduceus of this god. Such is the opinion of Huetius.

This pagan divinity had two very diſtinct names and characters; the Egyptian, known by the title of Hermes, a grave and venerable perſonage, who received divine honours on account of his uſeful and extenſive talents for every thing that was conducive to the good of ſociety: the Mercury of the Greeks, on the contrary, was a profligate character; the god of thieves, the intriguing meſſenger of Jupiter, and uſeful to him in all his amours. But to both theſe divinities is aſcribed the invention of muſic and the lyre.

Among the various opinions of the ſeveral ancient writers who have mentioned this circumſtance, and confined the invention to the Egyptian Mercury, that of Apollodorus is the moſt intelligible and probable. "The Nile," ſays this writer, "after having overflowed the whole country of Egypt, when it returned within its natural bounds, left on the ſhore a great number of dead animals of various kinds, and among the reſt, a tortoiſe, the fleſh of which being dried and waſted by the ſun, nothing was left within the ſhell, but nerves and cartilages, and theſe being braced and contracted by deſiccation, were rendered ſonorous; Mercury, in walking along the banks of the Nile, happening to ſtrike his foot againſt the ſhell of this tortoiſe, was ſo pleaſed with the ſound it produced, that it ſuggeſted to him the firſt idea of a lyre, which he afterwards conſtructed in the form of a tortoiſe, and ſtrung it with the dried ſinews of dead animals."

Of the Grecian Mercury, Horace, Ode x. lib. 1. gives us the beſt part of his character:

"Thou god of wit, from Atlas ſprung,
Who by perſuaſive power of tongue,
And graceful exerciſe, refin'd
The ſavage race of human kind,
Hail! winged meſſenger of Jove,
And all th' immortal powers above.
Sweet parent of the bending lyre,
Thy praiſe ſhall all its ſounds inſpire.
Artful and cunning to conceal
Whate'er in ſportive theft you ſteal,
When from the god who gilds the pole,
E'en yet a boy, his herds you ſtole:
With angry voice the threat'ning pow'r
Bad thee thy fraudful prey reſtore,
But of his quiver too beguil'd,
Pleas'd with the theft, Apollo ſmil'd.
You were the wealthy Priam's guide,
When ſafe from Agamemnon's pride,
Through hoſtile camps, which round him ſpread
Their watchful fires, his way he ſped.
Unſpotted ſpirits you conſign
To bliſsful ſeats and joys divine,
And, powerful with thy golden wand,
The light unbodied crowd command;
Thus grateful does thy office prove
To gods below, and gods above." Francis.

This ode contains the ſubſtance of a very long hymn to Mercury, attributed to Homer. See HERMES.

MERCURY *Bay*, in *Geography*, a bay on the N.E. coaſt of the northernmoſt of New Zealand, ſo called by lieutenant Cook, who anchored here in 1769, examined the adjoining country, and in November of the ſame year obſerved the tranſit of Mercury over the ſun, from which planet it derived its name. Southward and northward of this bay, there are ſeveral iſlands, and a ſmall iſland or rock in the middle of the entrance; within which iſland the depth of water no where exceeds nine fathoms. The beſt anchoring is in a ſandy bay, which lies juſt within the ſouth head, in five and four fathoms. This place is very convenient both for wooding and watering, and in the river there is an immenſe quantity of oyſters

oysters and other shell-fish, whence it was called by Cook the "Oyster river." But for a ship that wants to stay here any time, the best and safest place is in the river at the head of the bay, which, from the number of mangrove trees about it, was called "Mangrove river." To sail into this river, the south shore must be kept all the way on board. The country on the east side of the river and bay is very barren: its only produce being fern, and a few other plants that will grow in a poor soil. The land on the N.W. side is covered with wood, and the soil being much more fertile, would, with proper cultivation, produce all the necessaries of life; it is not, however, so fertile as the land observed by our navigators to the southward; nor do the inhabitants, though numerous, make so good an appearance: they have no plantations; their canoes are mean, and without ornament; they sleep in the open air; and say, that Teratu, whose sovereignty they do not acknowledge, if he were to come among them, would kill them. This favoured an opinion of their being outlaws; though they had "Heppahs," or strong holds, to which they retired in time of imminent danger. On the shore, in several parts of the bay, were found great quantities of iron sand, which is brought down by every little rivulet of fresh water, that finds its way from the country; a circumstance which demonstrates that there is ore of that metal not far inland; nevertheless none of the inhabitants of this place, or any other part of the coast, observed by Cook and his companions, knew the use of iron, or set the least value upon it: all of them preferring the most worthless trifle, not only to a nail, but to any tool of that metal. Our navigators, before they left the bay, cut upon one of the trees near the watering place, the ship's name and that of the commander, with the date of the year, and month when they were there; and after displaying the English colours, took a formal possession of it in the name of his Britannic majesty king George III. S. lat. 36°47′. W. long. 184° 4′. Hawkesworth's Voyages, vol. ii.

MERCURY *Point*, a cape on the E. coast of New Zealand, forming the N.E. point of Mercury bay.

MERCURY *Isles*, a cluster of small islands in the South Pacific ocean, near the E. coast of New Zealand, situated in a line, a little N.E. of Mercury Point.

MERCY, in *Ethics*, has the same general nature and sources as *compassion*, which see; and seems to differ from it only in this, that the object of it has forfeited his title to happiness, or the removal of misery, by some demerit, particularly against ourselves. Here, therefore, resentment on account of an injury done to ourselves, or what is called a just indignation against vice in general, interferes, and checks the otherwise natural course of our compassion, so as, in the unmerciful, entirely to put a stop to it. But in the merciful, the sources of compassion prevail over those of resentment and indignation; whence it appears, that the compassion required in acts of mercy is greater than in common acts of mere compassion; agreeably to which it is observable, that mercy is held in higher esteem than mere compassion. The mercy of God is that attribute of the divine nature, or that modification of benevolence, which respects the misery of mankind in connection with their offences and demerit; and the exercise of it makes provision for their relief by affording them the means of recovery, by repentance and reformation, so that they may become fit objects of pardon and favour.

MERCY, in *Law*. See MISERICORDIA.

MERCY, *Order of our Lady of*, was instituted, for the redemption of captives, as several writers affirm, by James I. king of Arragon, in 1218; but others, on better authority, attribute the institution of the order to Peter Nolasque, a native of Mar des Saintes Puelles, a town in the diocese of St. Papoule, one league distant from Castelnaudary. The badge worn by the knights at their breast was a small shield per fess gules and or; in chief, a cross pattée argent; in base four pallets gules, for Arragon: the shield crowned with a ducal coronet.

MERCY, *Religious Order of*, is said to have been instituted and liberally endowed, for ladies, in 1261, by Mary du Secours, a woman of quality born at Barcelona: the ladies of this order wore at their breast a small shield of the arms of the order, exactly similar to that worn by the knights.

MERCY-*Seat*, in *Scripture History*. See ARK *of the Covenant*.

MERDDIN, in *Biography*, the son of Mervyn, a celebrated Welsh poet, who flourished about A. D. 560. He ranked with Merddin Emyls, and Taliessin, as the three principal Christian bards of Britain. Merddin is said to have slain his nephew in battle, on which account he secluded himself from society in a wood, whence he is called Merddin the Wild. Owen's Camb. Biog.

MERDESENGI. See MARDAC.

MERDIN, or MARDIN, in *Geography*, a fortified town of Asiatic Turkey, in the province of Diarbekir. It is situated at the top of a very lofty and rugged mountain, surrounded by a strong and lofty wall of hewn stone, and guarded by a strong fort on the summit of the mountain, furnished with a few cannon. This town is of a considerable size, and very populous. It is the see of a bishop, and the greater part of its inhabitants consists of Armenians, who are very industrious, and carry on several manufactures. They are hospitable and well disposed, enjoy a pure air, and in general appear ruddy and healthy. Many of the women are beautiful. Provisions, and particularly vegetables, are plentiful, good, and cheap; and they have also most kinds of fruits, of excellent quality, the climate being very hot in the vallies, and temperate on the mountains. It is the residence of a pacha, in whose train are 200 spahis and 500 janizaries. This town, which seems to have been called "Zibin" by Rauwolf, was taken and sacked by Timur Bec, but the fortress was invincible; 50 miles S. of Diarbekir. N. lat. 37° 19′. E. long. 40°.

MERDIVORÆ, from *merda*, *dung*, and *voro*, *I devour*, the *dung-eaters*, in *Natural History*, the name given by authors to several flies, which feed on excrements of different animals. Of these there are three kinds very common among us; 1. The coprophagos, which is of a dun colour, with a reddish head, and a white streak along the middle of it: 2. The red dung-fly, which has silvery wings, a red body, and black shoulders: and, 3. The green one, which is of a very glittering hue, and has silvery wings.

MERDOO, in *Geography*, a town on the N. coast of the island of Sumatra. N. lat. 5°. E. long. 96° 20′.

MERDRIGNAC, a town of France, in the department of the Northern Coasts, and chief place of a canton, in the district of Loudéac; 13 miles E. of Loudéac. The place contains 2134, and the canton 10,044 inhabitants, on a territory of 302½ kiliometres, in nine communes.

MERE, a town of Norway, in the government of Drontheim; 68 miles N. of Drontheim.

MERE, a small market-town and parish, situated in the hundred of Mere, and county of Wilts, England. The parish is of an angular shape, and is bounded on two sides by the counties of Somerset and Dorset. Hence it is supposed to have derived its name. *Mere*, in the Saxon language, is often used to denote a boundary or land mark. The appearance of the town is that of a straggling village, the houses

houses being ill arranged and very indifferently built. In the middle of it stands a small cross or market-house, where a weekly market is held on Thursdays, and two fairs annually. According to the parliamentary returns of 1801, it contained 181 houses, and 381 inhabitants. A manufactory of bed-ticking and dowlas is carried on here chiefly by the women. The church is an extensive edifice, ornamented at one end by a handsome tower. The living is vicarial, and in the gift of the dean of Salisbury. In the parsonage house was born Francis Potter, one of the most singular mechanical geniuses of his age.

On an eminence still called Castle-hill, immediately adjoining the town, formerly stood a castle, but few traces of its walls can now be discovered. Some encampments appear in this neighbourhood, one of which, called by Leland "White-shole-hill," is surrounded by a double trench, and was probably occupied by the Danish army, previous to some engagement with the celebrated Alfred.

About two miles N.W. of Mere is the parish of Stourton, in which is a noble seat, named Stourhead, the seat of sir R. C. Hoare, bart. This gentleman has distinguished himself in the literary annals of the present age, by the publication of some interesting and handsome works on the topography and antiquities of Great Britain. One of these, entitled "The History of Ancient Wiltshire," contains much new and curious information respecting the characteristics of encampments, barrows, stonehenge, &c. and a particular account of some singular excavations, called Penn-pitts, in this neighbourhood. Stourhead is justly noted among the handsome seats of this county; and though the house has no prominent architectural beauties, yet it is stored with choice pictures, with drawings, and an extensive and well selected library. The pleasure grounds, woods, and water, display many picturesque and sylvan beauties, and the whole demesne is highly impressive and interesting. See Britton's Beauties of Wiltshire.

MERECZ, a town of Lithuania, in the palatinate of Troki, at the conflux of the Merecz and the Niemen; 28 miles N. of Grodno.

MEREDITH, Cape, a cape among the Falkland islands, in the South Atlantic ocean, between port Stephen's and cape Orford.

Meredith, a township of America, in Strafford county, New Hampshire, on the S.W. side of lake Winipiscogee; 15 miles N. of Gelmantown, and nine S.E. of Plymouth; incorporated in 1768, and first called New Salem.—Also, a post-town in Delaware county, New York; 25 miles S. of Cooperstown.

MEREEGA, Hammam, *i. e.* the baths of Mereega, formerly the "Aquæ Calidæ Coloniæ," a town of Algiers, in the province of Tlemsan or Tremecen, situated half way betwixt the shelliff and the sea, eight miles E.N.E. of Maliana, and celebrated for its hot baths. The largest and the most frequented of them is a bason 12 feet square, and four deep: and the water, which bubbles up in a degree of heat scarcely supportable, after it has filled this cistern, passes on to a much smaller one used by the Jews, who are not permitted to bathe in company, or in the same place with the Mahometans. These baths were formerly covered, and had corridores surrounding the basons; but they now lie exposed to the weather, and are half filled with stones and rubbish. Neverthelefs they are resorted to by a great concourse of people in the spring, which is the season of these waters; accounted very efficacious for curing the jaundice, rheumatic pains, and some of the most inveterate distempers. Higher up the hill is another bath, which being of too intense a heat for bathing, has its water conducted through a long pipe into another chamber, where it is used in "Duccian," an operation similar in its nature and effect with pumping. Betwixt this and the lower bath are the ruins of an old Roman town equal to that of "Herba; and at a little distance from it are tombs and coffins of stone, of an unusual size; 24 miles S.E. of Shershell. Shaw's Travels.

MERENDERA, in *Botany*, a name given by the Spaniards to this plant and some that resemble it, and which may perhaps be tolerated, like a few others of barbarous origin, as being sufficiently harmonious. Ramond Bullet. Philomat. n. 47. 178. t. 12. f. 2. Redout. Liliac. v. 1. 25.—Class and order, *Hexandria Trigynia*. Nat. Ord. *Coronariæ*, Linn. *Junci*, Juss.

Cal. Sheath of one leaf. *Cor.* of six petals, funnel-shaped, equal; claws erect, long and linear; borders elliptic-lanceolate, spreading. *Stam.* Filaments six, thread-shaped, equal, inserted into the claws of the petals, shorter than the limb, permanent; anthers terminal, erect, awl-shaped. *Pist.* Germen three-lobed, superior, somewhat stalked, oblong, acute; styles thread-shaped, the length of the stamens; stigmas simple. *Peric.* Capsule stalked, oblong, three-lobed, acute, of three valves and three cells, opening at their inner edge. *Seeds* several in each cell, obovate, stalked, ranged along the margins of each valve.

Ess. Ch. Sheath of one valve. Petals six, with long claws. Anthers vertical. Capsule of three cells, opening at their inner edge. Seeds several.

1. M. *Bulbocodium*. Pyrenean Merendera. Redout. Liliac. t. 25. (Bulbocodium vernum; Desfort. Atlant. v. 1. 284, excluding the synonyms, according to Redouté, but the description does not entirely agree. Colchicum montanum minus, versicolore flore; Clus. Hist. v. 1. 201. Ger. em. 160.)—Found in the grassy pastures of the highest of the Pyrenean mountains, flowering at the commencement of autumn, and ripening seed in the following spring. *Root* an ovate bulb. *Stem* none. *Leaves* three or four, produced after the flower is past, radical, spreading, linear, acute, channelled, smooth, a span long. *Flower* solitary, radical, the size of a small Crocus, with purplish rose-coloured petals, white at their base, and yellow anthers. *Capsule* small, brown, elevated on a stalk two inches high.—We have copied from Redouté the quotation of Ramond. This plant might perhaps, without violence to nature, be referred to *Colchicum*.

MERETRIX, among the Romans. The meretrices were the better sort of courtezans, and differed much from the *prostibulæ*, or common prostitutes, who had bills or inscriptions, *tituli*, over their doors, and were ready at all times to entertain their customers, whereas the meretrices entertained none but at night.

The meretrices were distinguished from the matrons by their dress, being obliged to wear the *toga* and short tunics, like those of the men; whereas the matrons wore the *stola*, which was a garment that reached down to their feet, as did likewise their *palla*, or outer robe.

MÉRÉVILLE, in *Geography*, a town of France, in the department of the Seine and Oise, and chief place of a canton, in the district of Corbeil; 10 miles from Estampes. The place contains 1307, and the canton 8012 inhabitants, on a territory of 240 kilometres, in 20 communes.

MERG, a town of Africa; 30 miles N. of Fez.

MERGANSER, in *Ornithology*, the name of a large water-fowl, called in English the *goosander*, and by some authors the *harle*.

This is the Mergus merganser in the Linnæan system: the bill of the male of this species is about three inches long,

long, narrow, and finely ferrated: the colour of the bill as well as of the irides is red; the head is large, and the feathers on the hind part long and loofe; the colour black, finely gloffed with green; the upper part of the neck the fame; the lower part and under fide of the body of a fine pale yellow; the upper part of the back and inner fcapulars are black; the lower part of the back and tail are afh-coloured; the tail confifts of eighteen feathers; the greater quill-feathers are black, the leffer white, fome of which are edged with black; the coverts at the fetting on of the wings are black; the reft white; and the legs of a deep orange colour. Pennant. See MERGUS.

MERGEN, a word ufed by fome of the chemical writers to exprefs coral.

MERGENTHEIM, in *Geography*, a town of Germany, on the S. fide of the Tauber; the refidence of the grand mafter of the Teutonic order, and feat of the regency; 25 miles S.S.W. of Wurzburg. N. lat. 49° 21′. E. long. 9° 27′.

MERGER, in *Law*, is where a leffer eftate in lands, &c. is drowned in the greater; as, if the fee comes to tenant for years or life, the particular eftates are merged in the fee: but an eftate tail cannot be merged in an eftate fee; for no eftate in tail can be extinct, by the acceffion of a greater eftate to it. If a leffor, who had the fee, marries with the leffee for years, this is no merger, becaufe he hath the inheritance in his own, and the leafe in right of his wife. And where a man hath a term in his own right, and the inheritance defcends to his wife, fo that he hath a freehold in her right, the term is not merged or drowned.

MERGIAN, in *Geography*, a town of Perfia, in the province of Segeftan; 32 miles S.S.W. of Kin.

MERGUEN HOTUN, a town of Chinefe Tartary; 670 miles N.N.E. of Peking. N. lat. 49° 12′. E. long. 142° 20′.

MERGUI, a fea-port town of the kingdom of Siam, fituated S. of Tavoy, on an ifland near the E. coaft, with a harbour that is accounted one of the beft in India. The fea near the coaft being full of iflands, is denominated by captain Forreft the Mergui Archipelago. N. lat. 12° 6′. E. long. 98° 23′.

MERGUS, in *Ornithology*, a genus of birds of the order Anferes. The trivial name of this genus is *Merganfer*: the bill is toothed, flender, cylindrical, hooked at the point; noftrils fmall, oval, in the middle of the bill; feet four-toed, the outer toe longeft. There are ten fpecies, of which five are common to our country; the others are natives of Europe and America. The birds of this genus live on fifh, and are very deftructive in ponds.

Species.

CUCULLATUS, Crefted Merganfer. Creft globular, white on each fide; body above brown, beneath white. It inhabits North America; and is 17 inches long; it builds near lakes, forming its neft of grafs, and down plucked from its own breaft; lays from four to fix eggs. The bill and legs are black; irids golden; creft larger than the head, edged with black. The female is brown; creft lefs, ferruginous.

* MERGANSER, Goofander. Subcrefted; white head; neck, upper part of the breaft, and wings gloffy-black; tail cinereous. It weighs about four pounds when full grown; its length is two feet four inches. It is found in Europe, Afia, and America. Sometimes the goofander vifits our rivers and lakes in fevere winters, but retires to the more northern latitudes to breed. It has been known to build on trees, like the cormorant, but more frequently among rocks or ftones, and lays 14 eggs, which, with the bird itfelf, are eagerly devoured by the weazel. It fwims with its head above the water; dives deep; remains a long time below, and rifes at a confiderable diftance. Its flefh is rancid, though fometimes eaten. In queft of fifh, it dives with great celerity, and holds its flippery prey with great fecurity by means of its toothed bill, fo admirably adapted to the purpofe. Bill, legs, and irids red; greater quill-feathers black, leffer white.

* CASTOR, Dun-diver. Crefted, cinereous; head and upper part of the neck bay; chin, middle quill-feathers, and belly white. It weighs about two pounds and a half, meafures twenty-five inches in length. Inhabits the fame countries with the preceding. It has been regarded by fome naturalifts as the female of another fpecies, but the labyrinth, or enlargement at the bottom of the wind-pipe, feems to others to prove it to be a male, and confequently a diftinct fpecies. Bill and irids red; belly fometimes flefh-colour

* SERRATOR, Red-breafted Merganfer. Creft pendent; breaft variegated with reddifh; collar white; tail-feathers brown, varied with cinereous. It inhabits the northern parts of Europe, Afia, and America; and is 21 inches long. The bill beneath and legs are red; feathers of the fides of the breaft large, white, edged with black, covering the fore-part of the folded wings. In the *male* the hind-head is crefted; head and upper part of the neck green. The *female* is fcarcely crefted at all; the head and beginning of the neck rufous. There are two other varieties diftinguifhed by differences of colouring marks; the *fecond* above is black, beneath white; greater quill-feathers black; tail brown; variety of the male: the *third* is above black, beneath white; neck bay; wings with a tranfverfe white ftripe; greater quill-feathers and tail black; variety of the female.

IMPERIALIS, Imperial Goofander. Varied with black, brown, and grey; head fmooth; firft quill-feathers black; it has no wing-fpot; bill and legs reddifh-white. It inhabits Sardinia; is the fize of a goofe; and the tongue fringed.

* ALBELLUS, Smew or White Nun. Creft pendent; hind-head black; body white; back and temples black; wings variegated. Inhabits Europe and America; breeds in the Arctic regions, and is driven to the fouth only by fevere weather. Bill and legs black; wing-fpot white; oval fpot from the bill furrounding the eyes, back, and two arched lines on each fide near the beginning of the wings, black. Female, head fmooth, grey; band acrofs the eyes black, and under the eyes a white fpot; body above blackifh-brown, beneath white; upper part of the head bay; chin white.

* MINUTUS, Minute Merganfer. Brown-afh, beneath and chin white; head and upper part of the neck ferruginous; wing-fpot white before and behind. There is a variety having a fmooth head; black back; belly white; bill and legs blood-red; firft quill-feathers black; tail cinereous.

FURCIFER, Fork-tailed Merganfer. Black; head fmooth; hind-head, neck, vent, belly, and lateral tail-feathers white; front and cheeks pale brown; the tail is forked. Bill black; dirty-red at the fides; from the ears on each fide, through the fides of the neck to the breaft, there is a black band.

FUSCUS, Brown Merganfer. Crefted; brown, beneath white; chin and breaft fpotted with black; wings black with a white band. It is found in Hudfon's bay, and is 17 inches long. Hind-head crefted; behind the eyes a white band

band extending to the nape; lower part of the creſt black; breaſt blueiſh waved with whitiſh; legs yellowiſh.

Cæruleus, Blue Merganſer. Creſted; blue; crown and tail black; chin, belly, and ſpot on the wings white. It inhabits Hudſon's bay, and is 14 inches long. The bill of this ſpecies is long and black; legs are blue. We ſhall now conclude this article with ſome general obſervations on the whole genus.

Theſe birds, with few exceptions, are of a middle ſize, between that of a gooſe and of a duck. The edges of both mandibles are ſerrated, the tongue is thick, ſet with ſmall briſtles pointing backward; an happy contrivance for holding the ſlippery fiſhes which form their prey, and conducting it into the bird's throat. They ſwallow with an undiſtinguiſhable voracity, fiſhes, that are by far too large to enter entire into the ſtomach; and hence, while the one end is digeſting in the œſophagus, the other often remains in the throat.

The head and back of the merganſer are black, beautified with a gloſs of green. The lower parts of the body are white, the breaſt tending to a pale yellow. The tail is grey, the eyes, feet, and part of the bill, are red. As this bird is obliged to ſearch for its food by diving, it is capable of remaining a long time under water; and for this purpoſe, is furniſhed with a quantity of air, lodged in a cavity of its body, to ſerve the purpoſe of reſpiration while it remains below.

The merganſers, from their voracity, and their expertneſs in ſwimming, are perhaps the moſt deſtructive of all birds that plunder the waters; while their fleſh, which is dry, and of a bad flavour, makes but a ſmall compenſation for the devaſtations which they commit.

Some of them build in trees; but the greater part in rocks, jutting over precipitous forelands. One or two ſpecies are ſaid to have been found as high up the North ſeas as Iceland, but this is uncommon. In all the ſpecies, the female is of a ſmaller ſize than the male, and differs conſiderably in the diſtribution of her colours. Her head is red; and the mantle or back and neck-feathers grey. The white nun is the moſt beautiful of the whole tribe; the white plumage of the fore parts, and the black mantle that covers its back, are each perfect in their kind; the tuft of ſmall detached feathers white upon the crown, but of a dark green ſhaded with purple upon the hind part, produces a very elegant effect; while to complete this modeſt and religious dreſs of the white nun, the lower part of the neck is half ſurrounded with a collar of long ſilky feathers like velvet.

Mergus *cirratus minor*, in *Ornithology*, a name by which Geſner calls the *capo negro*, a ſpecies of duck, called in Engliſh the *tufted duck*.

MERIANA, and Merianella, in *Botany*. See Antholyza and Watsonia.

MERIANIA, named by Swartz in memory of Maria Sybilla Merian, daughter of a German engraver, who was born at Frankfort on the Maine, April 12th 1647, and was the wife of John Andrew Graff. This lady is celebrated for her zeal in the purſuit of natural hiſtory, eſpecially in what relates to the metamorphoſes of inſects, and for her great ſkill in the uſe of the pencil. She publiſhed a work, of which there have been ſeveral editions, in folio or quarto, with plates, on European inſects, and the plants they feed upon; but her moſt famous book, detailing the metamorphoſes of Surinam inſects, is a ſplendid folio, of which original coloured copies are very rare and valuable. Botany was with her a ſecondary object, nor are her delineations, however magnificent, always remarkable for accuracy. She performed ſeveral voyages in purſuit of her favourite object. Sir Hans Sloane purchaſed what were ſuppoſed to be her original drawings on vellum, but the copy exhibited in the Britiſh Muſeum, has certainly marks of the graver, though it may have been coloured by her hand. She died at Amſterdam in 1717.—Swartz Ind. Occ. 823. Willd. Sp. Pl. v. 2. 600.—Claſs and order, *Decandria Monogynia*. Nat. Ord. *Calycanthemæ*, Linn. *Melaſtomæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, campanulate, permanent, its margin in five, ſhort, obtuſe, membranous ſegments, each accompanied by a long, external tooth. *Cor.* Petals five, inſerted below the throat of the calyx, ovate, ſomewhat leathery, ſpreading, deciduous. *Stam.* Filaments ten, fixed internally to the five-ſided margin of the calyx, within the petals, broad at the baſe, bent in the upper part; anthers long, broadiſh, bent backward, pointed at the ſummit, opening there by two pores. *Piſt.* Germen ſuperior, roundiſh, five-ſided, in the bottom of the calyx; ſtyle thick, club-ſhaped, bent downward; ſtigma obtuſe. *Peric.* Capſule in the bottom of the bell-ſhaped calyx, covered by the calyx; but unconnected with it, naked above, roundiſh, five-ſided, five-celled, five-valved; the partitions contrary to the valves. *Seeds* numerous, minute. *Recept.* creſcent-ſhaped.

Eſſ. Ch. Calyx bell-ſhaped, five-cleft. Petals five, inſerted into the calyx. Stamens declining. Capſule diſtinct, of five cells; the partitions contrary to the valves. Seeds numerous.

1. M. *leucantha*. White-flowered Meriania. Swartz Ind. Occ. 826. t. 15. f. *a*. (Rhexia leucantha; Swartz Prod. 61.)—Leaves oblong, ſhining. Flowers with two bracteas.—Native of the higheſt mountains of Jamaica, flowering in the ſummer and autumn.—This is a ſhining, elegant *tree*, whoſe ſtraight *trunk*, covered with a ſmooth *bark*, is from 15 to 30 feet in height. *Branches* erect, roundiſh, ſmooth; ſmaller ones quadrangular, compreſſed, furrowed, brittle. *Leaves* oppoſite, croſſing each other in pairs, ovate-oblong, pointed, three-nerved, toothed and cartilaginous at the margin, paler, and beautifully veined like net-work beneath; ſmooth on both ſides; very ſhining, four or five inches long; on angulated ſmooth *footſtalks* which are channelled above. *Flower-ſtalks* at the axils of the terminal leaves, oppoſite, ſolitary, remote, an inch and a half long, round, compreſſed, erect, ſingle-flowered, ſmooth. *Bracteas* two, oppoſite, nearly ſeſſile, ovato-lanceolate, pointed, entire, three-nerved, pale. *Flowers* large and handſome, white, or ſlightly fleſh-coloured, inodorous, ſomewhat drooping.

2. M. *purpurea*. Purple Meriania. Swartz Ind. Occ. 829. t. 15. f. *b*. (Rhexia purpurea; Swartz Prod. 61.)—Leaves ovato-lanceolate. Flowers with four bracteas.—Grows in ſimilar ſituations to the laſt, and flowers in autumn. The preſent ſpecies differs chiefly from *M. leucantha* in being conſiderably ſmaller, in having its *leaves* of a browniſh-green, its ſmaller branches round, not quadrangular, and its *flowers* of a deep blood or purple colour, accompanied by four *bracteas* inſtead of two. The corolla in each ſpecies is as large as that of a ſingle wild roſe. We find the ſecond ſpecies, in the herbarium of the younger Linnæus, marked *Wrightia ſuperba*, and we recollect to have ſeen the ſame name at Sir Joſeph Banks's, which, when the genus was eſtabliſhed, ought to have been retained in juſtice to a very indefatigable collector and botaniſt who firſt ſent the ſpecimens to Europe, Dr. Wm. Wright, now of Edinburgh.

MERJAPOUR, in *Geography*, a town of Hindooſtan, in Bahar; 28 miles S.S.W. of Bahar.

MERIBASA, a river of Asiatic Turkey, which runs into the Mediterranean, near Adana.

MERICHSWAND, a fertile tract of Switzerland, in the canton of Luccon, four miles long, and two broad, separated from the rest of the canton. In it is a parochial village near the Rufz.

MERIDA, an ancient town of Spain, in Estramadura, seated on an eminence, near the Guadiana. It was anciently large, populous, and flourishing, and much embellished by the Romans, so that it now only presents an image of its former grandeur and magnificence. This town became a colony under the emperor Augustus, and being peopled, after the war with the Cantabrians, with soldiers of the 5th and 10th legions, took the name of that prince, and was called "Emerita Augusta." (See AUGUSTA.) Writers differ about its extent; some assigning to it eight miles, and others six leagues of circumference. It was, however, the largest in Spain, under the Romans. Under the dominion of the Goths, it preserved its monuments; but when it was taken by the Moors, A.D. 713, it was very much ransacked and destroyed. From them it was retaken by Alphonso IX., king of Castile and Leon, in 1230; and from that period it has been always attached to the kingdom of Castile. It lies in that part of Spain which the Romans called Vetonia; but notwithstanding its former extent and populousness, the number of its present inhabitants scarcely amounts to 5000. Under the Gothic kings it was the see of an archbishop, and the seat of some provincial councils. The archiepiscopal see was removed to Compostella by pope Calixtus II., under king Alphonso VII., whilst this town was in the possession of the Moors. When it was retaken by Alphonso IX., he gave it to the military order of St. James, and it still belongs to this order. Merida took as arms the reverse of a medal struck under Augustus for commemorating its erection into a Roman colony; this is a gate of a town formed by two arches with two towers, and a semicircular enclosure, which extended from one to the other. It still affords considerable wrecks of its ancient magnificence under the Romans. Here they built superb bridges and magnificent temples; triumphal arches and beautiful aqueducts; here they raised edifices for public feasts and games; a circus, a theatre, and a naumachia. The vestiges of these grand public monuments are still visible; of which some are in and others out of the town. The baths are in a better state of preservation than most of the other monuments. In its vicinity are two large reservoirs of water, resembling lakes, called Albafera and Albuera. One is 90 feet long, and 51 deep, surrounded by thick walls, and ornamented with two beautiful towers; about a league from the town. The other is at the distance of two leagues; it is small, but the walls which contain the waters, and the great tower which serves as an aperture for air, are much finer. The environs of Merida are pleasant and fertile; abounding in wine, good fruits, and grain, with excellent pasture; nine leagues from Badajoz. N. lat. 38° 48′. W. long. 6° 3′.

MERIDA, the capital of Yucatan, in the audience of Mexico; lying near the N. side of the province between the gulfs of Mexico and Honduras; the residence of a governor, and see of a bishop; 130 miles N.E. of Campeachy. N. lat. 21° 38′. W. long. 90° 36′.—Also, a town of South America, in the government of Caraccas, founded in 1558 by John Rodriguez Suarez, under the name of Santiago de los Caballeros, and situated in a valley three leagues long, and about three quarters of a league wide in its broadest part. It is surrounded by three rivers, Mucujun, Albarregas, and Chama, neither of which is navigable. At some distance from the city are plantations of sugar, cacao, and coffee. All the environs of Merida abound with fruits, maize, beans, peas, potatoes, cassada, wheat of the finest quality, barley, &c. Excellent meat is purchased here at a very moderate price. The climate is variable, so that every day it experiences the four seasons of the year. The west wind is particularly insalubrious; the rains are heavy, and fall through the year, but with peculiar violence from the month of March to November. This city is the see of a bishop and a chapter. It possesses a college and seminary for the education of ministers who conduct the Catholic worship; and for other classes of inhabitants. The orders of St. Dominic and of St. Augustin, and also of St. Clair, have each a convent; and besides the cathedral, they have several places of worship. The number of inhabitants at Merida amounts to 11,500, of all colours and of all classes. No class here disdains labour; the white are employed in agriculture, the rearing of cattle, and the offices of the ecclesiastical state. The people of colour fabricate different articles of cotton and wool. Merida is distant from Maracaibo 80 leagues to the S.; from Caraccas 140 leagues to the S.E., and from Varinas 25 leagues S.E. N. lat. 8° 10′. W. long. 73° 45′.

MERIDIAN, in *Astronomy*, a great circle of the sphere, passing through the zenith, nadir, and poles of the world, crossing the equinoctial at right angles, and dividing the sphere into two hemispheres, the one eastern, and the other western.

It is called meridian, from the Latin *meridies, noon,* or *mid-day,* because when the sun is in this circle, it is noon in those places situated under it.

MERIDIAN, in *Geography*, is a great circle, as P A Q D, (*Plate* I. *Geography*, *fig*. 9.) passing through the poles of the earth P and Q: and any given place at Z. So that the plane of the terrestrial meridian is in the plane of the celestial one.

Hence, 1, as the meridian invests the whole earth, there are several places situated under the same meridian. And, 2, as it is noon-tide whenever the centre of the sun is in the meridian of the heavens; and as the meridian of the earth is in the plane of the former; it follows, that it is noon at the same time, in all places situate under the same meridian. 3. There are as many meridians on the earth as there are points conceived in the equator. In effect, the meridians always change, as you change the longitude of the place; and may be said to be infinite; each respective place from east to west having its respective meridian.

MERIDIAN, *First*, is that from which the rest are accounted, reckoning from west to east. The first meridian is the beginning of longitude.

The fixing of the first meridian is a matter merely arbitrary; and hence different persons, nations, and ages, have fixed it differently; whence some confusion has arisen in geography. The rule among the ancients was, to make it pass through the place farthest to the west that was known. But the moderns knowing that there is no such place in the earth as can be esteemed the most westerly, the way of computing the longitudes of places from one fixed point is much laid aside.

Ptolemy assumed the meridian that passes through the farthest of the Canary islands as his first meridian; that being the most western place of the world then known. After him, as more countries were discovered in that quarter, the first meridian was removed farther off. The Arabian geographers chose to fix the first meridian upon the utmost shore of the western ocean. Some fixed it to the island of St. Nicholas, near Cape Verd; Hondius to the isle of St. James; others to the island of Del Corvo, one of the

Azores;

Azores; becauſe on that iſland the magnetic needle, at that time, pointed directly north, without any variation; and it was not then known that the variation of the needle is itſelf ſubject to variation. The lateſt geographers, particularly the Dutch, have pitched on the Pike of Teneriffe; others on the iſle of Palm, another of the Canaries; and, laſtly, the French, by command of their king, on the iſland of Ferro, another of the Canaries.

But, without much regard to any of theſe rules, our geographers and map-makers frequently aſſume the meridian of the place where they live, or the capital of their country, for a firſt meridian; and thence reckon the longitudes of their places.

The aſtronomers in their calculations uſually chooſe the meridian of the place where their obſervations are made, for their firſt meridian; as Ptolemy, at Alexandria; Tycho Brahe, at Uranibourg; Riccioli, at Bologna; Mr. Flamſteed, at the Royal Obſervatory at Greenwich; and the French, at the Obſervatory at Paris.

Meridian *of a Globe*, or *Sphere*, is the brazen circle in which the globe hangs and turns. See Globe.

It is divided into four nineties, or three hundred and ſixty degrees, beginning at the equinoctial: on it, each way, from the equinoctial, on the celeſtial globe, is counted the ſouth and north declination of the ſun or ſtars; and on the terreſtrial globe, the latitude of places north and ſouth. There are two points on this circle, called the *poles;* and a diameter, continued from thence through the centre of either globe, is called the axis of the earth, or heavens, on which they are ſuppoſed to turn round.

On the terreſtrial globes there are uſually thirty-ſix meridians drawn, one through every tenth degree of the equator, or through every tenth degree of longitude.

The uſes of this circle are, to ſet the globes to any particular latitude, to ſhew the ſun's or a ſtar's declination, right aſcenſion, greateſt altitude, &c.

Meridian *Line*, an arc, or part of the meridian of the place, terminated each way by the horizon.

Or, a meridian line is the interſection of the plane of the meridian of the place with the plane of the horizon, vulgarly called a *north and ſouth line,* becauſe its direction is from one pole towards the other.

The uſe of a meridian line in aſtronomy, geography, dialling, &c. is very great, and on its exactneſs all depends; whence infinite pains have been taken by divers aſtronomers to fix it to the utmoſt preciſion. M. Caſſini has diſtinguiſhed himſelf by a meridian line drawn on the pavement of the church of S. Petronio, at Bologna, the largeſt and moſt accurate in the world; being 120 feet in length. In the roof of this church, a thouſand inches above the pavement, is a little hole, through which the ſun's image, when in the meridian, falling upon the line, marks his progreſs all the year. When finiſhed, M. Caſſini, by a public writing, informed the mathematicians of Europe, of a new oracle of Apollo, or the ſun, eſtabliſhed in a temple, which might be conſulted, with entire confidence, as to all difficulties in aſtronomy. See Gnomon.

To draw a Meridian Line.—Knowing the ſouth quarter pretty nearly, obſerve the altitude F E (*Plate* XVII. *Aſtronomy, fig.* 3.) of ſome ſtar on the eaſtern ſide thereof, not far from the meridian H Z R N: then, keeping the quadrant firm on its axis, ſo as the plummet may ſtill cut the ſame degree, only directing it to the weſtern ſide of the meridian, wait till you find the ſtar has the ſame altitude as before, *f, e*. Laſtly, biſect the angle E C *e*, formed by the interſection of the two planes wherein the quadrant is placed at the time of the two obſervations, by the right line H R. This H R is a meridian line.

Or thus: on the horizontal plane, from the ſame centre C (*fig.* 4.) deſcribe ſeveral arcs of circles B A, *b a*, &c. and on the ſame centre, C, erect a ſtyle, or gnomon, perpendicular to the plane A C B, a foot or half a foot long. About the twenty-firſt of June, between the hours of nine and eleven in the morning, and between one and three in the afternoon, obſerve the points B, *b*, &c. A, *a*, wherein the ſhadow of the ſtyle terminates. Biſect the arcs A B, *a b*, &c. in D, *d*, &c. If then the ſame right line D E biſect all the arcs A B, *a b*, &c. it will be the meridian line ſought.

As it is difficult to determine the extremity of the ſhadow exactly, it is beſt to have the ſtyle flat at top, and to drill a little hole, noting the lucid ſpot projected by it on the arcs A B and *a b*, inſtead of the extremity of the ſhadow. Otherwiſe the circles may be made with yellow, inſtead of black, &c.

A good meridian line for regulating clocks and watches may be had by the following method: make a round hole, almoſt a quarter of an inch in diameter, in a thin plate of metal; and fix the plate in the top of a ſouth window in ſuch a manner, that it may recline from the zenith at an angle equal to the co-latitude of your place, as nearly as you can gueſs; for then the plate will face the ſun directly at noon on the equinoctial days. Let the ſun ſhine freely through the hole into the room, previouſly darkened; and hang a plumb-line to the ceiling of the room, at leaſt five or ſix feet from the window, in ſuch a place as that the ſun's rays, tranſmitted through the hole, may fall upon the line when it is noon by the clock; and having marked the ſaid place on the ceiling, take away the line. Having adjuſted a ſliding-bar to a dove-tail groove, in a piece of wood about eighteen inches long, and fixed a hook into the middle of the bar, nail the wood to the abovementioned place in the ceiling, parallel to the ſide of the room in which the window is; the groove and bar being towards the floor. Then hang the plumb-line upon the hook in the bar, the weight or plummet reaching almoſt to the floor: when this is done, find the true ſolar time, and thereby regulate your clock or watch. Then, at the moment of next noon by the clock, when the ſun ſhines, move the ſliding-bar in the groove until the ſhadow of the plumbline biſects the image of the ſun on the floor, wall, or on a white ſcreen placed on the north ſide of the line; the plummet, or weight at the end of the line, hanging freely in a pail of water, placed below it on the floor. By repeated corrections, on the following days, with the ſun and clock, this method may be brought to a very great exactneſs. This meridian line will not only be ſufficient for the regulation of clocks and watches, to the true mean time, by equation tables, but alſo for moſt aſtronomical purpoſes. Ferguſon's Lect. on ſelect Subjects, &c. lect. x.

Several authors have invented particular inſtruments and methods for the deſcribing of meridian lines, or rather for determining equal altitudes of the ſun in the eaſtern and weſtern parts of the heavens; as Mr. Grey, Dr. Derham, &c. in the Philoſophical Tranſactions. But as the former of the methods above delivered ſuffices for aſtronomical obſervations, and the latter for more ordinary occaſions, we ſhall forbear to give any deſcriptions of them.

From what has been ſhewn, it is evident, that whenever the ſhadow of the ſtyle covers the meridian line, the centre of the ſun is in the meridian; and, therefore, it is then noon. And hence the uſe of a meridian line in adjuſting the motion of clocks, &c. to the ſun.

Hence

Hence also, if the meridian line be bisected by a right line O V, drawn perpendicularly through the point C, O V will be the intersection of the meridian, and first vertical; and, consequently, O will shew the east point, and V the west.

Lastly, if a style be erected perpendicularly in any other horizontal plane, and a signal be given when the shadow of the style covers the meridian line drawn in another plane, noting the apex, or extremity, of the shadow projected by the style, a line drawn from that point through that wherein the style is raised, will be a meridian line.

One meridian line being given, another may be drawn upon another horizontal plane by the following method: hang a thread with a plummet exactly over the south end of the meridian line given, and another thread with a plummet over the south end of the plane upon which the meridian line is to be drawn; let one person observe at noon the moment when the shadow of the first thread falls exactly upon the meridian given, and let another observer, at the same time, mark two distant points in the shadow of the second thread: a line drawn through those points is the meridian line required. By the same method may a meridian line be found upon a south wall, by making two points in the shadow of a thread hung at a little distance from it: if the meridians are near, he, that observes the shadow of the first thread, may let the other know the moment it falls upon the meridian line, by saying *now*: if they are far distant, it should be done by the motion of the hand, because sound takes some time to pass from one place to another. The meridian line is the basis of astronomical observations: a meridian line being found, there may be placed over it a quadrant or sextant in such a manner, that though it be moved up or down to give it different elevations, in order to view through the sights of it the celestial bodies at their different altitudes; yet the plane of that side of the instrument upon which the degrees are marked shall continue all the while in the plane of the meridian. Of this kind is the mural arc in the royal observatory at Greenwich. See MERIDIAN *Altitude*.

MERIDIAN *Line*, on a dial, is a right line arising from the intersection of the meridian of the place with the plane of the dial. This is the line of twelve o'clock, and from hence the division of the hour-line begins.

MERIDIAN, *Magnetical*, is a great circle, passing through or by the magnetical poles; to which the magnetic needle, or needle of the mariner's compass, if not otherwise hindered, conforms itself.

MERIDIAN *Altitude* of the sun or stars is, their altitude when in the meridian of the place where they are observed. See ALTITUDE.

To take the Meridian Altitude of the Stars.—Astronomers make two principal kinds of observations of the stars, the one when they are in the meridian, and the other when in vertical circles.

For meridian observations there are two instruments principally used, the quadrant and gnomon.

To take the Meridian Altitude with a Quadrant.—If the position of the meridian be known, and the plane of an astronomical quadrant be placed in the meridian line, by means of the plumb-line suspended at the centre, the meridian altitudes of the stars, which are the principal observations whereon the whole art of astronomy is founded, may easily be determined.

The meridian altitude of a star may likewise be had by means of a pendulum-clock, if the exact time of the star's passage by the meridian be known. Now it must be observed, that the stars have the same altitude for a minute before and after their passage by the meridian, if they be not in or near the zenith; but if they be, their altitudes must be taken every minute, when they are near the meridian; and then their greatest altitudes will be the meridian altitudes sought.

As to the manner of observing, it is found very difficult to place the vane of the quadrant in the meridian exact enough to take the meridian altitude of a star; for, unless there be a convenient place, and a wall, where the quadrant may be firmly fastened in the plane of the meridian, which is not easily had, we shall not have the true position of the meridian proper to observe the stars. It will be much easier, therefore, on several accounts, to use the portable quadrant, by which the altitude of the star may be observed a little before its passage over the meridian, every minute, till its greatest altitude be found. Here, though we have not the true position of the meridian by this means, yet we have the apparent meridian altitude of the star.

Though this method, in the general, be very good, and free from any sensible error; yet, in case a star passes by the meridian near the zenith, it proves somewhat defective: for in these kinds of observations, the inconvenient situation of the observer, the variation of the star's azimuth several degrees in a little time, the alteration of the instrument, and the difficulty of replacing it vertically, will prevent the observations being made oftener than in every four minutes; but in each minute the altitude varies about 15 minutes of a degree, so that there will be the difference of a degree in the star's altitude between each observation. In such cases, therefore, it will be better to have the true position of the meridian, or the exact time wherein the star passes the meridian, in order either to place the instrument in the meridian, or to observe the altitude of the star the moment it passes the meridian.

To find the Meridian Altitude of the Sun, &c. by a Gnomon, see GNOMON. By other means, see ALTITUDE.

MERIDIAN *Telescope*. See TELESCOPE.

To measure the Degrees of the Meridian, see DEGREE.

To observe the Transits or Passages of the heavenly Bodies across the Plane of the Meridian.—A meridian line being found, hang two threads with plummets exactly over it, at a little distance from one another, and they will be in the plane of the meridian: if you place your eye close to one of the threads in such a manner that you make it cover the other, and both appear as one thread; when a star is behind the threads, it is in the meridian. By the same method the sun may be viewed through a smoaked glass; when the threads pass through his centre, he is in the meridian: but the best way of observing the sun, moon, stars, or planets, is through a telescope placed in the meridian, with two cross hairs, one of which is in a vertical, the other in a horizontal position; when the vertical hair passes through the centre of the sun, he is in the meridian.

MERIDIAN, from *Meridies*, the hour for sleeping, which was allowed to the ancient monks, in this and other countries, about noon, during the summer months.

MERIDIANI, in *Antiquity*, is a name which the Romans gave to a kind of gladiators, who entered the arena about noon, after the bestiarii (who fought in the morning against beasts) had finished. See GLADIATOR.

They were thus called from *meridies*, i. e. *noon*, the time when they exhibited their shows.

The meridiani were a sort of artless combatants, who fought man with man, sword in hand: hence Seneca takes occasion to observe, that the combats of the morning were full of humanity, compared with those which followed.

MERIDIONAL Distance, in *Navigation*, the fame with departure, or eafting and wefting; being the difference of longitude between the meridian, under which the fhip now is, and any other meridian, which fhe was under before.

Meridional *Parts*, *Miles*, or *Minutes*, are the parts by which the meridians in a Mercator's chart increafe, as the parallels of latitude decreafe.

The cofine of the latitude of any place being equal to the radius, or femidiameter, of that parallel; therefore, in the true fea-chart, or nautical planifphere, this radius being the radius of the equinoctial, or whole fine, of 90 degrees, the meridional parts at each degree of latitude muft increafe, as the fecants of the arc contained between that latitude, and the equinoctial decreafe.

In order to underftand this, it is neceffary to confider, 1. That the diftance between any two meridians at the equator is to their diftance in any parallel of latitude as radius is to the cofine of that latitude. Let P D F E (*Plate* I. *Navigation*, *fig*. 8.) reprefent the fourth part of a fphere; E being the centre, P the pole, E D the radius of the equator, A B the radius of a parallel of latitude: then each of the arcs P B D, P C *d*, will reprefent a quadrant of a meridian; D *d* an arc of the equator; and B C an arc of a parallel of latitude: D B expreffes the latitude, and P B the complement of the latitude, whofe right fine is B A. But the circumference of a circle, whofe radius is E D, is to the circumference of a circle, whofe radius is A B, and confequently like arcs D *d*, B C, intercepted between the fame two meridians, as E D is to A B, *i. e.* as radius to the cofine of the latitude. Whence it is eafy to conftruct a table fhewing in what proportion the degrees of longitude diminifh in every latitude. See fuch a table under article Degree *of Latitude*.

2. Any part of a parallel of latitude is to a like part of a meridian, as radius is to the fecant of the latitude of that parallel. Let P D E (*Plate* I. *Navigation*, *fig*. 9.) reprefent a quadrant of a meridian, where P is the pole, and D E the radius of the equator; A B is the radius of a parallel of latitude, or the cofine of the latitude, whofe fine is B F, and fecant E C. Then E F : E B :: E D : E C; or cofine latitude : rad. : : rad. : fecant of the latitude, in that parallel. Therefore, part of a parallel of latitude is to a like part of the equator as the radius is to the fecant of the latitude to that parallel: confequently, fince like parts of the meridian and equator are equal, as great circles, any part of a parallel of latitude is to a like part of a meridian, as radius to the fecant of the latitude to that parallel.

3. The diftance of any parallel of latitude, A, from the equator, is expreffed by the fum of the fecants of all the arcs between the equator and that parallel. For, as radius to the fecant of the latitude A, fo is a diminifhed degree of longitude in the latitude A, or a degree of that parallel, to a degree of the meridian: but the degrees of latitude, or of the meridian, are to be lengthened in proportion as the degrees of longitude decreafe: therefore, as radius to the fecant of the latitude A, fo is a natural degree of the meridian to a lengthened degree in the latitude A, radius being here as unity, and one natural degree as unity alfo: therefore, the length of a degree in any latitude is as the fecant of that latitude, or may be expreffed by that fecant: but the diftance of any parallel from the equator is the fum of all the fucceffive arcs between the equator and that parallel: confequently, the diftance of that parallel is expreffed by the fum of the fecants of all thefe arcs between the equator and that parallel of latitude: and, therefore, by the addition of the fecants of fmall arcs, the diftances of the parallels of latitude from the equator are obtained.

The tables, therefore, of meridional parts, in books of navigation, are to be made by a continual addition of fecants, calculated in fome books, as in fir Jonas Moor's Tables, Robertfon's Navigation, &c. for every degree and minute of latitude; and thefe will ferve either to make or graduate a Mercator's chart, or to work the Mercator's failing.

Mr. Wright, to whom we are indebted for this excellent difcovery, made his table for the divifion of the nautical meridian, or the table of meridional parts, as follows: the meridional parts for 1 minute he made equal to the fecant of 1 minute; thofe of 2′ equal to the fum of the fecants of 1′ and 2′; thofe of 3′ equal to the fum of the fecants of 1′, 2′, and 3′; thofe of 4′ equal to the fum of the meridional parts of 3′ and the fecant of 4′; and fo on by a conftant addition of the fecants: Mr. Oughtred, fir Jonas Moor, Dr. Wallis, Dr. Halley, and others, have endeavoured to find methods of conftructing thefe tables with greater accuracy than by the addition of the fecants to every minute. As the reader may not have immediate accefs to fuch a table, we have here annexed one, extracted from Robertfon's "Elements of Navigation."

The following is a Table of meridional parts to every degree and minute of the quadrant, eftablifhed on a fuppofition that the earth is a perfect fphere.

D. l.	0	1	2	3	4	5	6	7	8	9	10	11	12	D. l.
min.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	min.
0	0.0	60.0	120.0	180.1	240.2	300.4	360.7	421.1	481.6	542.2	603.1	664.1	725.3	0
1	1.0	61.0	121.0	181.1	241.2	301.4	361.7	422.1	482.6	543.3	604.1	665.1	726.4	1
2	2.0	62.0	122.0	182.1	242.2	302.4	362.7	423.1	483.6	544.3	605.1	666.1	727.4	2
3	3.0	63.0	123.0	183.1	243.2	303.4	363.7	424.1	484.6	545.3	606.1	667.1	728.4	3
4	4.0	64.0	124.0	184.1	244.2	304.4	364.7	425.1	485.6	546.3	607.1	668.1	729.4	4
5	5.0	65.0	125.0	185.1	245.2	305.4	365.7	426.1	486.6	547.3	608.2	669.2	730.5	5
6	6.0	66.0	126.0	186.1	246.2	306.4	366.7	427.1	487.6	548.3	609.2	670.2	731.5	6
7	7.0	67.0	127.0	187.1	247.2	307.4	367.7	428.1	488.6	549.3	610.2	671.2	732.5	7
8	8.0	68.0	128.0	188.1	248.2	308.4	368.7	429.1	489.6	550.3	611.2	672.2	733.5	8
9	9.0	69.0	129.0	189.1	249.2	309.4	369.7	430.1	490.7	551.4	612.2	673.2	734.5	9
10	10.0	70.0	130.0	190.1	250.2	310.4	370.7	431.1	491.7	552.4	613.2	674.3	735.6	10
11	11.0	71.0	131.0	191.1	251.2	311.4	371.7	432.1	492.7	553.4	614.2	675.3	736.6	11
12	12.0	72.0	132.0	192.1	252.2	312.4	372.7	433.1	493.7	554.4	615.3	676.3	737.6	12
13	13.0	73.0	133.0	193.1	253.2	313.4	373.7	434.2	494.7	555.4	616.3	677.3	738.6	13
14	14.0	74.0	134.0	194.1	254.2	314.4	374.7	435.2	495.7	556.4	617.3	678.4	739.6	14
15	15.0	75.0	135.0	195.1	255.2	315.4	375.7	436.2	496.7	557.4	618.3	679.4	740.7	15
16	16.0	76.0	136.0	196.1	256.2	316.4	376.8	437.2	497.7	558.4	619.3	680.4	741.7	16
17	17.0	77.0	137.0	197.1	257.2	317.5	377.8	438.2	498.7	559.4	620.3	681.4	742.7	17
18	18.0	78.0	138.0	198.1	258.2	318.5	378.8	439.2	499.8	560.5	621.3	682.4	743.7	18
19	19.0	79.0	139.0	199.1	259.2	319.5	379.8	440.2	500.8	561.5	622.4	683.4	744.8	19
20	20.0	80.0	140.0	200.1	260.2	320.5	380.8	441.2	501.8	562.5	623.4	684.5	745.8	20
21	21.0	81.0	141.0	201.1	261.3	321.5	381.8	442.2	502.8	563.5	624.4	685.5	746.8	21
22	22.0	82.0	142.0	202.1	262.3	322.5	382.8	443.2	503.8	564.5	625.4	686.5	747.8	22
23	23.0	83.0	143.0	203.1	263.3	323.5	383.8	444.2	504.8	565.5	626.4	687.5	748.9	23
24	24.0	84.0	144.0	204.1	264.3	324.5	384.8	445.2	505.8	566.6	627.4	688.5	749.9	24
25	25.0	85.0	145.0	205.1	265.3	325.5	385.8	446.3	506.8	567.6	628.5	689.6	750.9	25
26	26.0	86.0	146.0	206.1	266.3	326.5	386.8	447.3	507.8	568.6	629.5	690.6	751.9	26
27	27.0	87.0	147.0	207.7	267.3	327.5	387.8	448.3	508.9	569.6	630.5	691.6	753.0	27
28	28.0	88.0	148.0	208.1	268.3	328.5	388.8	449.3	509.9	570.6	631.5	692.6	754.0	28
29	29.0	89.0	149.0	209.1	269.3	329.5	389.8	450.3	510.9	571.6	632.5	693.6	755.0	29
30	30.0	90.0	150.0	210.1	270.3	330.5	390.8	451.3	511.9	572.6	633.5	694.7	756.0	30
31	31.0	91.0	151.0	211.1	271.3	331.5	391.8	452.3	512.9	573.7	634.6	695.7	757.1	31
32	32.0	92.0	152.0	212.1	272.3	332.5	392.9	453.3	513.9	574.7	635.6	696.7	758.1	32
33	33.0	93.0	153.1	213.1	273.3	333.5	393.9	454.3	514.9	575.7	636.6	697.7	759.1	33
34	34.0	94.0	154.1	214.1	274.3	334.5	394.9	455.3	515.9	576.7	637.6	698.7	760.1	34
35	35.0	95.0	155.1	215.1	275.3	335.5	395.9	456.3	516.9	577.7	638.6	699.8	761.1	35
36	36.0	96.0	156.1	216.1	276.3	336.5	396.9	457.3	518.0	578.7	639.6	700.8	762.2	36
37	37.0	97.0	157.1	217.1	277.3	337.5	397.9	458.4	519.0	579.7	640.7	701.8	763.2	37
38	38.0	98.0	158.1	218.1	278.3	338.5	398.9	459.4	520.0	580.8	641.7	702.8	764.2	38
39	39.0	99.0	159.1	219.1	279.3	339.6	399.9	460.4	521.0	581.8	642.7	703.8	765.2	39
40	40.0	100.0	160.1	220.2	280.3	340.6	400.9	461.4	522.0	582.8	643.7	704.9	766.3	40
41	41.0	101.0	161.1	221.2	281.3	341.6	401.9	462.4	523.0	583.8	644.7	705.9	767.3	41
42	42.0	102.0	162.1	222.2	282.3	342.6	402.9	463.4	524.0	584.8	645.8	706.9	768.3	42
43	43.0	103.0	163.1	223.2	283.3	343.6	403.9	464.4	525.0	585.8	646.8	707.9	769.3	43
44	44.0	104.0	164.1	224.2	284.3	344.6	404.9	465.4	526.0	586.8	647.8	709.0	770.4	44
45	45.0	105.0	165.1	225.2	285.3	345.6	405.9	466.4	527.1	587.9	648.8	710.0	771.4	45
46	46.0	106.0	166.1	226.2	286.3	346.6	407.0	467.4	528.1	588.9	649.8	711.0	772.4	46
47	47.0	107.0	167.1	227.2	287.3	347.6	408.0	468.4	529.1	589.9	650.8	712.0	773.4	47
48	48.0	108.0	168.1	228.2	288.3	348.6	409.0	469.5	530.1	590.9	651.9	713.0	774.5	48
49	49.0	109.0	169.1	229.2	289.3	349.6	410.0	470.5	531.1	591.9	652.9	714.1	775.5	49
50	50.0	110.0	170.1	230.2	290.3	350.6	411.0	471.5	532.1	592.9	653.9	715.1	776.5	50
51	51.0	111.0	171.1	231.2	291.3	351.6	412.0	472.5	533.1	593.9	654.9	716.1	777.5	51
52	52.0	112.0	172.1	232.2	292.4	352.6	413.0	473.5	534.1	595.0	655.9	717.1	778.6	52
53	53.0	113.0	173.1	233.2	293.4	353.6	414.0	474.5	535.1	596.0	657.0	718.2	779.6	53
54	54.0	114.0	174.1	234.2	294.4	354.6	415.0	475.5	536.2	597.0	658.0	719.2	780.6	54
55	55.0	115.0	175.1	235.2	295.4	355.6	416.0	476.5	537.2	598.0	659.0	720.2	781.7	55
56	56.0	116.0	176.1	236.2	296.4	356.6	417.0	477.5	538.2	599.0	660.0	721.2	782.7	56
57	57.0	117.0	177.1	237.2	297.4	357.6	418.0	478.5	539.2	600.0	661.0	722.3	783.7	57
58	58.0	118.0	178.1	238.2	298.4	358.6	419.0	479.5	540.2	601.0	662.1	723.3	784.7	58
59	59.0	119.0	179.1	239.2	299.4	359.6	420.0	480.5	541.2	602.1	663.1	724.3	785.8	59
min.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	min.
D. l.	0	1	2	3	4	5	6	7	8	9	10	11	12	D. l.

D. l.	13	14	15	16	17	18	19	20	21	22	23	24	25	D. l.
min.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	min.
0	786.8	848.5	910.5	972.8	1035.3	1098.2	1161.5	1225.1	1289.2	1353.7	1418.6	1484.1	1550.0	0
1	787.8	849.5	911.5	973.8	1036.3	1099.3	1162.5	1226.2	1290.3	1354.8	1419.7	1485.2	1551.1	1
2	788.8	850.5	912.6	974.8	1037.4	1100.3	1163.6	1227.3	1291.3	1355.8	1420.8	1486.3	1552.2	2
3	789.9	851.6	913.6	975.9	1038.4	1101.4	1164.7	1228.3	1292.4	1356.9	1421.9	1487.3	1553.3	3
4	790.9	852.6	914.6	976.9	1039.5	1102.4	1165.7	1229.4	1293.5	1358.0	1423.0	1488.4	1554.4	4
5	791.9	853.6	915.7	978.0	1040.5	1103.5	1166.8	1230.4	1294.5	1359.0	1424.1	1489.5	1555.5	5
6	792.9	854.7	916.7	979.0	1041.6	1104.5	1167.8	1231.5	1295.6	1360.2	1425.1	1490.6	1556.6	6
7	794.0	855.7	917.7	980.0	1042.6	1105.6	1168.9	1232.6	1296.7	1361.2	1426.2	1491.7	1557.7	7
8	795.0	856.7	918.8	981.1	1043.7	1106.6	1170.0	1233.6	1297.8	1362.3	1427.3	1492.8	1558.8	8
9	796.0	857.8	919.8	982.1	1044.7	1107.7	1171.0	1234.7	1298.8	1363.4	1428.4	1493.9	1559.9	9
10	797.0	858.8	920.8	983.2	1045.8	1108.7	1172.1	1235.8	1299.9	1364.5	1429.5	1495.0	1561.0	10
11	798.1	859.8	921.9	984.2	1046.8	1109.8	1173.1	1236.8	1301.0	1365.6	1430.6	1496.1	1562.1	11
12	799.1	860.9	922.9	985.2	1047.9	1110.8	1174.2	1237.9	1302.0	1366.6	1431.7	1497.2	1563.2	12
13	800.2	861.9	923.9	986.3	1048.9	1111.9	1175.2	1239.0	1303.1	1367.7	1432.8	1498.3	1564.3	13
14	801.2	862.9	925.0	987.3	1049.9	1112.9	1176.3	1240.0	1304.2	1368.8	1433.9	1499.4	1565.4	14
15	802.2	864.0	926.0	988.4	1051.0	1114.0	1177.4	1241.1	1305.3	1369.9	1434.9	1500.5	1566.5	15
16	803.2	865.0	927.0	989.4	1052.0	1115.0	1178.4	1242.2	1306.3	1370.9	1436.0	1501.6	1567.6	16
17	804.2	866.0	928.1	990.4	1053.1	1116.1	1179.5	1243.2	1307.4	1372.0	1437.1	1502.7	1568.7	17
18	805.3	867.1	929.1	991.5	1054.1	1117.1	1180.5	1244.3	1308.5	1373.1	1438.2	1503.8	1569.8	18
19	806.3	868.1	930.1	992.5	1055.2	1118.2	1181.6	1245.4	1309.6	1374.2	1439.3	1504.9	1571.0	19
20	807.3	869.1	931.2	993.6	1056.2	1119.2	1182.7	1246.4	1310.6	1375.3	1440.4	1506.0	1572.1	20
21	808.4	870.1	932.2	994.6	1057.3	1120.3	1183.7	1247.5	1311.7	1376.4	1441.5	1507.1	1573.2	21
22	809.4	871.2	933.2	995.6	1058.3	1121.3	1184.8	1248.6	1312.8	1377.4	1442.6	1508.2	1574.3	22
23	810.4	872.2	934.3	996.7	1059.4	1122.4	1185.8	1249.6	1313.8	1378.5	1443.7	1509.3	1575.4	23
24	811.4	873.2	935.3	997.7	1060.4	1123.4	1186.9	1250.7	1314.9	1379.6	1444.8	1510.4	1576.5	24
25	812.5	874.3	936.3	998.8	1061.4	1124.5	1188.0	1251.8	1316.0	1380.7	1445.8	1511.5	1577.6	25
26	813.5	875.3	937.4	999.8	1062.5	1125.5	1189.0	1252.8	1317.1	1381.8	1446.9	1512.6	1578.7	26
27	814.5	876.3	938.4	1000.8	1063.5	1126.6	1190.1	1253.9	1318.1	1382.8	1448.0	1513.7	1579.8	27
28	815.5	877.4	939.4	1001.9	1064.6	1127.6	1191.1	1255.0	1319.2	1383.9	1449.1	1514.8	1580.9	28
29	816.6	878.4	940.5	1002.9	1065.6	1128.7	1192.2	1256.0	1320.3	1385.0	1450.2	1515.9	1582.0	29
30	817.6	879.4	941.5	1004.0	1066.7	1129.7	1193.2	1257.1	1321.4	1386.1	1451.3	1517.0	1583.2	30
31	818.6	880.5	942.5	1005.0	1067.7	1130.8	1194.3	1258.2	1322.5	1387.2	1452.4	1518.1	1584.3	31
32	819.6	881.5	943.6	1006.1	1068.8	1131.8	1195.4	1259.2	1323.5	1388.3	1453.5	1519.2	1585.4	32
33	820.7	882.5	944.6	1007.1	1069.8	1132.9	1196.4	1260.3	1324.6	1389.4	1454.6	1520.3	1586.5	33
34	821.7	883.6	945.6	1008.1	1070.9	1134.0	1197.5	1261.4	1325.7	1390.4	1455.6	1521.4	1587.6	34
35	822.7	884.6	946.7	1009.2	1072.0	1135.1	1198.5	1262.4	1326.7	1391.5	1456.7	1522.5	1588.7	35
36	823.8	885.6	947.7	1010.2	1073.0	1136.1	1199.6	1263.5	1327.8	1392.6	1457.8	1523.6	1589.8	36
37	824.8	886.7	948.7	1011.3	1074.1	1137.2	1200.7	1264.6	1328.9	1393.7	1458.9	1524.7	1590.9	37
38	825.8	887.7	949.8	1012.3	1075.1	1138.2	1201.7	1265.6	1330.0	1394.8	1460.0	1525.8	1592.0	38
39	826.8	888.7	950.8	1013.4	1076.2	1139.3	1202.8	1266.7	1331.0	1395.8	1461.1	1526.9	1593.2	39
40	827.9	889.8	951.9	1014.4	1077.2	1140.3	1203.9	1267.8	1332.1	1396.9	1462.2	1528.0	1594.3	40
41	828.9	890.8	952.9	1015.4	1078.3	1141.4	1204.9	1268.8	1333.2	1398.0	1463.3	1529.1	1595.4	41
42	829.9	891.8	953.9	1016.5	1079.3	1142.4	1206.0	1269.9	1334.3	1399.1	1464.4	1530.2	1596.5	42
43	831.0	892.9	955.0	1017.5	1080.4	1143.5	1207.1	1271.0	1335.3	1400.2	1465.5	1531.3	1597.6	43
44	832.0	893.9	956.0	1018.6	1081.4	1144.6	1208.1	1272.1	1336.4	1401.3	1466.6	1532.4	1598.7	44
45	833.0	894.9	957.1	1019.6	1082.5	1145.6	1209.2	1273.1	1337.5	1402.4	1467.7	1533.5	1599.8	45
46	834.1	896.0	958.1	1020.6	1083.5	1146.7	1210.2	1274.2	1338.6	1403.4	1468.8	1534.6	1600.9	46
47	835.1	897.0	959.2	1021.7	1084.6	1147.7	1211.3	1275.3	1339.7	1404.5	1469.8	1535.7	1602.0	47
48	836.1	898.0	960.2	1022.7	1085.6	1148.8	1212.4	1276.3	1340.7	1405.6	1470.9	1536.8	1603.1	48
49	837.2	899.1	961.3	1023.8	1086.7	1149.8	1213.4	1277.4	1341.8	1406.7	1472.0	1537.9	1604.3	49
50	838.2	900.1	962.3	1024.8	1087.7	1150.9	1214.5	1278.5	1342.9	1407.8	1473.1	1539.0	1605.4	50
51	839.2	901.1	963.4	1025.9	1088.8	1152.0	1215.5	1279.5	1344.0	1408.8	1474.2	1540.1	1606.5	51
52	840.2	902.2	964.4	1026.9	1089.8	1153.0	1216.6	1280.6	1345.1	1409.9	1475.3	1541.2	1607.6	52
53	841.3	903.2	965.5	1028.0	1090.9	1154.1	1217.7	1281.7	1346.1	1411.0	1476.4	1542.3	1608.7	53
54	842.3	904.3	966.5	1029.0	1091.9	1155.1	1218.7	1282.8	1347.2	1412.1	1477.5	1543.4	1609.8	54
55	843.4	905.3	967.6	1030.1	1093.0	1156.2	1219.8	1283.8	1348.3	1413.2	1478.6	1544.5	1610.9	55
56	844.4	906.3	968.6	1031.1	1094.0	1157.2	1220.9	1284.9	1349.4	1414.3	1479.7	1545.6	1612.0	56
57	845.4	907.4	969.6	1032.2	1095.1	1158.3	1221.9	1286.0	1350.4	1415.4	1480.8	1546.7	1613.1	57
58	846.5	908.4	970.7	1033.2	1096.1	1159.4	1223.0	1287.0	1351.5	1416.5	1481.9	1547.8	1614.2	58
59	847.5	909.4	971.7	1034.3	1097.2	1160.4	1224.1	1288.1	1352.6	1417.6	1483.0	1548.9	1615.4	59
min.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	min.
D. l.	13	14	15	16	17	18	19	20	21	22	23	24	25	D. l.

D. l.	26	27	28	29	30	31	32	33	34	35	36	37	38	D. l.
min.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	min.
0	1616.5	1683.5	1751.2	1819.5	1888.4	1958.0	2028.4	2099.6	2171.5	2244.3	2318.0	2392.7	2468.3	0
1	1617.6	1684.6	1752.3	1820.6	1889.5	1959.2	2029.6	2100.7	2172.7	2245.5	2319.3	2393.9	2469.6	1
2	1618.7	1685.8	1753.4	1821.7	1890.7	1960.4	2030.7	2101.9	2173.9	2246.8	2320.5	2395.2	2470.8	2
3	1619.8	1686.9	1754.6	1822.9	1891.9	1961.6	2031.9	2103.1	2175.1	2248.0	2321.7	2396.4	2472.1	3
4	1620.9	1688.0	1755.7	1824.0	1893.0	1962.7	2033.1	2104.3	2176.3	2249.2	2323.0	2397.7	2473.4	4
5	1622.0	1689.1	1756.8	1825.2	1894.1	1963.9	2034.3	2105.5	2177.5	2250.4	2324.2	2398.9	2474.6	5
6	1623.2	1690.3	1758.0	1826.3	1895.3	1965.0	2035.5	2106.7	2178.7	2251.6	2325.4	2400.2	2475.9	6
7	1624.3	1691.4	1759.1	1827.5	1896.5	1966.2	2036.7	2107.9	2180.0	2252.9	2326.7	2401.4	2477.1	7
8	1625.4	1692.5	1760.2	1828.6	1897.6	1967.4	2037.8	2109.1	2181.2	2254.1	2327.9	2402.7	2478.5	8
9	1626.5	1693.6	1761.4	1829.7	1898.8	1968.5	2039.0	2110.3	2182.4	2255.3	2329.2	2403.9	2479.7	9
10	1627.6	1694.8	1762.5	1830.9	1899.9	1969.7	2040.2	2111.5	2183.6	2256.5	2330.4	2405.2	2481.0	10
11	1628.7	1695.9	1763.6	1832.0	1901.1	1970.9	2041.4	2112.7	2184.8	2257.8	2331.6	2406.4	2482.3	11
12	1629.8	1697.0	1764.8	1833.2	1902.3	1972.0	2042.6	2113.9	2186.0	2259.0	2332.9	2407.7	2483.5	12
13	1631.0	1698.1	1765.9	1834.3	1903.4	1973.2	2043.8	2115.1	2187.2	2260.2	2334.1	2409.0	2484.8	13
14	1632.1	1699.3	1767.0	1835.5	1904.6	1974.4	2044.9	2116.3	2188.4	2261.4	2335.3	2410.2	2486.1	14
15	1633.2	1700.4	1768.2	1836.6	1905.7	1975.6	2046.1	2117.5	2189.6	2262.7	2336.6	2411.5	2487.4	15
16	1634.3	1701.5	1769.3	1837.8	1906.9	1976.8	2047.3	2118.7	2190.8	2263.9	2337.8	2412.7	2488.6	16
17	1635.4	1702.6	1770.5	1838.9	1908.1	1977.9	2048.5	2119.8	2192.0	2265.1	2339.0	2414.0	2489.9	17
18	1636.5	1703.8	1771.6	1840.1	1909.2	1979.1	2049.7	2121.0	2193.3	2266.3	2340.3	2415.2	2491.2	18
19	1637.7	1704.9	1772.7	1841.2	1910.4	1980.3	2050.8	2122.2	2194.5	2267.6	2341.5	2416.5	2492.5	19
20	1638.8	1706.0	1773.9	1842.4	1911.5	1981.4	2052.0	2123.4	2195.7	2268.8	2342.8	2417.8	2493.7	20
21	1639.9	1707.1	1775.0	1843.5	1912.7	1982.6	2053.2	2124.6	2196.9	2270.0	2344.0	2419.0	2495.0	21
22	1641.0	1708.3	1776.1	1844.6	1913.8	1983.7	2054.4	2125.8	2198.1	2271.2	2345.3	2420.3	2496.3	22
23	1642.1	1709.4	1777.2	1845.8	1915.0	1984.9	2055.6	2127.0	2199.3	2272.5	2346.5	2421.5	2497.6	23
24	1643.2	1710.5	1778.4	1846.9	1916.2	1986.1	2056.8	2128.2	2200.5	2273.7	2347.8	2422.8	2498.8	24
25	1644.3	1711.6	1779.5	1848.1	1917.3	1987.3	2058.0	2129.4	2201.7	2274.9	2349.0	2424.0	2500.1	25
26	1645.5	1712.8	1780.6	1849.2	1918.5	1988.4	2059.1	2130.6	2203.0	2276.1	2350.2	2425.3	2501.4	26
27	1646.6	1713.9	1781.8	1850.4	1919.6	1989.6	2060.3	2131.8	2204.2	2277.4	2351.5	2426.5	2502.7	27
28	1647.7	1715.0	1783.0	1851.5	1920.8	1990.8	2061.5	2133.0	2205.4	2278.6	2352.7	2427.8	2503.9	28
29	1648.8	1716.1	1784.1	1852.7	1921.9	1992.0	2062.7	2134.2	2206.6	2279.8	2354.0	2429.1	2505.2	29
30	1649.9	1717.3	1785.2	1853.8	1923.1	1993.1	2063.9	2135.4	2207.8	2281.0	2355.2	2430.3	2506.5	30
31	1651.0	1718.4	1786.4	1855.0	1924.3	1994.3	2065.1	2136.6	2209.0	2282.3	2356.5	2431.6	2507.8	31
32	1652.2	1719.5	1787.5	1856.1	1925.4	1995.5	2066.2	2137.8	2210.2	2283.5	2357.7	2432.9	2509.0	32
33	1653.3	1720.7	1788.6	1857.2	1926.6	1996.6	2067.4	2139.0	2211.4	2284.7	2358.9	2434.1	2510.3	33
34	1654.4	1721.8	1789.8	1858.4	1927.8	1997.8	2068.6	2140.2	2212.7	2286.0	2360.2	2435.4	2511.6	34
35	1655.5	1722.9	1790.9	1859.6	1928.9	1999.0	2069.8	2141.4	2213.9	2287.2	2361.4	2436.7	2512.9	35
36	1656.6	1724.0	1792.1	1860.7	1930.1	2000.2	2071.0	2142.6	2215.1	2288.4	2362.7	2437.9	2514.2	36
37	1657.8	1725.2	1793.2	1561.9	1931.3	2001.3	2072.2	2143.8	2216.3	2289.7	2363.9	2439.2	2515.4	37
38	1658.9	1726.3	1794.3	1863.0	1932.4	2002.5	2073.4	2145.0	2217.5	2290.9	2365.2	2440.4	2516.7	38
39	1660.0	1727.4	1795.5	1864.2	1933.6	2003.7	2074.6	2146.2	2218.7	2292.1	2366.4	2441.7	2518.0	39
40	1661.1	1728.6	1796.6	1865.3	1934.7	2004.9	2075.7	2147.4	2219.9	2293.3	2367.7	2443.0	2519.3	40
41	1662.2	1729.7	1797.8	1866.5	1935.9	2006.0	2076.9	2148.6	2221.2	2294.6	2368.9	2444.2	2520.6	41
42	1663.4	1730.8	1798.9	1867.6	1937.1	2007.2	2078.1	2149.8	2222.4	2295.8	2370.2	2445.5	2521.8	42
43	1664.5	1731.9	1800.0	1868.8	1938.2	2008.4	2079.3	2151.0	2223.6	2297.0	2371.4	2446.8	2523.1	43
44	1665.6	1733.1	1801.2	1869.9	1939.4	2009.6	2080.5	2152.2	2224.8	2298.3	2372.7	2448.0	2524.4	44
45	1666.7	1734.2	1802.3	1871.1	1940.5	2010.7	2081.7	2153.4	2226.0	2299.5	2373.9	2449.3	2525.7	45
46	1667.8	1735.3	1803.5	1872.2	1941.7	2011.9	2082.9	2154.6	2227.2	2300.7	2375.2	2450.6	2527.0	46
47	1669.0	1736.5	1804.6	1873.4	1942.9	2013.1	2084.1	2155.8	2228.5	2302.0	2376.4	2451.8	2528.3	47
48	1670.1	1737.6	1805.7	1874.5	1944.0	2014.3	2085.3	2157.0	2229.7	2303.2	2377.7	2453.1	2529.5	48
49	1671.2	1738.7	1806.9	1875.7	1945.2	2015.4	2086.5	2158.2	2230.9	2304.4	2378.9	2454.3	2530.8	49
50	1672.3	1739.9	1808.0	1876.8	1946.4	2016.6	2087.7	2159.4	2232.1	2305.7	2380.1	2455.6	2532.1	50
51	1673.4	1741.0	1809.2	1878.0	1947.5	2017.8	2088.9	2160.7	2233.3	2306.9	2381.4	2456.9	2533.4	51
52	1674.5	1742.1	1810.3	1879.2	1948.7	2019.0	2090.1	2161.9	2234.6	2308.1	2382.6	2458.1	2534.7	52
53	1675.7	1743.2	1811.4	1880.3	1949.9	2020.2	2091.3	2163.1	2235.8	2309.4	2383.9	2459.4	2536.0	53
54	1676.8	1744.4	1812.6	1881.5	1951.0	2021.3	2092.5	2164.3	2237.0	2310.6	2385.1	2460.7	2537.2	54
55	1678.0	1745.5	1813.7	1882.6	1952.2	2022.5	2093.7	2165.5	2238.2	2311.8	2386.4	2461.9	2538.5	55
56	1679.1	1746.6	1814.9	1883.8	1953.4	2023.7	2094.9	2166.7	2239.4	2313.1	2387.6	2463.2	2539.8	56
57	1680.2	1747.8	1816.0	1884.9	1954.5	2024.9	2096.1	2167.9	2240.7	2314.3	2388.9	2464.5	2541.1	57
58	1681.3	1748.9	1817.2	1886.1	1955.7	2026.0	2097.3	2169.1	2241.9	2315.5	2390.2	2465.8	2542.4	58
59	1682.4	1750.0	1818.3	1887.2	1956.9	2027.2	2098.5	2170.3	2243.1	2316.7	2391.4	2467.0	2543.7	59
min.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	min.
D. l.	26	27	28	29	30	31	32	33	34	35	36	37	38	D. l.

D. l.	39	40	41	42	43	44	45	46	47	48	49	50	51	D. l.
min.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	min.
0	2545.0	2622.7	2701.6	2781.7	2863.1	2945.7	3030.0	3115.6	3202.8	3291.6	3382.1	3474.5	3568.8	0
1	2546.2	2624.0	2702.9	2783.1	2864.5	2947.2	3031.4	3117.0	3204.2	3293.1	3383.6	3476.1	3570.4	1
2	2547.5	2625.3	2704.3	2784.4	2865.8	2948.6	3032.8	3118.5	3205.7	3294.6	3385.2	3477.6	3572.0	2
3	2548.8	2626.6	2705.6	2785.8	2867.2	2950.0	3034.2	3119.9	3207.2	3296.1	3386.7	3479.2	3573.6	3
4	2550.1	2627.9	2706.9	2787.1	2868.5	2951.4	3035.6	3121.4	3208.6	3297.5	3388.2	3480.7	3575.2	4
5	2551.4	2629.2	2708.3	2788.5	2870.0	2952.8	3037.0	3122.8	3210.1	3299.0	3389.7	3482.3	3576.8	5
6	2552.7	2630.5	2709.6	2789.8	2871.3	2954.2	3038.4	3124.2	3211.6	3300.5	3391.3	3483.9	3578.4	6
7	2554.0	2631.9	2710.9	2791.2	2872.7	2955.6	3039.8	3125.7	3213.0	3302.0	3392.8	3485.4	3580.0	7
8	2555.3	2633.2	2712.2	2792.5	2874.1	2957.0	3041.3	3127.1	3214.5	3303.5	3394.3	3487.0	3581.6	8
9	2556.6	2634.5	2713.6	2793.8	2875.4	2958.4	3042.7	3128.6	3216.0	3305.0	3395.9	3488.5	3583.2	9
10	2557.8	2635.8	2714.9	2795.1	2876.8	2959.8	3044.1	3130.0	3217.4	3306.5	3397.4	3490.1	3584.8	10
11	2559.1	2637.1	2716.2	2796.5	2878.2	2961.1	3045.5	3131.5	3218.9	3308.0	3398.9	3491.7	3586.4	11
12	2560.4	2638.4	2717.5	2797.9	2879.5	2962.5	3047.0	3132.9	3220.4	3309.5	3400.4	3493.2	3588.0	12
13	2561.7	2639.7	2718.9	2799.3	2880.9	2963.9	3048.4	3134.3	3221.9	3311.0	3402.0	3494.8	3589.5	13
14	2563.0	2641.0	2720.2	2800.6	2882.3	2965.3	3049.8	3135.8	3223.3	3312.5	3403.5	3496.3	3591.1	14
15	2564.3	2642.3	2721.5	2802.0	2883.7	2966.7	3051.2	3137.2	3224.8	3314.0	3405.0	3497.9	3592.7	15
16	2565.6	2643.6	2722.9	2803.3	2885.0	2968.1	3052.6	3138.7	3226.3	3315.5	3406.6	3499.5	3594.3	16
17	2566.9	2644.9	2724.2	2804.7	2886.4	2969.5	3054.1	3140.1	3227.7	3317.0	3408.1	3501.0	3595.9	17
18	2568.2	2646.3	2725.5	2806.0	2887.8	2970.9	3055.5	3141.6	3229.2	3318.5	3409.6	3502.6	3597.5	18
19	2569.5	2647.6	2726.9	2807.4	2889.2	2972.3	3056.9	3143.0	3230.7	3320.0	3411.2	3504.2	3599.1	19
20	2570.7	2648.9	2728.2	2808.8	2890.5	2973.7	3058.3	3144.5	3232.2	3321.5	3412.7	3505.7	3600.7	20
21	2572.0	2650.2	2729.5	2810.1	2891.9	2975.1	3059.7	3145.9	3233.6	3323.1	3414.2	3507 3	3602.3	21
22	2573.3	2651.5	2730.8	2811.4	2893.3	2976.5	3061.2	3147.4	3235.1	3324.6	3415.8	3508.9	3603.9	22
23	2574.6	2652.8	2732.2	2812.8	2894.7	2977.9	3062.6	3148.8	3236.6	3326.1	3417.3	3510.5	3605.5	23
24	2575.9	2654.1	2733.5	2814.1	2896.0	2979.3	3064.0	3150.3	3238.1	3327.6	3418.8	3512.0	3607.1	24
25	2577.2	2655.5	2734.8	2815.5	2897.4	2980.7	3065.4	3151.7	3239.5	3329.1	3420.4	3513.6	3608.7	25
26	2578.5	2656.8	2736.2	2816.8	2898.8	2982.1	3066.9	3153.2	3241.0	3330.6	3421.9	3515.1	3610.3	26
27	3579.7	2658.1	2737.5	2818.2	2900.2	2983.5	3068.3	3154.6	3242.5	3332.1	3423.5	3516.7	3611.9	27
28	2581.1	2659.4	2738.8	2819.5	2901.5	2984.9	3069.7	3156.1	3244.0	3333.6	3425.0	3518.3	3613.6	28
29	2582.4	2660.7	2740.2	2820.9	2902.9	2986.3	3071.1	3157.5	3245.5	3335.1	3426.5	3519.8	3615.2	29
30	2583.7	2662.0	2741.5	2822.3	2904.3	2987.7	3072.6	3159.0	3246.9	3336.6	3428.1	3521.4	3616.8	30
31	2585.0	2663.3	2742.9	2823.6	2905.7	2989.1	3074.0	3160.4	3248.4	3338.1	3429.6	3523.0	3618.4	31
32	2586.3	2664.6	2744.2	2825.0	2907.1	2990.5	3075.4	3161.9	3249.9	3339.6	3431.2	3524.6	3620.0	32
33	2587.6	2666.0	2745.5	2826.3	2908.4	2991.9	3076.9	3163.3	3251.4	3341.1	3432.7	3526.1	3621.6	33
34	2588.9	2667.3	2746.9	2827.7	2909.7	2993.3	3078.3	3164.8	3252.9	3342.7	3434.2	3527.7	3623.2	34
35	2590.2	2668.6	2748.2	2829.0	2911.2	2994.7	3079.7	3166.2	3254.4	3344.2	3435.8	3529.3	3624.8	35
36	2591.5	2669.9	2749.5	2830.4	2912.6	2996.1	3081.1	3167.7	3255.8	3345.7	3437.3	3530.9	3626.4	36
37	2592.8	2671.2	2750.9	2831.8	2914.0	2997.5	3082.6	3169.1	3257.3	3347.2	3438.9	3532.4	3628.0	37
38	2594.1	2672.5	2752.2	2833.1	2915.3	2998.9	3084.0	3170.6	3258.8	3348.7	3440.4	3534.0	3629.6	38
39	2595.4	2673.9	2753.5	2834.5	2916.7	3000.3	3085.4	3172.1	3260.3	3350.1	3442.0	3535.6	3631.1	39
40	2596.7	2675.1	2754.9	2835.8	2918.1	3001.8	3086.9	3173.5	3261.8	3351.7	3443.5	3537.2	3632.9	40
41	2598.0	2676.5	2756.2	2837.2	2919.5	3003.2	3088.3	3175.0	3263.3	3353.2	3445.0	3538.8	3634.5	41
42	2599.3	2677.8	2757.6	2838.6	2920.9	3004.6	3089.7	3176.4	3264.7	3354.8	3446.6	3540.3	3636.1	42
43	2600.6	2679.1	2758.9	2839.9	2922.3	3006.0	3091.2	3177.9	3266.2	3356.3	3448.1	3541.9	3637.7	43
44	2601.9	2680.5	2760.2	2841.3	2923.6	3007.4	3092.6	3179.3	3267.7	3357.8	3449.7	3543.5	3639.3	44
45	2603.2	2681.8	2761.5	2842.6	2925.0	3008.8	3094.0	3180.8	3269.2	3359.3	3451.2	3545.1	3640.9	45
46	2604.5	2683.1	2762.9	2844.0	2926.4	3010.2	3095.5	3182.3	3270.7	3360.8	3452.8	3546.7	3642.5	46
47	2605.8	2684.4	2764.3	2845.4	2927.8	3011.6	3096.9	3183.7	3272.2	3362.3	3454.3	3548.2	3644.2	47
48	2607.1	2685.7	2765.6	2846.7	2929.2	3013.0	3098.3	3185.2	3273.7	3363.9	3455.9	3549.8	3645.8	48
49	2608.4	2687.1	2766.9	2848.1	2930.6	3014.4	3099.8	3186.6	3275.2	3365.4	3457.4	3551.4	3647.4	49
50	2609.7	2688.4	2768.3	2849.5	2932.0	3015.8	3101.2	3188.1	3276.6	3366.9	3459.0	3553.0	3649.0	50
51	2611.0	2689.7	2769.6	2850.8	2933.3	3017.2	3102.6	3189.6	3278.1	3368.4	3460.5	3554.6	3650.6	51
52	2612.3	2691.0	2771.0	2852.2	2934.7	3018.7	3104.1	3191.0	3279.6	3369.9	3462.1	3556.1	3652.3	52
53	2613.6	2692.3	2772.3	2853.6	2936.1	3020.1	3105.6	3192.5	3281.1	3371.5	3463.6	3557.7	3653.9	53
54	2614.9	2693.7	2773.7	2854.9	2937.5	3021.5	3107.0	3194.0	3282.6	3373.0	3465.2	3559.3	3655.5	54
55	2616.2	2695.0	2775.0	2856.3	2938.9	3022.9	3108.4	3195.4	3284.1	3374.5	3466.7	3560.9	3657.1	55
56	2617.5	2696.3	2776.4	2857.7	2940.3	3024.3	3109.8	3196.9	3285.6	3376.0	3468.3	3562.5	3658.7	56
57	2618.8	2697.6	2777.7	2859.1	2941.7	3025.7	3111.2	3198.4	3287.1	3377.6	3469.8	3564.1	3660.4	57
58	2620.1	2699.0	2779.0	2860.5	2943.1	3027.1	3112.7	3199.8	3288.6	3379.1	3471.4	3565.7	3662.0	58
59	2621.4	2700.3	2780.4	2861.8	2944.4	3028.5	3114.1	3201.3	3290.1	3380.6	3473.0	3567.3	3663.6	59
min.	M. P	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	min.
D. l.	39	40	41	42	43	44	45	46	47	48	49	50	51	D. l.

D. L.	52	53	54	55	56	57	58	59	60	61	62	63	64	D. L.
min.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	min.
0	3665.2	3763.8	3864.7	3968.0	4073.9	4182.6	4294.3	4409.2	4527.4	4649.2	4475.0	4905.0	5039.4	0
1	3666.9	3765.5	3866.4	3969.7	4075.7	4184.5	4296.2	4411.1	4529.4	4651.3	4777.1	4907.2	5041.7	1
2	3668.5	3767.1	3868.1	3971.5	4077.5	4186.3	4298.1	4413.1	4531.4	4653.4	4779.3	4909.4	5044.0	2
3	3670.1	3768.8	3869.8	3973.2	4079.3	4188.2	4300.0	4415.0	4533.4	4655.5	4781.4	4911.6	5046.3	3
4	3671.7	3770.4	3871.5	3975.0	4081.1	4190.0	4301.9	4417.0	4535.4	4657.5	4783.5	4913.8	5048.6	4
5	3673.4	3772.1	3873.2	3976.7	4082.9	4191.8	4303.8	4418.9	4537.4	4659.6	4785.7	4916.0	5050.8	5
6	3675.0	3773.8	3874.9	3978.4	4084.7	4193.7	4305.7	4420.8	4539.4	4661.7	4787.8	4918.2	5053.2	6
7	3676.6	3775.4	3876.6	3980.2	4086.5	4195.5	4307.6	4422.8	4541.4	4663.7	4790.0	4920.4	5055.5	7
8	3678.2	3777.1	3878.3	3982.0	4088.3	4197.4	4309.5	4424.7	4543.4	4665.8	4792.1	4922.6	5057.7	8
9	3679.9	3778.8	3880.0	3983.7	4090.1	4199.2	4311.4	4426.7	4545.4	4667.9	4794.2	4924.8	5060.0	9
10	3681.5	3780.4	3881.7	3985.5	4091.9	4201.1	4313.2	4428.6	4547.5	4669.9	4796.4	4927.1	5062.3	10
11	3683.1	3782.1	3883.4	3987.2	4093.7	4202.9	4315.1	4430.6	4549.5	4672.0	4798.5	4929.3	5064.6	11
12	3684.8	3783.8	3885.1	3989.0	4095.5	4204.7	4317.0	4432.5	4551.5	4674.1	4800.7	4931.5	5066.9	12
13	3686.4	3785.5	3886.8	3990.7	4097.3	4206.6	4318.9	4434.5	4553.5	4676.2	4802.8	4933.7	5069.2	13
14	3688.0	3787.1	3888.6	3992.5	4099.1	4208.4	4320.8	4436.4	4555.5	4678.2	4804.9	4935.9	5071.5	14
15	3689.7	3788.8	3890.3	3994.2	4100.9	4210.3	4322.7	4438.4	4557.5	4680.3	4807.1	4938.1	5073.8	15
16	3691.3	3790.5	3892.0	3996.0	4102.7	4212.1	4324.6	4440.4	4559.5	4682.4	4809.2	4940.4	5076.1	16
17	3692.9	3792.1	3893.7	3997.7	4104.5	4214.0	4326.5	4442.3	4561.5	4684.5	4811.4	4942.6	5078.4	17
18	3694.6	3793.8	3895.4	3999.5	4106.3	4215.8	4328.4	4444.3	4563.6	4686.6	4813.5	4944.8	5080.7	18
19	3696.2	3795.5	3897.1	4001.3	4108.1	4217.7	4330.3	4446.2	4565.6	4688.6	4815.7	4947.0	5083.0	19
20	3697.8	3797.2	3898.8	4003.0	4109.9	4219.5	4332.2	4448.2	4567.6	4690.7	4817.8	4949.3	5085.3	20
21	3699.5	3798.8	3900.5	4004.8	4111.7	4221.4	4334.2	4450.2	4569.6	4692.8	4820.0	4951.5	5087.7	21
22	3701.1	3800.5	3902.3	4006.5	4113.5	4223.2	4336.1	4452.1	4571.6	4694.9	4822.2	4953.7	5090.0	22
23	3702.7	3802.2	3904.0	4008.3	4115.3	4225.1	4338.0	4454.1	4573.7	4697.0	4824.3	4956.0	5092.3	23
24	3704.4	3803.9	3905.7	4010.0	4117.1	4227.0	4339.9	4456.0	4575.7	4699.1	4826.5	4958.2	5094.6	24
25	3706.0	3805.5	3907.4	4011.8	4118.9	4228.8	4341.8	4458.0	4577.7	4701.2	4828.6	4960.4	5096.9	25
26	3707.7	3807.2	3909.1	4013.6	4120.7	4230.7	4343.7	4460.0	4579.7	4703.2	4830.8	4962.7	5099.2	26
27	3709.3	3808.9	3910.9	4015.3	4122.5	4232.5	4345.6	4461.9	4581.8	4705.3	4832.9	4964.9	5101.5	27
28	3710.9	3810.6	3912.6	4017.1	4124.3	4234.4	4347.5	4463.9	4583.8	4707.4	4835.1	4967.1	5103.9	28
29	3712.6	3812.3	3914.3	4018.9	4126.1	4236.2	4349.4	4465.9	4585.8	4709.5	4837.3	4969.4	5106.2	29
30	3714.2	3813.9	3916.0	4020.6	4127.9	4238.1	4351.3	4467.8	4587.8	4711.6	4839.4	4971.6	5108.5	30
31	3715.9	3815.6	3917.7	4022.4	4129.7	4240.0	4353.3	4469.8	4589.9	4713.7	4841.6	4973.9	5110.8	31
32	3717.5	3817.3	3919.5	4024.2	4131.6	4241.8	4355.2	4471.8	4591.9	4715.8	4843.8	4976.1	5113.1	32
33	3719.2	3819.0	3921.2	4025.9	4133.4	4243.7	4357.1	4473.8	4593.9	4717.9	4845.9	4978.3	5115.5	33
34	3720.8	3820.7	3922.9	4027.7	4135.2	4245.6	4359.0	4475.7	4596.0	4720.0	4848.1	4980.6	5117.8	34
35	3722.4	3822.3	3924.6	4029.5	4137.0	4247.4	4360.9	4477.7	4598.0	4722.1	4850.3	4982.8	5120.1	35
36	3724.1	3824.0	3926.4	4031.2	4138.8	4249.3	4362.8	4479.7	4600.1	4724.2	4852.5	4985.1	5122.5	36
37	3725.7	3825.7	3928.1	4033.0	4140.6	4251.2	4364.8	4481.7	4602.1	4726.3	4854.6	4987.3	5124.8	37
38	3727.4	3827.4	3929.8	4034.8	4142.5	4253.0	4366.7	4483.6	4604.1	4728.4	4856.8	4989.6	5127.1	38
39	3729.0	3829.1	3931.5	4036.6	4144.3	4254.9	4368.6	4485.6	4606.2	4730.5	4859.0	4991.8	5129.5	39
40	3730.7	3830.8	3933.3	4038.3	4146.1	4256.8	4370.5	4487.6	4608.2	4732.6	4861.2	4994.1	5131.8	40
41	3732.3	3832.5	3935.0	4040.1	4147.9	4258.6	4372.5	4489.6	4610.3	4734.7	4863.3	4996.3	5134.1	41
42	3734.0	3834.2	3936.7	4041.9	4149.7	4260.5	4374.4	4491.6	4612.3	4736.9	4865.5	4998.6	5136.5	42
43	3735.6	3835.8	3938.5	4043.6	4151.6	4262.4	4376.3	4493.5	4614.3	4739.0	4867.7	5000.9	5138.8	43
44	3737.3	3837.5	3940.2	4045.4	4153.4	4264.3	4378.2	4495.5	4616.4	4741.1	4869.9	5003.1	5141.2	44
45	3738.9	3839.2	3941.9	4047.2	4155.2	4266.1	4380.1	4497.5	4618.4	4743.2	4872.1	5005.4	5143.5	45
46	3740.6	3840.9	3943.7	4049.0	4157.0	4268.0	4382.1	4499.5	4620.5	4745.3	4874.3	5007.6	5145.9	46
47	3742.2	3842.6	3945.4	4050.8	4158.8	4269.9	4384.0	4501.5	4622.5	4747.4	4876.4	5009.9	5148.2	47
48	3743.9	3844.3	3947.1	4052.5	4160.7	4271.8	4385.9	4503.5	4624.6	4749.5	4878.6	5012.2	5150.6	48
49	3745.6	3846.0	3948.9	4054.3	4162.5	4273.6	4387.9	4505.5	4626.6	4751.7	4880.8	5014.4	5152.9	49
50	3747.2	3847.7	3950.6	4056.1	4164.3	4275.5	4389.8	4507.5	4628.7	4753.8	4882.0	5016.7	5155.3	50
51	3748.9	3849.4	3952.3	4057.9	4166.2	4277.4	4391.7	4509.4	4630.7	4755.9	4885.2	5019.0	5157.6	51
52	3750.5	3851.1	3954.1	4059.7	4168.0	4279.3	4393.7	4511.4	4632.8	4758.0	4887.4	5021.2	5160.0	52
53	3752.2	3852.8	3955.8	4061.4	4169.8	4281.1	4395.6	4513.4	4634.8	4760.1	4889.6	5023.5	5162.3	53
54	3753.8	3854.5	3957.6	4063.2	4171.7	4283.0	4397.5	4515.4	4636.9	4762.3	4891.8	5025.8	5164.7	54
55	3755.5	3856.2	3959.3	4065.0	4173.5	4284.9	4399.5	4517.4	4639.0	4764.4	4894.0	5028.1	5167.0	55
56	3757.2	3857.9	3961.0	4066.8	4175.3	4286.8	4401.4	4519.4	4641.0	4766.5	4896.2	5030.3	5169.4	56
57	3758.8	3859.6	3962.8	4068.6	4177.2	4288.7	4403.4	4521.4	4643.1	4768.6	4898.4	5032.6	5171.8	57
58	3760.5	3861.3	3964.5	4070.4	4179.0	4290.6	4405.3	4523.4	4645.1	4770.8	4900.6	5034.9	5174.1	58
59	3762.2	3863.0	3966.3	4072.1	4180.8	4292.5	4407.2	4525.4	4647.2	4772.9	4902.8	5037.2	5176.5	59
min.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	min.
D. L.	52	53	54	55	56	57	58	59	60	61	62	63	64	D. L.

D. l.	65	66	67	68	69	70	71	72	73	74	75	76	77	D. l.
min.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	min.
0	5178.8	5323.6	5474.0	5630.9	5794.6	5966.0	6145.7	6334.9	6534.5	6745.7	6970.3	7210.1	7467.2	0
1	5181.2	5326.0	5476.6	5633.5	5797.4	5968.9	6148.8	6338.1	6537.9	6749.4	6974.2	7214.2	7471.7	1
2	5183.6	5328.5	5479.2	5636.2	5800.2	5971.8	6151.9	6341.4	6541.3	6753.0	6978.1	7218.3	7476.1	2
3	5186.0	5330.9	5481.7	5638.9	5803.0	5974.7	6155.0	6344.6	6544.7	6756.6	6981.9	7222.5	7480.6	3
4	5188.3	5333.4	5484.3	5641.5	5805.8	5977.7	6158.0	6347.8	6548.2	6760.3	6985.8	7226.6	7485.0	4
5	5190.7	5335.9	5486.9	5644.2	5808.6	5980.6	6161.1	6351.1	6551.6	6763.9	6989.7	7230.8	7489.5	5
6	5193.1	5338.3	5489.4	5646.9	5811.4	5983.5	6164.2	6354.3	6555.0	6767.6	6993.6	7234.9	7494.0	6
7	5195.4	5340.8	5492.0	5649.6	5814.2	5986.5	6167.3	6357.6	6558.5	6771.2	6997.5	7239.1	7498.5	7
8	5197.8	5343.3	5494.6	5652.3	5817.0	5989.4	6170.4	6360.9	6561.9	6774.9	7001.4	7243.3	7502.9	8
9	5200.2	5345.7	5497.1	5655.0	5819.8	5992.4	6173.5	6364.1	6565.4	6778.5	7005.3	7247.5	7507.4	9
10	5202.6	5348.2	5499.7	5657.6	5822.6	5995.3	6176.6	6367.4	6568.8	6782.2	7009.2	7251.6	7511.9	10
11	5205.0	5350.7	5502.3	5660.3	5825.4	5998.3	6179.7	6370.6	6572.3	6785.8	7013.1	7255.8	7516.4	11
12	5207.3	5353.2	5504.9	5663.0	5828.2	6001.2	6182.8	6373.9	6575.7	6789.5	7017.0	7260.0	7520.9	12
13	5209.7	5355.6	5507.4	5665.7	5831.0	6004.2	6185.9	6377.2	6579.2	6793.2	7020.9	7264.2	7525.4	13
14	5212.1	5358.1	5510.0	5668.4	5833.9	6007.1	6189.0	6380.5	6582.6	6796.9	7024.8	7268.4	7530.0	14
15	5214.5	5360.6	5512.6	5671.1	5836.7	6010.1	6192.1	6383.7	6586.1	6800.5	7028.7	7272.6	7534.5	15
16	5216.9	5363.1	5515.2	5673.8	5839.5	6013.0	6195.2	6387.0	6589.5	6804.2	7032.7	7276.8	7539.0	16
17	5219.3	5365.6	5517.8	5676.5	5842.3	6016.0	6198.3	6390.3	6593.0	6807.9	7036.6	7281.0	7543.6	17
18	5221.7	5368.1	5520.4	5679.2	5845.2	6019.0	6201.4	6393.6	6596.5	6811.6	7040.5	7285.2	7548.1	18
19	5224.1	5370.5	5523.0	5681.9	5848.0	6021.9	6204.6	6396.9	6600.0	6815.3	7044.5	7289.4	7552.7	19
20	5226.5	5373.0	5525.6	5684.6	5850.8	6024.9	6207.7	6400.2	6603.4	6819.0	7048.4	7293.7	7557.2	20
21	5228.9	5375.5	5528.2	5687.3	5853.7	6027.9	6210.8	6403.5	6606.9	6822.7	7052.4	7297.9	7561.8	21
22	5231.3	5378.0	5530.8	5690.0	5856.5	6030.8	6213.9	6406.8	6610.4	6826.4	7056.3	7302.1	7566.3	22
23	5233.7	5380.5	5533.4	5692.8	5859.3	6033.8	6217.1	6410.1	6613.9	6830.1	7060.3	7306.4	7570.9	23
24	5236.1	5383.0	5536.0	5695.5	5862.2	6036.8	6220.2	6413.4	6617.4	6833.8	7064.2	7310.6	7575.5	24
25	5238.5	5385.5	5538.6	5698.2	5865.0	6039.8	6223.3	6416.7	6620.9	6837.6	7068.2	7314.9	7580.1	25
26	5240.9	5388.0	5541.2	5700.9	5867.9	6042.7	6226.5	6420.0	6624.4	6841.3	7072.2	7319.1	7584.7	26
27	5243.3	5390.5	5543.8	5703.6	5870.7	6045.7	6229.6	6423.3	6627.9	6845.0	7076.2	7323.4	7589.3	27
28	5245.7	5393.0	5546.4	5706.3	5873.5	6048.7	6232.7	6426.6	6631.4	6848.7	7080.1	7327.7	7593.9	28
29	5248.1	5395.5	5549.0	5709.1	5876.4	6051.7	6235.9	6429.9	6635.0	6852.5	7084.1	7332.0	7598.5	29
30	5250.5	5398.0	5551.6	5711.8	5879.3	6054.7	6239.0	6433.2	6638.5	6856.2	7088.1	7336.2	7603.1	30
31	5252.9	5400.5	5554.2	5714.5	5882.1	6057.7	6242.2	6436.6	6642.0	6860.0	7092.1	7340.4	7607.7	31
32	5255.3	5403.0	5556.8	5717.3	5885.0	6060.7	6245.3	6439.9	6645.5	6863.7	7096.1	7344.8	7612.3	32
33	5257.7	5405.6	5559.5	5720.0	5887.8	6063.7	6248.5	6443.2	6649.1	6867.5	7100.1	7349.1	7617.0	33
34	5260.1	5408.1	5562.1	5722.7	5890.7	6066.7	6251.7	6446.6	6652.6	6871.2	7104.1	7353.4	7621.6	34
35	5262.6	5410.6	5564.7	5725.5	5893.6	6069.7	6254.8	6449.9	6656.1	6875.0	7108.2	7357.7	7626.3	35
36	5265.0	5413.1	5567.3	5728.2	5896.4	6072.7	6258.0	6453.3	6659.7	6878.7	7112.2	7362.0	7630.9	36
37	5267.4	5415.6	5569.9	5731.0	5899.3	6075.7	6261.2	6456.6	6663.2	6882.5	7116.2	7366.4	7635.6	37
38	5269.8	5418.1	5572.6	5733.7	5902.2	6078.8	6264.4	6460.0	6666.8	6886.3	7120.2	7370.7	7640.2	38
39	5272.3	5420.7	5575.2	5736.4	5905.1	6081.8	6267.5	6463.3	6670.3	6890.1	7124.3	7375.0	7644.9	39
40	5274.7	5423.2	5577.8	5739.2	5907.9	6084.8	6270.7	6466.7	6673.9	6893.8	7128.3	7379.4	7649.6	40
41	5277.1	5425.7	5580.5	5741.9	5910.8	6087.8	6273.9	6470.0	6677.4	6897.6	7132.3	7383.7	7654.3	41
42	5279.5	5428.2	5583.1	5744.7	5913.7	6090.8	6277.1	6473.4	6681.0	6901.4	7136.4	7388.0	7659.0	42
43	5282.0	5430.8	5585.7	5747.5	5916.6	6093.9	6280.3	6476.8	6684.6	6905.2	7140.4	7392.4	7663.7	43
44	5284.4	5433.3	5588.4	5750.2	5919.5	6096.9	6283.5	6480.1	6688.1	6909.0	7144.5	7396.8	7668.4	44
45	5286.8	5435.8	5591.0	5753.0	5922.4	6099.9	6286.6	6483.5	6691.7	6912.8	7148.6	7401.1	7673.1	45
46	5289.3	5438.4	5593.7	5755.7	5925.2	6103.0	6289.8	6486.9	6695.3	6916.6	7152.6	7405.5	7677.8	46
47	5291.7	5440.9	5596.3	5758.5	5928.1	6106.0	6293.0	6490.3	6698.9	6920.4	7156.7	7409.9	7682.6	47
48	5294.2	5443.5	5599.0	5761.3	5931.0	6109.1	6296.2	6493.6	6702.4	6924.2	7160.8	7414.2	7687.3	48
49	5296.6	5446.0	5601.6	5764.0	5933.9	6112.1	6299.4	6497.0	6706.0	6928.1	7164.9	7418.6	7692.0	49
50	5299.0	5448.5	5604.3	5766.8	5936.8	6115.1	6302.7	6500.4	6709.6	6931.9	7169.0	7423.0	7696.8	50
51	5301.5	5451.1	5606.9	5769.6	5939.7	6118.2	6305.9	6503.8	6713.2	6935.7	7173.0	7427.4	7701.5	51
52	5303.9	5453.6	5609.6	5772.3	5942.6	6121.2	6309.1	6507.2	6716.8	6939.5	7177.1	7431.8	7706.3	52
53	5306.3	5456.2	5612.2	5775.1	5945.5	6124.3	6312.3	6510.6	6720.4	6943.4	7181.2	7436.2	7711.0	53
54	5308.8	5458.7	5614.9	5777.9	5948.5	6127.4	6315.5	6514.0	6724.0	6947.2	7185.3	7440.6	7715.8	54
55	5311.3	5461.3	5617.5	5780.7	5951.4	6130.4	6318.7	6517.4	6727.6	6951.1	7189.5	7445.0	7720.6	55
56	5313.7	5463.8	5620.2	5783.5	5954.3	6133.5	6322.0	6520.8	6731.2	6954.9	7193.6	7449.5	7725.4	56
57	5316.2	5466.4	5622.9	5786.2	5957.2	6136.5	6325.2	6524.2	6734.9	6958.8	7197.7	7453.9	7730.2	57
58	5318.6	5468.9	5625.5	5789.0	5960.1	6139.6	6328.4	6527.6	6738.5	6962.6	7201.8	7458.3	7735.0	58
59	5321.1	5471.5	5628.2	5791.8	5963.0	6142.7	6331.7	6531.0	6742.1	6966.5	7205.9	7462.8	7739.8	59
min.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	min.
D. l.	65	66	67	68	69	70	71	72	73	74	75	76	77	D. l.

D. L.	78	79	80	81	82	83	84	85	86	87	88	89	D. L.
min.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	min.
0	7744.6	8045.7	8375.3	8739.1	9145.5	9605.9	10137.0	10764.7	11532.6	[illegible]	13916.6	16299.8	0
1	7749.4	8051.0	8381.0	8745.5	9152.7	9614.1	10146.6	10776.2	11547.0	12541.4	13945.4	16357.5	1
2	7754.2	8056.2	8386.8	8751.9	9159.9	9622.4	10156.2	10787.7	11561.4	12560.7	13974.4	16416.3	2
3	7759.0	8061.5	8392.6	8758.3	9167.2	9630.6	10165.8	10799.3	11575.9	[illegible]	14003.7	16476.1	3
4	7763.9	8066.8	8398.3	8764.8	9174.4	9638.9	10175.4	10810.8	11590.5	12599.5	14033.2	16537.0	4
5	7768.7	8072.0	8404.1	8771.2	9181.6	9647.2	10185.1	10822.6	11605.0	12619.1	[illegible]	16598.9	5
6	7773.5	8077.3	8409.9	8777.7	9188.9	9655.5	10194.8	10834.2	11619.7	12638.8	14093.0	16662.0	6
7	7778.4	8082.6	8415.8	8784.1	9196.2	9663.8	10204.6	10845.9	11634.5	12658.6	14123.3	16726.2	7
8	7783.2	8087.9	8421.6	8790.6	9203.5	9672.2	10214.4	10857.7	11649.3	12678.6	14153.9	16791.7	8
9	7788.1	8093.2	8427.4	8797.1	9210.8	9680.6	10224.2	10869.6	11664.1	12698.6	14184.7	16858.5	9
10	7793.0	8098.5	8433.3	8803.6	9218.1	9689.0	10234.0	10881.4	11679.1	12718.8	14215.8	16926.5	10
11	7797.8	8103.8	8439.1	8810.1	9225.4	9697.4	10243.8	10893.3	11694.0	12739.1	14247.2	16995.6	11
12	7802.7	8109.2	8445.0	8816.6	9232.7	9705.8	10253.7	10905.2	11709.1	12759.5	14278.9	17066.9	12
13	7807.6	8114.5	8450.9	8823.2	9240.2	9714.2	10263.6	10917.2	11724.2	12780.0	14310.9	17140.3	13
14	7812.5	8119.8	8456.8	8829.7	9247.6	9722.7	10273.5	10929.1	11739.4	12800.7	14343.2	17213.2	14
15	7817.4	8125.2	8462.6	8836.3	9255.0	9731.2	10283.5	10941.2	11754.7	12821.5	14375.8	17288.7	15
16	7822.3	8130.6	8468.6	8842.8	9262.4	9739.7	10293.5	10953.3	11770.0	12842.5	14408.7	17366.0	16
17	7827.2	8135.9	8474.5	8849.4	9269.9	9748.3	10303.5	10965.5	11785.4	12863.5	14441.9	17444.0	17
18	7832.2	8141.3	8480.4	8856.0	9277.3	9756.8	10313.6	10977.7	11800.9	12884.7	14475.4	17525.9	18
19	7837.1	8146.7	8486.3	8862.6	9284.8	9765.4	10323.7	10989.9	11816.4	12906.0	14509.3	17608.7	19
20	7842.0	8152.1	8492.3	8869.3	9292.3	9774.0	10333.8	11002.2	11832.0	12927.4	14543.5	17694.6	20
21	7847.0	8157.5	8498.2	8875.9	9299.8	9782.7	10344.0	11014.5	11847.6	12948.9	14578.1	17780.5	21
22	7851.9	8162.9	8504.2	8882.6	9307.3	9791.3	10354.1	11026.9	11863.4	12970.6	14613.0	17869.9	22
23	7856.9	8168.3	8510.2	8889.2	9314.8	9800.0	10364.3	11039.3	11879.2	12992.5	14648.3	17961.6	23
24	7861.9	8173.7	8516.2	8895.9	9322.4	9808.6	10374.5	11051.7	11895.1	13014.4	14683.9	18055.8	24
25	7866.8	8179.2	8522.2	8902.6	9330.0	9817.3	10384.8	11064.2	11911.0	13036.6	14719.9	18152.6	25
26	7871.8	8184.6	8528.2	8909.3	9337.6	9826.1	10395.0	11076.8	11927.1	13058.8	14756.3	18252.3	26
27	7876.8	8190.1	8534.2	8916.0	9345.2	9834.8	10405.3	11089.3	11943.1	13081.2	14793.0	18354.9	27
28	7881.8	8195.5	8540.2	8922.7	9352.8	9843.6	10415.7	11102.0	11959.3	13103.8	14830.2	18460.7	28
29	7886.8	8201.0	8546.2	8929.5	9360.4	9852.4	10426.2	11114.6	11975.6	13126.5	14867.8	18569.8	29
30	7891.8	8206.5	8552.3	8936.2	9368.1	9861.3	10436.6	11127.4	11991.9	13149.3	14905.8	18682.5	30
31	7896.8	8212.0	8558.4	8943.0	9375.8	9870.1	10447.1	11140.1	12008.4	13172.3	14944.2	18799.1	31
32	7901.9	8217.5	8564.4	8949.8	9383.5	9879.0	10457.5	11152.9	12024.9	13195.5	14983.0	18919.7	32
33	7906.9	8223.0	8570.5	8956.6	9391.2	9887.8	10468.0	11165.8	12041.5	13218.8	15022.3	19044.7	33
34	7911.9	8228.5	8576.6	8963.4	9398.9	9896.7	10478.5	11178.7	12058.2	13242.3	15062.1	19174.4	34
35	7917.0	8234.1	8582.7	8970.2	9406.6	9905.7	10489.1	11191.7	12074.9	13265.9	15102.3	19309.2	35
36	7922.1	8239.6	8588.9	8977.1	9414.4	9914.6	10499.7	11204.7	12091.7	13289.7	15143.0	19449.5	36
37	7927.1	8245.1	8595.0	8983.9	9422.1	9923.6	10510.4	11217.7	12108.6	13313.7	15184.2	19595.8	37
38	7932.2	8250.7	8601.1	8990.8	9429.9	9932.7	10521.1	11230.8	12125.6	13337.8	15225.8	19748.6	38
39	7937.3	8256.3	8607.3	8997.7	9437.8	9941.7	10531.8	11244.0	12142.7	13362.1	15268.0	19908.5	39
40	7942.4	8261.8	8613.5	9004.6	9445.6	9950.8	10542.6	11257.2	12159.9	13386.6	15310.7	20076.4	40
41	7947.5	8267.4	8619.6	9011.5	9453.4	9959.8	10553.3	11270.5	12177.1	13411.2	15353.8	20252.5	41
42	7952.6	8273.0	8625.8	9018.4	9461.3	9968.9	10564.1	11283.8	12194.4	13436.1	15397.8	20483.3	42
43	7957.7	8278.6	8632.0	9025.4	9469.1	9978.0	10574.9	11297.1	12211.8	13461.1	15442.1	20635.1	43
44	7962.8	8284.2	8638.2	9032.3	9477.0	9987.2	10585.8	11310.5	12229.3	13486.3	15486.9	20843.5	44
45	7968.0	8289.9	8644.5	9039.3	9484.9	9996.3	10596.7	11324.0	12246.9	13511.6	15532.6	21065.4	45
46	7973.1	8295.5	8650.7	9046.3	9492.9	10005.5	10607.6	11337.6	12264.6	13537.0	15578.7	21302.5	46
47	7978.2	8301.1	8656.9	9053.3	9500.8	10014.8	10618.6	11351.1	12282.4	13562.8	15625.5	21557.3	47
48	7983.4	8306.8	8663.2	9060.3	9508.8	10024.0	10629.7	11364.8	12300.2	13588.9	15672.7	21832.5	48
49	7988.5	8312.4	8669.5	9067.3	9516.8	10033.3	10640.8	11378.4	12318.1	13615.1	15721.0	22131.6	49
50	7993.7	8318.1	8675.7	9074.4	9524.8	10042.6	10651.9	11392.2	12336.3	13641.4	15769.8	22459.3	50
51	7998.9	8323.8	8682.0	9081.4	9532.9	10051.9	10663.0	11406.0	12354.4	13667.8	15819.3	22821.5	51
52	8004.0	8329.4	8688.3	9088.5	9540.9	10061.3	10674.1	11419.8	12372.7	13694.5	15869.4	23226.4	52
53	8009.2	8335.1	8694.6	9095.6	9548.9	10070.6	10685.3	11433.7	12391.0	13721.5	15920.4	23685.4	53
54	8014.4	8340.8	8701.0	9102.7	9557.0	10080.0	10696.5	11447.7	12409.5	13748.9	15972.1	24215.3	54
55	8019.6	8346.6	8707.3	9109.8	9565.1	10089.4	10707.7	11461.7	12428.0	13776.1	16024.6	24842.1	55
56	8024.8	8352.3	8713.6	9116.9	9573.2	10098.9	10719.1	11475.8	12446.5	13803.7	16077.9	25609.2	56
57	8030.0	8358.0	8720.0	9124.0	9581.4	10108.4	10730.4	11489.9	12465.3	13831.5	16132.0	26598.2	57
58	8035.3	8363.7	8726.4	9131.2	9589.5	10117.9	10741.8	11504.1	12484.2	13859.6	16187.0	27992.1	58
59	8040.5	8369.5	8732.7	9138.4	9597.7	10127.4	10753.3	11518.3	12503.1	13887.8	16242.9	30375.0	59
min.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	M. P.	min.
D. L.	78	79	80	81	82	83	84	85	86	87	88	89	D. L.

N.B. In this table D. l. ſtands for degree of lat. and M. P. for meridional parts. In uſing it, ſeek the degrees of latitude at the top or bottom, and the minutes in the right or left hand columns; and the correſponding meridional parts will ſtand right againſt the minutes, and in the column ſigned with the degree propoſed.

Having the latitude of two places, to find the meridional miles or minutes between them; conſider whether the places be one under the equinoctial, and the other wide of it; or the one on the one ſide of the equinoctial, and the other on the other; or whether they both lie on the ſame ſide.

If one place lie under the equator, the meridional minute next under the degree of latitude of the other place, is the meridional difference of latitude, or latitude enlarged. If one be in north, and the other in ſouth latitude, the meridional minutes, correſponding to the two latitudes, added together, give the meridional minutes between them.

Both places lying towards the ſame pole, ſubtract the meridional parts anſwering to the leſs latitude from thoſe of the greater, the remainder gives the meridional minutes. See Sailing.

In the Philoſophical Tranſactions, No. 219, Dr. Halley has given a very curious paper relating to the diviſion of the nautical meridian, by a quite different method from Mr. Wright's; and containing a method of performing the problems of ſailing according to the true chart, by the help of Briggs's, or the common table of logarithmic tangents, without a table of meridional parts. Dr. Halley avails himſelf of a principle, firſt accidentally diſcovered by Mr. Henry Bond, and publiſhed about the year 1645, that the meridian line was analogous to a ſcale of logarithmic tangents of half the complements of the latitude. This analogy was firſt demonſtrated by Mr. James Gregory, in his "Exercitationes Geometricæ," publiſhed in 1688, and more elegantly and conciſely by Dr. Halley himſelf; who has alſo ſhewn (ubi ſupra) how to apply this analogy, by means of any ſyſtem of logarithms, for computing the interval of the meridional parts anſwering to any two given latitudes. The reader may find this ſubject well illuſtrated by Mr. Robertſon in his Elements of Navigation, book viii. p. 142, &c. See alſo Phil. Tranſ. vol. xlvi. p. 559, &c.

To find the meridional parts to any ſpheroid, with the ſame exactneſs as in a ſphere.

Let the ſemi-diameter of the equator be to the diſtance of the focus of the generating ellipſe from the centre, as m to 1. Let A repreſent the latitude for which the meridional parts are required, s the ſine of the latitude, the radius being unit; find the arc B, whoſe ſine is $\frac{s}{m}$; take the logarithmic tangent of half the complement of B, from the common tables; ſubtract this logarithmic tangent from 10.0000000, or the logarithmic tangent of 45°: multiply the remainder by $\frac{7915.7044678978}{m}$, &c. and the product ſubtracted from the meridional parts in the ſphere, computed in the uſual manner for the latitude A, will give the meridional parts expreſſed in minutes for the ſame latitude in the ſpheroid, provided it be oblate.

Example:—If $mm : 1 :: 1000 : 22$, then the greateſt difference of the meridional parts in the ſphere and ſpheroid is 76.0929 minutes; in other caſes it is found by multiplying the remainder above mentioned by 1174.078.

When the ſpheroid is oblong, the difference of the meridional parts in the ſphere and ſpheroid, for the ſame latitude, is then determined by a circular arc. Phil. Tranſ. No. 461. ſect. 14. See alſo Maclaurin's Fluxions, art. 195—899.

Mr. Murdoch has ſolved this problem by infinite ſeries, and has computed a table of meridional parts for an oblate ſpheroid, ſuch as is mentioned in the foregoing example. See his treatiſe, intitled "Mercator's Sailing applied to the true Figure of the Earth," Lond. 1741, 4to. See the article Degree.

MERJEIAH, in *Geography*, a town of Algiers; 80 miles E. of Oran.

MERIGHI, La Signora, in *Biography*, was announced in Handel's advertiſements, on his return from Italy in 1729, where he had been to engage ſingers, as "a woman of a very fine preſence, an excellent actreſs, and a very good ſinger, with a counter-tenor voice." We find afterwards, however, that ſhe was only engaged as ſecond woman under the Strada.

MERJIAN, in *Geography*, a town of Perſia, in the province of Kerman; 55 miles N. of Kabis.

MERIM, a large lake of S. America, in Paraguay, near the coaſt of the S. Atlantic ocean. At the S. end ſtands fort St. Miguel, and at its northern extremity fort Mangaveira. Parallel to it, and between it and the ocean, is another lake nearly as long. The forts command the extremities of the peninſula.

MERIMEG, or Maramag, a large river of Louiſiana, which runs into the Miſſiſippi, below the mouth of the Miſſouri.

MERINDAPILLY, a town of Hindooſtan, in Baramaul; 25 miles N.W. of Darempoury.

MERINO-Sheep, in *Agriculture*, a breed of fine-woolled ſheep lately introduced from Spain, hence ſometimes termed the *Spaniſh breed.* They are characteriſed by the males having horns, but the females being ſometimes without them, by having white faces and legs, the latter rather long, the body not very perfect in ſhape, fine in the bone, ſome degree of thrc[illegible]tineſs, the pelt fine and clear. The weight, when fattened in ſome degree, in the rams about 17lbs., in the ewes 11lbs. the quarter. The wool is very fine. They are ſaid to be hardy, and to have the property of fattening in a pretty expeditious manner. See Mesta, and Sheep.

MERION, Upper and Lower, in *Geography*, two townſhips of America, in Montgomery county, Pennſylvania; the firſt has 993, and the latter 1422 inhabitants.

MERIONETHSHIRE, one of the counties of North Wales, is bounded on the W. by the extenſive bay of Cardigan, which forms part of the Iriſh ſea; on the N. by Denbighſhire and Caernarvonſhire; on the E. by Montgomeryſhire; and on the S. by the river Dovey, which divides it from Cardiganſhire. This county extends in length, from Beddgelert, near Snowdon, to Bwlch y Vedwen, on the confines of Montgomeryſhire, 43 miles; in breadth, from Harlech to the extreme boundary of Llangollen pariſh, 38. It is called by the natives Meironydd, and is the only county in Wales which, with the addition of the word ſhire, ſtill retains its ancient appellation. This name is ſaid to be derived from Meirion, the ſon of Tibrawn, and grandſon of Cunedda, a diſtinguiſhed Britiſh chieftain of the fifth century, who, having aſſiſted the Welſh in reſcuing their country from the depredations of a band of Iriſh marauders, received from them a large extent of territory as the reward of his ſervices.

The early hiſtory of this county is equally as obſcure as that of any other in Wales. That it was known to the Romans is evident from the many veſtiges of their cuſtoms which are yet to be diſcovered in different parts of it. Of theſe the

the principal are, the fortifications of Tommen-y-Bala, near Bala town; Caer-Gai, in the vicinity of Llanuwchllyn; Cefn-Caer, in the parifh of Penul, and Tommen-y-Mur, near Feftiniog. The Roman road, denominated Sarn-Helen, can eafily be traced from the fine ftation laft mentioned, ftretching itfelf towards Dinas Emryfm, Caernarvonfhire. From this road two branches appear to have ftruck off in this neighbourhood, one of which led to Conovium, and the other to Segontium. During the Saxon and Norman dynafties, hiftory is nearly filent concerning Merionethfhire, but the numerous fortifications which cover its hills plainly evince that it did not in thefe ages efcape the ravages of war. At a later period it was the fcene of many of the daring exploits of the celebrated Owen Glyndyr, who fo vigoroufly efpoufed the caufe of the unfortunate Richard II.

The general afpect of Merionethfhire differs in fome refpects from that of the other counties in North Wales. For the moft part it is extremely mountainous, but its mountains are lefs elevated, with the exception of a few points, than thofe of the adjacent county of Caernarvon. The higheft hill, however, called Cader-Idris, is inferior in height only to Snowdon. This mountain, according to tradition, was fo called from being the favourite feat of Idris, who was a great prince, poet, aftronomer, and philofopher in ancient times. Its higheft peak is faid to be two thoufand eight hundred and fifty feet above the level of the town of Dolgellau, which is fituated near its bafe. The other principal eminences are Aren-Vowdhwy, Aren-Benllyn, Arennig, Moelwyn, Manod, &c.: thefe rear their lofty heads over a profufion of lower hills, which are interfected by fome beautiful vallies, and are interfperfed with woods, lakes, rivers, rivulets, and cataracts.

The principal river in this county is the Dee, which takes its rife from feveral fprings on the declivity of the lofty Aren. Thefe quickly uniting their ftreams enter the lake, called by the Welfh Llyn-tegid, and by the Englifh Pimblemeer, and from thence flow through the beautiful vale of Edernion, towards Corwen, a little below which town it enters Denbighfhire. The Dee, in its courfe through this county, forms feveral fine cataracts. That called Rhaiadrdu, or the Black-Cataract, from the colour of its waters, is fituated in the vicinity of Dolgellau, and is a double fall about fixty feet in height, where the river dafhes rapidly over a feries of black rugged rocks, which are covered in many places with white lichens, and thus give a peculiar appearance to the fcene. The other rivers of importance befides the Dee are the Maw or Mawddach, the Dovey or Duff, and the Glaflyn and Dwy'rid, the two laft of which form a junction, and paffing Traeth-Mawr and Traeth-Bychan, empty their waters into the Irifh fea. There is in this county a variety of lakes: the principal ones are Llyn-tegid near Bala, and Llyn Talyllyn at the fouthern foot of Cader Idris.

From the mountainous nature of Merionethfhire it may naturally be fuppofed that it is not deftined to reach any high degree of agricultural improvement. Mr. Davies, in his enlightened Survey of North Wales, eftimates the number of acres in the whole county at 430,000, and ftates that out of thefe not above 146,000 acres are inclofed. The foil is various, but in general extremely poor. The hilly diftricts, where covered with foil, are in general too fteep and rugged to admit of culture. By far the greater proportion of the low grounds confifts of peat earth, forming bogs and turbaries. In fome few places attempts have been made by different individuals to bring a part of thefe wafte lands into cultivation, but their progrefs has by no means anfwered their expectations, though fome advantages have certainly been gained. The attention of the inhabitants therefore is chiefly directed to the rearing and feeding of cattle, fheep, and goats, of which a great number are exchanged for the commodities of more fertile, or more commercial diftricts. The cultivated fpots lie chiefly on the fea-coaft, and on the fkirts of the county. In the vallies, and on the fides of the hills, in many parts there appear confiderable plantations of wood, both natural and raifed by art.

Notwithftanding the apparently favourable character of this county for the productions of the mineral kingdom, it is remarkable that few mines of any importance have been difcovered in it. The diftrict abounds indeed with numerous veins, both of lead and copper ore, but they are generally either fo peculiarly placed, or fo limited in extent, as to deprive the adventurer of any fair profpect of remuneration for the expence and trouble of opening them. Sulphat of copper, in particular, is found at Aberdyfo, and at Buddugre and Clogiau mines near Dolgellau. The two latter are the principal in Merionethfhire, and perhaps the only ones which are wrought with any degree of fpirit or profit. At Moel-Ifbri, in the parifh of Llanellyd, Pont-yr-avonddu, Bulch-y-plwm, and Craig-wen, near Dinas-mowddwy, are the chief veins of lead. The fame metal alfo abounds at Melin, Illyw-y-pair, in the parifh of Tywyn, and at Bryndinas, near Dyffryn-gwyn.

This county poffeffes no iron ores, and can only boaft of one infulated white lime rock at Gwerclas, near Corwen, in which about 50,000 bufhels are annually burnt. Merionethfhire affords no coal, fo that peat forms the chief article for fuel.

But if the practical miner does not difcover here fuch exhauftlefs ftores of ufeful metals as he might be led to expect upon a general view of the county, the fcientific mineralogift will find ample materials for the illuftration of his geological inquiries. The lofty mountain of Cader-Idris poffeffes numerous peculiarities, both of ftructure and compofition; and affords feveral facts tending to fupport the Huttonian hypothefis. This eminence is the commencement of a chain of primitive mountains, which extend in a north-north-eafterly direction towards the Arens and Arrenig. It is extremely fteep, and more craggy than the hills of fecondary formation which furround it, and confifts of filiceous porphyry, quartz, and feldfpar, inclofed in a green pafte, with filiceous fchiftofe porphyry, interfected with veins of quartz and argillaceous porphyry in a mafs, and a dark grey pafte. Befides thefe fpecies, fome of the rocks likewife contain the component parts of granite and porphyry, together with the granitell in mafs of Mr. Kirwan, compofed of quartz and fchorl. On the fides of the mountain lie a confiderable quantity of ftones, refembling lava; and hence fome writers fuppofe it to have been at one time volcanic. But this fuppofition is unqueftionably erroneous. The porous appearance of thefe ftones has arifen from the circumftance of the feldfpar which interfected the quartz having been decompofed. On the fouth fide of the mountain, and near its apex, is a large lake, from which the rocks rife almoft perpendicularly. On the north fide is another lake: and at the fummit is a mafs of large ftones, called Idris's chair. See Aikin's Tour in Wales.

In a level part of the county, called Towyn Meironydd, rifes a very fingular rock of immenfe fize, and terminating in a conical form. Quartz conftitutes the chief matrix of the lead and copper ores here. In fome places feveral veins confift entirely of this mineral upon the furface. A line of dark coloured argillaceous limeftone can be traced in a fouthweftern direction, ftretching through the whole extent of the

the county to Cadair-Ddinmael, near Cerrig-Druidion. This lime is of little value, either as a cement or a manure.

Besides the Roman roads already mentioned, Merionethshire contains many interesting monuments of remote ages. Above Nannua, in the neighbourhood of Dolgellau, on a rocky eminence, is a vast collection of loose stones, which have evidently formed the rampart of a British post. The hill on which these stones are placed is emphatically denominated Moel-orthrwm, or the hill of oppression. The remains of a castle, formerly of great strength and extent, occupy the top of the insulated rock near Towyn-Meironydd, already noticed. It appears to have stretched longitudinally over the whole surface of the summit. One of the apartments, thirty feet in diameter, is excavated in the rock. In some parts, the lines of circumvallation consist of stones loosely piled on the edges of the precipices; but on other parts appear well built walls of squared stones, cemented with mortar composed of calcined shells and gravel. According to Mr. Pennant, this castle was anciently called Castle-bere, and was granted by Edward I. to the custody of Robert Fitzwalter. The same author likewise supposes, from its present name Teberri, that it may have been the fortress belonging to the last Llewellin, which was taken only a short time previous to the final conquest of Wales by William de Valence, earl of Pembroke. This conjecture, however, is extremely questionable. St. Cadwan's stone, in the church-yard of Towyn, is traditionally reported to have been erected, in honour of that saint, in the sixth century. In the parish of Llanelltyd are the ruins of Cynmer-abbey, founded by two Welsh princes in 1198. On the mountain called Mikneint, near Rhyd-ar-Helen, stand some remarkable stone monuments, at least thirty in number. Each separate grave has four stones, one at each corner, resembling small square pillars, two or three feet high, and about nine inches broad. Tradition says they serve to commemorate some persons of note, who fell in the battle fought here between the men of Dyffryn-Ardwdwy, and some of Denbighshire. A considerable number of similar monuments are found likewise in the parish of Trawsfynudd. Several stone circles appear in the vicinity of these graves, the largest about fifty-two feet in diameter, and a vast carnedd, with two upright stones; also several smaller circles, the whole apparently surrounded by one of much greater circumference. Near Rhuw-goch is a small fort, in a singular position, on a circular isolated rock, resembling an artificial mount, between the hills, evidently intended for the defence of the pass. Some persons have supposed that this was of British construction, but the regularity of its facings, and the numerous coins which have been found in its neighbourhood, seem to imply that it was of Roman formation. Besides, in the inclosed country immediately adjacent, is a large encampment, undoubtedly the work of that illustrious people. This commands a variety of passes, which are defended by minor posts. At one extremity of the vale of Maentwrog is a large upright stone, called Maen-twrog, which is supposed to be the monument of a saint so named, who was contemporary with St. Beuno. The large artificial mount called Tomen-y-Bala, near the lake of Bala, is supposed to have been originally Roman, but afterwards to have been occupied by the Welsh during their conflicts with the English. Situated on an eminence fronting the town of Corwen, is the British post called Caer-Drewin, which consists of a circular wall, about a mile and a half in circumference, and is supposed by Mr. Pennant to have been one of those strong holds in which the Welsh secured their families and their property, in the event of an invasion. Lyttelton conjectures that Owen Gwynnedd occupied this post, while Henry II. encamped on the opposite side of the vale, from whence however he was forced to return to England in chagrin, without being able to strike a single blow. It was afterwards the retreat of the brave and heroic Owen Glyndwr, whose memory continues to be highly revered by the inhabitants of the surrounding district. Harlech castle has been already described under the word HARLECH. This county is not distinguished for its manufactures; but at Bala and Dolgellau, some strong cloths, druggets, kersimeres, flannels, &c. are made. Bala is particularly noted for its stockings and wigs.

The political divisions of this county have varied at different periods. At present it comprehends five comots, or hundreds, *viz.* Ardwdwy, Penllyn, Estumaner, Edernion, and Talybont; 37 parishes, and seven market-towns; *viz.* Harlech, Bala, Dolgellau, Dinas-y-Mowddu, Corwen, Tywen or Towyn, and Barmouth. Harlech, the county-town, is but a poor place, though governed by a mayor. Barmouth is the only port in the county. Dolgellau is distinguished as the place where the summer assizes are held, and is perhaps the most thriving town in Merionethshire. Bala is likewise a thriving town. Dinas-Mowddu, although now a mean town, was anciently a fortified city, and the residence of a Welsh prince or chieftain. It is still a corporate town, with a mayor, alderman, recorder, and several burgesses. The mayor has the right of trying criminals, but of late years that privilege has not been put in practice. He still, however, retains all the insignia of his magisterial office. Besides these towns there is a variety of villages dispersed through different parts of the county. Of these, Festiniog and Mallwyd are remarkable for the beauty of their situations, and noble prospects which they command. Festiniog has been celebrated by several authors, but more especially by lord Lyttelton. The vale in which this stands has been compared to the celebrated vale of Tempe, and it must be confessed that few spots in this island can boast of such varied and romantic scenery.

According to the parliamentary return of 1801, this county contained 5980 houses, and 29,506 inhabitants, of whom 13,896 were males, and 15,6 o females. The number engaged in agriculture was 10,308, and in commerce and manufactures 2711. Pennant's Tour in Wales. Carlisle's Topographical Dictionary of Wales. Aikin's Tour in Wales.

MERIS, μερις, *a part*, in *Music*, an appellation given by Mr. Sauveur to the forty-third part of an octave. See Mem. Acad. Scienc. 1701.

MERISMA, in *Botany*, from μερισμος, *a division*, alluding to the divided or branched nature of this fungus.—Pers. Syn. 582.—Class and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi*.

Eff. Ch. Branching, leathery, compressed, even; for the most part hairy at the top.

This genus consists of seven species in Persoon, differing from *Clavaria* chiefly in their compressed dilated form, for the hairiness is avowedly not constant. Examples may be seen in

M. *cristatum*. Pers. n. 3. (Clavaria laciniata; Bull. t. 415. f. 1. Sowerb. t. 158.)—Somewhat decumbent, incrusting other plants, pale; its branches laciniated, tumid, rugose. Found in woods, running over every thing that comes in its way, like a stalactitical concretion, and throwing out variously dilated, sharply jagged, fan-like branches. The whole is of a pale whitish hue, and faint smell and taste.

M. *fœtidum*. Pers. n. 7. (Clavaria anthocephala; Bull. t. 452. f. 1. Sowerb. t. 156)—Purplish-brown. Branches palmate, crowded, whitish and polished at their tips.—Not unfrequent on the ground in fir woods. It is of a tough

woody

woody texture, and about two inches high, of a nauseous scent when fresh. The whole is of a palmate figure, stalked, with many crowded, fan-like *branches*, various in diameter, whitish at their summits, which are abrupt and notched.

MERIT, in *Theology*, is used to signify the moral goodness of the actions of men, and the reward due to them.

The Romish schoolmen distinguish two kinds of merit towards God: the one of *congruity*, the other of *condignity*.

MERIT *of Congruity* is when there is no just proportion between the action and the reward; but he who bestows the reward supplies, by his goodness or liberality, what was wanting in the action. Such is the merit of a son towards his father: but this is only merit in an improper sense.

MERIT *of Condignity* is when there is an absolute equality and a just estimation between the action and the reward: as in the wages of a workman.

Those of the reformed religion disclaim all merit of condignity towards God; even their best works, they own, do not merit at his hands. Hence the doctrine of condign merits makes one of the great articles of controversy between the Romish and reformed churches.

MERIT, *Order of*, was instituted by Frederick, king of Prussia. The ensign of the order is a star of eight points enamelled blue, and edged with gold; on the centre the letters F.R. in a cypher; in each angle an eagle displayed sable; on the upper two points, the regal crown of Prussia; on the reverse, in enamel, this motto, POUR LE MERITE. It is worn round the neck, pendent to a black ribbon, edged with silver.

MERIT, *Military Order of*, in Hesse Cassel, was instituted by the late landgrave. The badge is a gold star of eight points enamelled white; on the centre this motto, VIRTUTE ET FIDELITATE. It is worn at the button-hole, pendent to a blue ribbon, edged with silver.

MERIT, *Military, the Order of*, was instituted in France, in the year 1759, by Louis XV. in favour of those officers of his army who were Protestants. The marks of honour are the same with those of the order of *St. Louis*. The ensign of the order is also of the same form as that of St. Louis, with this difference, that on one side is "a sword in pale," within this motto, PRO VIRTUTE BELLICA: and on the reverse is a chaplet of laurel: within this inscription, LUD. XV. INSTITUIT, 1759.

MERKA, in *Geography*, a town of Prussia, in the palatinate of Culm; 10 miles N.N.E. of Thorn.

MERKENDORF, a town of Germany, in the margravate of Anspach; 7 miles S.E. of Anspach.

MERKET ISLANDS, a cluster of small islands in the Red sea, near the coast of Arabia. N. lat. 18° 10′.

MERKLIN, a town of Bohemia, in the circle of Pilsen; 15 miles S.S.W. of Pilsen.

MERLANGUS, in *Ichthyology*, a name given by Bellonius and some other authors, to a small species of whiting, or *asellus mollis*, called by the Venetians *mollo*, and by some other nations the *capelon*. See GADUS *minutus*.—Also, the name of the common whiting, a species of *Gadus*; which see.

MERLENGO, in *Geography*, a town of Italy, in the department of the Mincio; 10 miles N. of Mantua.

MERLERA, a small island in the Mediterranean, four miles from cape Sidero, on the N. coast of Corfu.

MERLERAULT, a town of France, in the department of the Orne, and chief place of a canton, in the district of Argentan; 18 miles N.N.E. of Alençon. The place contains 1222, and the canton 8098 inhabitants, on a territory of $177\frac{1}{2}$ kiliometres, in 19 communes.

MERLIN, AMBROSE, in *Biography*, a British writer, who flourished in the fifth century, was regarded as a prophet and magician. Strange stories are told of him by ancient writers, some of whom have assumed that he conveyed by enchantment the stupendous stones on Salisbury plain from Ireland. There are likewise certain extravagant predictions that pass under his name, printed at Paris in 1530. Near Caermarthen is a mount called Merlin's Hill, beneath which it is said the prophet was buried.

MERLIN, in *Ornithology*, the name of the yellow-legged falcon. See FALCO *Æsalon*.

MERLINGEN, in *Geography*, a town of Switzerland, in the canton of Bern; 7 miles S.E. of Thun.

MERLOM, a town of Hindoostan, in Dowlatabad; 12 miles S.E. of Bader.

MERLON, in *Fortification*, that part of the parapet, from fifteen to eighteen feet in length, which lies betwixt two embrasures.

The word comes from *merula*, or *merla*, which, in the corrupt Latin, was used for a battlement.

To stake out the merlons, measure from each end of the wall, twelve feet, there stick a stake, and plant other stakes at every intermediate eighteen feet: when this is done on the inside of the wall, let other stakes be planted on the outside, either directly opposite to the former, or in the line towards the place where the gun is more particularly intended to deliver its shot. Plant other stakes on the inside, one a foot distant on each side of the former, and this will leave spaces of two feet each for the inner opening of embrasures: then, on the outside, plant other stakes at five or six feet distance from the former ones, one on each side, and the spaces of ten or twelve feet will be marked out for the outside openings of the embrasures. In the direction of the pickets, which limit the inner and outer openings of the embrasures, let single rows of fascines be staked down across the wall, and these will be the sides of the embrasures: fill the intermediate spaces, or merlons, with rows or fascines laid lengthwise to the wall, and this will be the first floor of the merlon, which is to be picketted down, and the hollows filled with earth. Let other floors be raised in like manner, until the merlons are carried up to about five or six feet, or more if necessary; and on the top of each let a bed or floor of earth be laid of about eight or twelve inches thick.

MERLON, or *Mellon*, in *Geography*, a town of France, in the department of the Oise; seven miles S. of Clermont.

MERLUCIUS, *Gadus merluccius* of Linnæus, in *Ichthyology*, the name of a fish commonly called the *hake*, and by some authors the *asellus alter*.

It is a moderately large fish, growing to two feet or more in length, and resembling the common pike in figure, from whence it has its name, *merlucius*, *quasi maris lucius*, *the sea-pike*. See GADUS *Merluccius*.

MERMAID, or MERMAN, a sea-creature, frequently talked of, and supposed half human and half a fish.

However naturalists may doubt of the reality of *mermen*, or mermaids, if we might believe particular writers, there seems testimony enough to establish it. In the year 1187, as Larrey informs us, such a monster was fished up in the county of Suffolk, and kept by the governor for six months. It bore so near a conformity with man, that nothing seemed wanting to it besides speech. One day it took the opportunity of making its escape, and plunging into the sea, and was never more heard of. Hist. d'Angleterre, p. i, p. 403.

In the year 1430, we are told, that, after an huge tempest, which broke down the dykes in Holland, and made way for the sea into the meadows, &c. some girls, of the town of Edam, in West-Friesland, going in a boat to milk their cows,

cows, perceived a mermaid embarraffed in the mud with a very little water. They took it into their boat, and brought it with them to Edam, dreffed it in women's apparel, and taught it to fpin. It fed like one of them, but could never be brought to offer at fpeech. Some time after it was brought to Haerlem, where it lived for fome years, though ftill fhewing an inclination to the water. Parival relates that they had given it fome notions of a deity, and that it made its reverences very devoutly whenever it paffed by a crucifix. (Delices d'Hollande.) In the year 1560, near the ifland of Manar, on the weftern coaft of the ifland of Ceylon, fome fifhermen are faid to have brought up, at one draught of a net, feven mermen and maids; of which feveral Jefuits, and among the reft F. Hen. Henriques, and Dimas Bofquez, phyfician to the viceroy of Goa, are faid to have been witneffes. And it is added, that the phyfician, who examined them with a great deal of care, and made diffections thereof, afferted that all the parts, both internal and external, were found perfectly conformable to thofe of men. See the Hift. de la Compagne de Jefus, p. ii. tom. iv. N° 276, where the relation is given at length.

We have another account, as well attefted, of a merman, near the great rock called Diamond, on the coaft of Martinico. The perfons who faw it gave in a precife defcription of it before a notary: they affirmed, that they faw it wipe its hands over its face, and even heard it blow its nofe.

Another creature, of the fame fpecies, was caught in the Baltic, in the year 1531, and fent as a prefent to Sigifmund king of Poland, with whom it lived three days, and was feen by all the court. And another very young one was taken near Rocca de Sintra, as related by Damian Goes.

The king of Portugal, and the grand-mafter of the order of St. James, are faid to have had a fuit at law, to determine which party thefe monfters belonged to. See Sea-cow, and Siren. See Pontoppidan's Nat. Hift. of Norway, vol. ii. p. 186, &c.

MERMEREDGIK, in *Geography*, a town of Afiatic Turkey, in Natolia; 44 miles E. of Smyrna.

MERO, a diftrict of Teneffee, in America, on the banks of Cumberland river, comprehending feven counties and 32,178 inhabitants, of whom 8074 are flaves.

Mero *Point*, a point on the coaft of Peru, in the South Pacific ocean, between cape Blanco to the S.W., and Tumber river to the N.E., on the S.E. fide of Guayaquil bay. S. lat. 3° 40′.

Mero *Motu*. See Ex *Mero*.

MEROCELE, from μηρος, *the thigh*, and κηλη, *a tumour*, in *Surgery*, the crural or femoral rupture. See Hernia.

MEROLA, in *Geography*, a river of Naples, which runs into the Adriatic, N. lat. 42° 6′. E. long. 14° 55′.

MEROPE, a town of Peru, in the diocefe of Truxillo; 12 miles N.W. of Lambayeque.

MEROPS, the Bee-eater, in *Natural Hiftory*, a genus of birds of the order Picæ: bill curved, quadrangular, compreffed, carinate, pointed; noftrils fmall, at the bafe of the bill; tongue flender, the tip, generally, jagged; feet greffiorial. There are twenty-fix fpecies. The birds of this genus, with a few exceptions, inhabit the old continent. Their general food is infects, and they are particularly fond of bees and wafps. They have no note beyond a whiftle, and that far from an agreeable one. Like the king-fifher, they breed in holes in the banks of rivers.

Species.

* Apiaster. Back ferruginous; belly and tail blueifh-green; two of the tail-feathers longer; chin pale yellow. A variety occurs with the bill convex and uncarinated, and the toes unconnected at the laft joint. Bill black; irids red; front blue-green; crown, hind-head, and neck bay; a black ftreak from the bill to the hind-head; tail wedged, the feathers edged within with cinereous; legs chefnut; claws reddifh-black. This is one of the moft elegant of the European birds, and, next to the roller and king-fifher, may be regarded as the moft brilliant in point of colour. This bird is a native of the warmer parts of Europe, and of many parts both of Afia and Africa. It is rarely feen in the northern regions of Europe. In Greece, and among the iflands of the Archipelago, it feems to be extremely common, and we are told by Belon, that in the ifland of Crete the inhabitants practife a curious mode of catching it by means of a cicada, faftened on a bent pin, or a fifh hook, and tied to a long line; the infect is then thrown into the air, and flies with great rapidity, and the bee-eater, ever on the watch for infects, feeing the cicada, fprings at it, and fwallowing the bait, is thus taken by the Cretan boys. It has been feen in Sweden; and in the third volume of the Tranfactions of the Linnæan fociety, it is afferted that a flight of thefe birds, not lefs than twenty in number, was feen near Mattifhall in Norfolk, in the month of June 1793, and again in the following October. They feed, on the wing, upon bees, gnats, flies, and other infects. Their neft is compofed of mofs, and the eggs, from five to feven, are perfectly white, and about the fize of thofe of a ftare. When the fun fhines upon them, in their flight, they are a pleafing object, as they appear gilded. It is recorded by Kolben, the hiftorian of the Cape of Good Hope, that bee-eaters guide the Hottentots to the honey, which the bees lay up in clefts of the rocks.

Viridis, Indian Bee-eater. Green; band on the breaft black; chin and tail blue; two of the tail-feathers longer. It inhabits Bengal, and is eight or nine inches in length. Bill and band acrofs the eyes are black; legs are brown. There are four other varieties of this fpecies: in the *fecond*, the body is longer, front blue: in the *third*, the chin is yellow; line on the fides of the head black; quill-feathers tipt with brown. It is found in Egypt. The bill is black, ftraight; tongue not jagged; legs flefh-colour; tail even; in the *fourth* variety, the chin and ftripe beneath the eyes are blue; tail even; it is found in the Philippine iflands; two middle tail-feathers are black; in the *fifth* and laft variety, the front is of a pale yellow colour; chin blue, it inhabits India.

Congener, Yellow-headed Bee-eater. Yellowifh; rump greenifh; quill-feathers tipt with red; tail-feathers yellow at the bafe. Found in the fouthern parts of Europe. The band acrofs the eyes is black; back and fhoulders bay; leffer wing-coverts blueifh, the greater are yellow; quill-feathers black; legs yellow. According to Gefner it is often feen in the neighbourhood of Strafburg.

Superciliosus, Supercilious Bee-eater. Green, frontal line above and beneath the eyes white; chin yellowifh; two of the tail-feathers longer. There is a variety of this fpecies defcribed as having a flenderer bill; an even tail, with a rump and tail of blue-green. It inhabits Madagafcar, and is nearly a foot long. Bill and area of the eyes black; crown greenifh-bay; the legs are brown, and claws black.

Philippensis, Philippine Bee-eater. Green, beneath yellowifh; rump blue; tail even. This, as its name imports, inhabits the Philippine iflands, and is about eight or nine inches long. The bill and line through the eyes are black; legs and claws brown.

Cinereus, Cinereous Bee-eater. Variegated red and yellow, beneath reddifh-yellow; the two longeft tail-feathers are red. Inhabits New Spain, and is between nine and

and ten inches long. The bill is green; head, quill and lateral tail-feathers cinereous.

Flavicans, Yellow Bee-eater. Whitifh; head varied with white and tawny; breaft reddifh; back yellow; rump, wings, and tail rufous; two middle tail-feathers very long. In Willughby's Ornithology this fpecies is defcribed as the fecond bird of Paradife of Aldrovandus. This naturalift fays he obferved it, in the year 1577, in the poffeffion of a Roman knight of the name of Cavallieri. The head was nearly white, fprinkled with yellow, and gold-coloured fpots; the eyes were luteous, with red eye-lafhes; the bill between green and yellow, two fingers breadth long, and rather curved; the tongue red, longifh, and fharp, not unlike that of a wood-pecker, and calculated for piercing; the breaft reddifh; the back, wings, and belly whitifh, but the upper parts of the tips of the wings ferruginous; the upper part of the back yellowifh, but becoming reddifh or ferruginous at the rump; the tail-feathers were white at the bafe, but ferruginous for the remainder of their length, and the two middle feathers exceeded the others two palms in length. The wings in the figure of Aldrovandus appear very long in proportion to the bird, and the author fays they meafured five palms in length; the tail likewife, exclufively of the two middle feathers, appears of confiderable length.

Coromandus, Coromandel Bee-eater. Yellowifh; fides of the neck, wings, and tail yellow; wing-coverts, back, and rump waved blueifh, ocular ftripes black. Inhabits different parts of India and Coromandel, whence it derives its name. Bill and legs black; irids pale rufous; chin greenifh.

Brasiliensis, Brafilian Bee-eater. Varied brown and black; head, chin, leffer wing-coverts, and body beneath red; wings and tail blue. It is found, as its name imports, in Brafil; is about nine inches long; the bill, wings beneath, legs and claws yellow.

Superbus, Superb Bee-eater. Front and rump blue; two middle tail-feathers longer. Bill blackifh; quill-feathers edged with brown; lower half of the middle tail-feathers dark brown. The fize of this fplendid bird is nearly that of the common or European bee-eater.

Badius, Chefnut Bee-eater. Blue-green; head, neck, and fhoulders chefnut coloured; tail-feathers above blue, beneath grey-brown; two middle tail-feathers longer pointed. There is a variety that has the wings and tail chefnut. It inhabits the ifle of France. Bill black, band beneath the eyes brown; upper wing-coverts green, beneath tawny; quill-feathers beneath grey, four inner ones totally green; 13 middle ones tipt with black; tail-feathers grey at the inner edge; legs reddifh; claws blackifh.

Chrysocephalus, Yellow-throated Bee-eater. Green-gold, beneath blue-green; head and neck tawny; chin yellow; two middle tail-feathers longer. It is found in different parts of Afia, and is about ten inches long. The front and eye-brows blue-green; upper tail-coverts green.

Angolensis, Angola Bee-eater. Gloffy green-gold; band through the eyes cinereous, fpotted with black; wings and wedged tail beneath cinereous; chin yellow; throat chefnut. It inhabits, as its name expreffes, Angola, and is about five inches long. The bill and claws are black; legs cinereous; body beneath blueifh.

Erythrocephalus, Red-headed Bee-eater. Green, beneath yellowifh; head and neck red; chin yellow; wings and even tail beneath cinereous. It is found in India, and is about fix inches long. According to Briffon, the crown of the head and upper part of the neck are of a bright red; there is acrofs the eyes a black ftreak; all the upper parts of the bird are of a fine green; the throat and under parts yellow, but flightly dafhed, from the throat downwards, with red; tail even at the end, and rather fhort; irides red; bill black; legs brown.

Nubicus, Blue-headed Bee-eater. Blue-green, beneath red; back, wings, and forked tail dirty red. It inhabits Nubia, and is ten inches long. The bill is black; great quill-feathers tipt with blueifh-afh, the fecondary are blackifh; legs pale-afh.

Erythropterus, Red-winged Bee-eater. Olive, beneath whitifh, chin yellow; wings and tail red, tipt with black. It was defcribed by Buffon, from a fpecimen brought from Senegal by Adanfon. Its total length was about fix inches.

Cayanensis, Cayenne Bee-eater. Green; wings and tail rufous, the latter tipt with black. It is a native of Cayenne, from whence it derives its name. The bill is black; quill-feathers white at the bafe; the tail-feathers edged with black; legs yellowifh.

Surinamensis, Surinam Bee-eater. Variegated; hind-head reddifh; fcrag greenifh-yellow; quill-feathers greenifh, varied with black and blue. An inhabitant of Surinam. The irids are chefnut and claws black.

Novæ Seelandiæ, New Zealand Bee-eater. Gloffy greenifh-black; greater wing-coverts and tuft of curled feathers on each fide the neck white; tail even, coverts blue. Is found in New Zealand; is about 11 inches long; fings well; is held facred by the inhabitants; and the flefh is good. Legs and claws black; infide the mouth and tongue yellow, the latter tipt with black and befet with briftles; feathers of the neck lax, long, a little curled, with a longitudinal white ftreak through the fhaft.

Phrygius, Embroidered Bee-eater. Black variegated with yellow. This beautiful fpecies is the fize of a thrufh, and its black moft elegantly variegated with bright and pale yellow; the fides of the head, round the eyes, are covered by a naked, yellow, granulated fkin; the back and breaft undulated by numerous pale or whitifh-yellow crefcents, the tips of the black feathers being of that colour; the fmaller wing-coverts are marked in a fimilar manner; the larger tipt with bright yellow, and the quill-feathers edged with the fame colour, as are alfo the exterior tail-feathers; the bill is black, of a moderate length, and fharp-pointed; the legs are brown. It is a native of New Holland.

Niger, Yellow-tufted Bee-eater. Black; a large tuft of feathers behind the wings and vent yellow; tail wedged, edged and tipt with white. Native of the Sandwich iflands, where it is much efteemed on account of the tufts of yellow feathers beneath the wings, which are ufed in various ornamental articles of drefs among the natives, and on that account Dr. Shaw fays it might juftify us in placing this fpecies among a particular divifion of the genus Certhia. There are two other varieties, of which the *fecond* is known by having two middle tail-feathers uniform; and the *third* by its rufous flanks, and by its having all the tail-feathers uniform.

Carunculatus, New Holland Bee-eater. Brown, belly yellow; wattles carunculate; tail wedged, tipt with white. It inhabits New Holland, and is defcribed and figured in White's Voyage to New South Wales. It is fomewhat of the fize of a Miffel thrufh, but much longer in proportion, meafuring about fourteen inches. The feathers on the upper part of the head are longer than the reft, giving the appearance of a flight creft; the plumage of the bird is brown, the feathers long and pointed, and each feather has a white longitudinal ftreak; beneath the eye, on each fide the head, beyond the bafe of the lower mandible, is a lengthened pendent wattle of an orange colour; the

 middle

middle of the belly is yellow, the tail wedge-ſhaped, like that of the magpie, and the feathers are tipt with white. The bill and legs are brown. In ſome individuals of this ſpecies a ſilvery ſtreak appears beyond each ſide of the bill, and in the young birds the white ſtreaks on the plumage terminate in a kind of dilated ſpot at the tip of each feather.

Corniculatus, Horned Bee-eater. Brown, head nakedifh; body beneath and tips of the tail-feathers whitiſh; horn on the front obtuſe. This is alſo an inhabitant of New Holland, and is deſcribed and figured by Mr. White. It is rather larger than a black-bird, the plumage above is brown, and beneath it is white; the head and upper part of the neck is ſparingly covered with narrow white feathers, almoſt like hairs; but the fore-part of the neck and breaſt are furniſhed with long ones of a white colour with a dark middle ſtreak, and pointed at the ends; its moſt remarkable feature is, that on the forehead, juſt at the baſe of the bill, there is a ſhort blunt knob, about a quarter of an inch in height, and of a browniſh colour; the tongue is nearly the length of the bill, and briſtly at the end; the legs are dark brown.

Gularis, Red-throated Bee-eater, and ſometimes, from its colour, called the Black Bee-eater. Black; forehead and rump blue; belly ſpotted with blue; throat red. It inhabits Sierra Leona. In ſize it is rather ſmaller than the common bee-eater, and its prevailing colour is the fineſt velvet black; the forehead is of the richeſt blue, ſo alſo is the rump, ſurpaſſing that of the king-fiſher; the throat is of a bright blood-red, the larger wing-coverts and middle quill-feathers bordered with bright ferruginous; the tail is even at the end; the bill and legs black.

Rufus, Rufous Bee-eater. Quill-feathers brown, the outer edge rufous. Body beneath inclining to yellow; toes ſeparated to the baſe; hind-claw longer. It is obſerved by Buffon, that as the toes in this ſpecies are not united, as in the reſt of the genus, it ſeems to form as it were a connecting link, or ſhade, between the bee-eaters and the hoopoes.

Moluccensis, Molucca Bee-eater. Grey; orbits naked; cheeks black; tail ſubequal. It is a native of the Molucca iſlands, and is about 14 inches long. The bill is blackiſh, pervious, half covered with a membrane; tongue as long as the bill, fringed at the tip; ſome of the feathers of the cheeks are tipt with a ſilvery colour; legs duſky; outer toe connected with the middle one; hind-claw longer.

Monachus, Brown or Cowled Bee-eater. Deſcribed by Latham, white beneath, with black and ſomewhat downy head with raiſed crown. It is a large ſpecies, and a native of New Holland.

Malimbicus, Malimba Bee-eater. Sanguine roſe coloured beneath, with black eye-ſtripe, white throat, and two lengthened tail-feathers. This is a native of Malimba, in Congo, Africa, where it continues only three months in the year; migrating in troops, flying with the ſwiftneſs of a ſwallow, feeding on inſects, rarely perching on trees; nor on the ground any length of time.

MEROS, in *Ichthyology*, the name of a very large American fiſh, growing to five or ſix feet long, and called by the Braſilians *cugupu-guacu*. Its head is very large, and its mouth wide and toothleſs; its eyes have a black pupil and a yellow iris; it hath five fins, one running the whole length of the back and reaching nearly to the tail; the anterior part of this is narrow, and armed with ſmall but ſharp ſpines; the other part is broader, and ſuſtained by ſofter rays; behind the anus is one like the hinder part of that on the back, and two others behind the gills, which are large and broad; the tail fin is very large and broad, and much more ſo at its extremity than at its origin; the ſcales are ſmall; the head, back, and ſides are of a browniſh-grey; and its belly white. It is accounted a well taſted fiſh. Ray. See Perca *Guttata*.

MEROSAGLIA, in *Geography*, a town of the iſland of Corſica; 14 miles N.E. of Corte.

MEROVEUS, in *Biography*, king of France, or of the Franks, whoſe monarchy, at that time, was confined to both banks of the Lower Rhine, began his reign about the year 448. Little is known of his origin and deſcent, but the moſt probable opinion ſeems to be, that he was the younger of the two ſons of Clodion, his predeceſſor, and that he obtained the crown of the Franks through the protection of Valentinian III., and his miniſter Aëtius. Attila ſupported the cauſe of his elder brother, and Meroveus was preſent as an ally of the Romans in the famous battle of Chalons, fought againſt that conqueror in 451. He afterwards probably extended his dominion in the provinces of Mentz and Rheims, to the banks of the Seine, and it has been ſaid, that in conſequence of his celebrity and renown, all the French kings of the firſt race bore the name of *Merovingian*, though others maintain that the appellation is older than this ſovereign. He died about the year 456. Gibbon. Univer. Hiſt.

MEROVINGIAN Character, derives its name from Meroüée, the firſt king of France of that race, which reigned 333 years, from Pharamond to Charles Martel. This race is ſaid by ſome to have terminated in Childeric III. A.D. 751. There are many MSS. in the French libraries ſtill extant in this character. See Spect. de la Nat. vol. vii. p. 190.

MERRET, Christopher, in *Biography*, a phyſician and naturaliſt, was born at Winchcombe, in Glouceſterſhire, in February 1614. He was educated at Oxford, being firſt entered at Glouceſter hall, and ſubſequently removing to Oriel, and took the degree of M.D. in 1642, when he ſettled in London. He appears to have enjoyed a conſiderable ſhare of practice in his profeſſion, was a fellow of the College of Phyſicians, and one of the original members of the Philoſophical Society, which after the reſtoration became the Royal Society. He died in 1695. Merret was a ſtrenuous ſupporter of the excluſive rights of the college, and his firſt publication was "A Collection of Acts of Parliament, Charters, Trials at Law, and Judges' Opinions, concerning thoſe Grants to the College of Phyſicians," 4to. 1660. This book became the baſis of Dr. Goodall's Hiſtory of the College, and it was followed, in 1669, by "A ſhort View of the Frauds and Abuſes committed by Apothecaries, in relation to Patients and Phyſicians." This publication involved him in an angry controverſy with Henry Stubbe. He was known to the public, however, more reputably as a naturaliſt, by the publication of his work, entitled "Pinax Rerum Naturalium Britannicarum, continens Vegetabilia, Animalia, et Foſſilia in hac Inſula reperta," Lond. 1667, 8vo. This, though a dry and incomplete catalogue, and abounding with errors, has the merit of being the firſt of the kind relating to this country, and was without doubt inſtrumental in promoting the ſtudy of natural hiſtory here. The botanical part is the fulleſt, conſiſting chiefly, however, of an alphabetical liſt, according to the Latin names. A great portion of his knowledge of plants was obtained through the medium of Thomas Williſel, a noted herbaliſt, whom he employed to travel through the kingdom for him during five ſummers. The zoological and mineral parts of his pinax are very meagre. Merret communicated ſeveral papers to the Royal Society, which are printed in the earlier volumes of the Philoſophical Tranſactions; particularly an account of ſome experiments on vegetation; of the tin mines in Cornwall; of the art of refining; and ſome curious obſervations relative to the fens of Lincolnfhire. In 1662, he tranflated into Englifh, Neri's work "De Arte Vitraria." In 1686, an edition of the fame work was publifhed in Latin, with Merret's obfervations and notes; and fubfequently a work was printed in German and French, comprehending all that had been written by Neri, Merret, and Kunckel, upon this art. Eloy Dict. Hift. Gen. Biog.

MERRIMACK, in *Geography*, a river of America, which is formed by the confluence of Pemigewaffet and Winnipifcogee rivers in about N. lat. 43° 26′, and which purfues a foutherly courfe through the ftate of New Hampfhire, till it enters Maffachufetts, and then turning eafterly, paffes into the ocean at Newbury-Port. It is navigable for veffels of burden about 20 miles from its mouth.

Merrimack, a townfhip in Hillfborough county, New Hampfhire, on the W. bank of Merrimack river; eight or ten miles S. of Amherft; containing 926 inhabitants.

MERRIMICHI, a river of America, which falls into the head of a bay of that name on the N.E. coaft of the province of New Brunfwick. From this river there is a communication with St. John's, partly by land, but principally by water carriage in canoes. The falmon fifhery is carried on with fuccefs, and the cod-fifhery is improving near the entrance of the bay.

MERRITCH, or Merrick, a town of Hindooftan, in the country of Vifiapour, fituated on the N. fide of the Kiftnah; 50 miles S.W. of Vifiapour. N. lat. 16° 58′. E. long. 74° 47′.

MERRY, Robert, in *Biography*, was born in London, April 1755, and was defcended in a right line from fir Henry Merry, who was knighted by James I. at Whitehall. Mr. Merry's father was governor of the Hudfon's Bay Company. His grandfather was a captain in the royal navy, and one of the elder brethren of the Trinity Houfe; he eftablifhed the commerce of the Hudfon's Bay Company upon the plan which it now purfues. He made a voyage himfelf to Hudfon's Bay, and difcovered the ifland in the North feas, which ftill bears the name of Merry's ifland. He alfo made a voyage to the Eaft Indies, and was, perhaps, the firft Englifhman who returned home over land; in which expedition he encountered inconceivable hardfhips. Mr. Merry's mother was the eldeft daughter of the late lord chief juftice Willes, who prefided for many years with great ability in the court of Common Pleas, and was for fome time firft lord commiffioner of the great feal. Mr. Merry was educated at Harrow, under Dr. Sumner. The celebrated Dr. Parr was his private tutor. From Harrow he went to Cambridge, and was entered of Chrift's college. He left Cambridge without taking any degree, and was afterwards entered of Lincoln's Inn, but was never called to the bar. Upon the death of his father he bought a commiffion in the horfe-guards, and was for feveral years adjutant and lieutenant to the firft troop, commanded by lord Lothian. Mr. Merry quitted the fervice and went abroad, where he remained nearly eight years; during which time he vifited moft of the principal towns of France, Switzerland, Italy, Germany, and Holland. At Florence he ftayed a confiderable time, enamoured (as it is faid) of a lady of diftinguifhed rank and beauty. Here he ftudied the Italian language, encouraged his favourite purfuit, poetry, and was elected a member of the academy Della Crufca; the name of which academy he afterwards ufed as a fignature to many poems which were favourably received by the public, and which excited a great number of imitators. When Mr. Merry obferved this, he dropped his fictitious character, and ever afterwards publifhed in his own name.

Upon his marriage with Mifs Brunton, who performed in his tragedy of Lorenzo, a profpect opened to him of living at his eafe, by the joint production of that lady's talents, and his own pen; but unfortunately the pride of thofe relations upon whom he had moft dependence was wounded by the alliance; and he was conftrained, much againft Mrs. Merry's inclination, to take her from the ftage. This he did as foon as her engagement at the theatre expired, which was in the fpring of 1792. They then vifited the continent, and returned in the fummer of 1793. They retired to America in 1796, and our author died fuddenly at Baltimore, in Maryland, Dec. 24, 1798, of an apoplectic diforder, which proceeded, as is fuppofed, from a plethora, and the want of proper exercife. He was author of the following dramatic pieces, *viz.* "Ambitious Vengeance;" "Lorenzo;" "The Magician no Conjurer;" and "Fenelon," a ferious drama. Monthly Magazine, Jan. 1799.

Merry's *Ifland*, in *Geography*, an ifland in Hudfon's Bay. N. lat. 61° 52′. W. long. 93° 5′.

MERRY-MEETING Bay, a bay of America, in Strafford county, New Hampfhire, being the fouthernmoft arm of lake Winnipifcogee. On its W. fide ftands mount Major. —Alfo, a bay in Maine, formed by the junction of Androfcoggin and Kennebeck rivers, oppofite to the town of Woolwich, 20 miles from the fea.

MERS Agoleta, a town of Algiers, near the fea-coaft; fix miles S.W. of Tneifs.

Mers *il Keeber*. See Mazalquivir.

MERSA, El, a town of Africa; 12 miles N.E. of Tunis.

MERSBURG, or Morspurg, a town of the duchy of Baden, feated on the lake of Conftance, containing a feminary for fecular clergy, and a nunnery of the Dominicans; fix miles N.E. of Conftance. N. lat. 47° 41′. E. long. 9° 14′.

MERSCH, a town of France, in the department of the Forefts, and chief place of a canton, in the diftrict of Luxembourg. The place contains 1446, and the canton 8185 inhabitants, on a territory of 217½ kiliometres, in 15 communes.

MERSCHOWITZ, a town of Bohemia, in the circle of Leitmeritz; 14 miles W.S.W. of Leitmeritz.

MERSEA, a townfhip of Upper Canada, in the county of Effex, feated on lake Erie, W. of Romney.

MERSEBURG, a principality of Saxony, encompaffed by the circles of Leipfic and Thuringia, the principality of Querfurt, and duchy of Magdeburg. The foil is fertile, and well cultivated, producing wheat, millet, and flax, but wanting wood.—Alfo, the capital of the above-named principality, feated on the Saale. It contains within the liberties of the Chapter, the epifcopal palace and cathedral; a gymnafium or foundation fchool, the chancery-houfe, the chapter-houfe, the curiæ or refidences of the canons, and other buildings. It has alfo a parifh church; and derives its chief fubfiftence from the ftrong beer that is brewed here and exported to different places; 16 miles W. of Leipfic. N. lat. 51° 22′. E. long. 14° 6′.

MERSENETI, a town of Afiatic Turkey, in Natolia; 10 miles S.E. of Milets.

MERSENNE, Marin, in *Biography*, a learned French mathematician and philofopher, was born at Oyfe, in the province of Maine, in the year 1588. He purfued his college ftudies at La Fleche, where he had as a fellow ftudent the celebrated Des Cartes, with whom he contracted an intimacy and friendfhip that lafted during their lives. Here Merfenne rendered himfelf confpicuous for the diligence and rapid progrefs which he made in his various ftudies. From La Fleche he went to the univerfity of Paris, where he paid the

the utmost attention to the mathematical sciences; after which, he went through a theological course at the Sorbonne. When he had completed his studies, he entered himself at the convent of Minims near Paris, and took the vows in 1612, when he was only 24 years of age. In the following year he was ordained priest, and began to study the Hebrew language, of which he made himself a complete master. In 1615 he was sent to the convent of his order near Nevers, to fill the philosophical chair in that house; and he continued there, teaching philosophy, and afterwards theology, till the year 1619, when he was chosen superior of the convent. Upon the expiration of the term of his office, which was annual, he withdrew to Paris, where he spent the remainder of his life in study and literary converse, excepting such time as he devoted to short excursions into Italy, Germany, and the Netherlands. While at this great city, he was the chief friend and literary agent of Des Cartes, giving him advice and assistance upon all occasions, and informing him of every thing of a literary and philosophical kind that was going on in that city, and elsewhere. So highly did Des Cartes estimate the opinion of our philosopher, that he scarcely did any thing, without first consulting his friend. It has been reported, that when Des Cartes was about to found his system of philosophy upon the principle of a vacuum, he was informed by Mersenne, who had founded the Parisian philosophers upon it, that it would not be admitted, and immediately changed his system, and adopted the opposite doctrine of a plenum. Mersenne was much celebrated for possessing the peculiar talent of forming curious questions and problems; some of which, it afterwards appeared, he was unable to solve. To him has been ascribed the invention of the curve, well known by the name of the "cycloid," which instantly engaged the attention of mathematicians. Schooten, indeed, ascribes the invention to Des Cartes; but Torricelli, in the appendix, "De Dimensione Cycloidis," says, the curve was discovered and named by Galileo and others, about the year 1599, before Mersenne and Des Cartes could have made much progress in mathematical learning. Dr. Wallis, in the first volume of the London "Philosophical Transactions abridged," attempts to shew that it is a much older invention, and was known to Bovilli in the year 1500, and by cardinal Cusa a full half century before this. Mersenne died in the year 1648. The loss of him was deeply regretted by persons of all ranks who were acquainted with him, by whom he was as much beloved for the cheerful qualities of his heart, and his mild and amiable temper, as he was respected for his profound scientific knowledge. He was, while a resident at Paris, the very centre of communication between literary men of all countries; being there, what Mr. Collins was in England. He omitted no opportunity of engaging them to publish their works; and to Mersenne the world is indebted for several important discoveries, which would probably have been lost, but for his encouragement and patronage. His own works were numerous, and many of them highly important. The first which he published, of any magnitude, was entitled "Quæstiones celeberrimæ in Genesim, &c. cum accurata Textus Explicatione. In hoc Volumine Athei et Deistæ impugnantur et expugnantur." The other works of this philosopher are enumerated in the General Biography, to which our readers are referred.

In the musical writings of this diligent and ingenious ecclesiastic may be found the most minute and satisfactory account of the state of music in France, during the reign of Louis XIII., particularly in his "Harmonie Universelle," published at Paris in 1636, in folio; a work in which, through all the partiality to his country, want of taste, and method, there are so many curious researches and ingenious and philosophical experiments, which have been of the greatest use to subsequent writers, particularly Kircher, as render the book extremely valuable. This work, corrected and enlarged, was translated into Latin, and published by the author in 1648, the year of his death, under the following title, "De Sonorum Natura, Causis et Effectibus." In his twenty-third proposition, liv. i., this author explains and describes twelve different kinds of music and movement, used in France during his time: these were motets, songs or airs, passacailles, pavans, allemandes, gaillards, voltes, courantes, sarabandes, canaries, branles, and balets; of all which he gives examples in notes. But though most of these movements were the specific names of the dances then in vogue, the minuet, which, during the present century, has been in such general favour all over Europe, is never mentioned.

In the "Pref. generale," Mersenne speaks of Galileo's discoveries in harmonics; and in his liv. ii. "Des Consonances," of sympathic vibrations. In other parts of his work he explains clearly the twelve keys major of practical music; and shews, for the first time perhaps, that there may be seventy-two keys, or six for each note, flat, natural, and sharp, major and minor. There is nothing in this good father's book which reflects more honour on his taste and penetration than his partiality for the violin, to which, in liv. iv, "Des Instrumens," prop. i. he gives the preference over all other instruments then in use, at a time when it was thought unworthy of being admitted into the concerts of other countries.

It is amusing, however, to see how contented mankind have ever been, in the most rude and uncultivated ages of the world, with their own talents and accomplishments. A singular instance of this mental comfort appears in Mersenne, chap. "De l'Embellissemens des Chants," which he addresses "to posterity, that they may form some idea," says he, "of our manner of gracing and embellishing airs; as such advances have at no time been made in polishing and refining melody, as at present." In his treatise "De la Voix," where he explains the manner of running divisions and making shakes, he says, that "of all nations who study singing, and who run divisions in the throat, the French execute passages in the neatest manner: this even the Italians confess, who make a particular profession of singing. It is impossible," adds he, "to describe the beauty and sweetness of our vocal embellishments to such as have not heard them; for the purling of a stream, the meandering of a brook, or the warbling of a nightingale, is not half so mellifluous. And I find nothing in nature," continues this pious father, "that can give the least idea of these passages, which are far more ravishing than shakes or trills, for they are the very quintessence of music." (Liv. i. De la Voix, p. 40.) He afterwards observes, that no traces are to be found in the writers of music among the ancient Greeks, that this ingenious and voluptuous people ever had "des fredons & des passages comme nous autres:" trills and divisions in their music, like us.

One proposition in this book (xxxiv.) is to inquire whether the French method of singing is the best of all possible methods? and determines in the affirmative, not only with respect to this proposition, but affirms that of all those he had heard sing in neighbouring countries, as in Spain, Germany, Flanders, and Italy, he had met with none who sung so agreeably as the French. "There may," says he, "be now and then a miraculous performer in other countries, but I speak here in general."

He mentions recitative as a thing little practised in France, for

for want of courage. The Italians, he obferves, had fucceeded in this fpecies of finging, which Giacomo Peri had invented at Florence the beginning of the century. Here he fpeaks of feveral mufical dramas in Italy, but does not call them operas. (Liv. vi. L'Art de bien Chanter.) A book with the fame title was publifhed at Paris, by Bacilly, 1668.

The *fi*, to exprefs the feventh of the key, does not feem to have been in ufe at this time in France; as Merfennus in his folmifation has never introduced it, repeating the *mi*, in the key of C, for E and B.

MERSEY, in *Geography*, a navigable river of England, flows from the eaft to the weft, and forms, in the greater part of its courfe, a natural boundary between the counties of Lancafter and Chefter. Its whole extent is about fifty miles; thirty-five of which are navigable, from Liverpool to the mouth of the river Irwell, for veffels of confiderable burthen. The Merfey derives its origin from the junction of the rivers Etherow and Goyt, where it affumes the prefent name, and in its courfe receives the ftreams of the Tame, the Bollen, the Irwell, and the Weever. Oppofite Warrington in Lancafhire, where it meets the tide-water, the Merfey is only forty yards wide; but at Runcorn-gap, where it communicates with the Grand-trunk, and duke of Bridgewater's canals, its width is three hundred yards: below the gap, it extends itfelf into a grand eftuary of three miles in width, and receives the navigable river Weever from Northwich and Frodfham. In its courfe northward from Runcorn, it gradually diminifhes for fix miles, and oppofite Liverpool is only three-quarters of a mile wide; but it forms a fine channel, at leaft ten fathoms deep at low water, and is very commodious for fhipping. About five miles farther, meafuring by the Chefhire coaft, it falls into the Irifh fea, by two or three different channels, which are much incommoded by fands; but the paffage is rendered fecure by means of various land-marks, buoys, and light-houfes, and the excellent fyftem of pilotage eftablifhed by the Liverpool merchants. Lyfons's Magna Britannia, vol. ii.

MERSIG, a town of France, in the department of the Sarre, and chief place of a canton, in the diftrict of Sarrebruck. The place contains 1832, and the canton 6421 inhabitants, in 20 communes.

MERTAQUE, a town of New Spain, in the province of Honduras, which produces cochineal.

MERTENSIA, in *Botany*, a genus of the Submerfed *Algæ*, commonly termed Sea-weeds, named by the celebrated Thunberg, in honour of Profeffor F. C. Mertens, of Bremen, a man of the moft amiable character, highly diftinguifhed by his knowledge of this tribe of vegetables in particular. A treatife illuftrating this genus was publifhed by Dr. Roth, in Schrader's New Journal for 1807. A *Mertenfia* had indeed previoufly appeared, from the pen of Profeffor Willdenow, in the Stockholm Tranfactions for 1804, belonging to the order of Ferns; but that being reduced to another genus, (fee GLEICHENIA,) the prefent is eftablifhed; and as far as any opinion can be formed of fo unfettled a tribe, it feems to be tolerably diftinct from all that have already been adopted. Roth. in Schrad. New Journ. v. 2. fafc. 1. 11. t. 1. f. B.—Clafs and order, *Cryptogamia Algæ*. Nat. Ord. *Algæ*, Linn. Juff.

Eff. Ch. Frond internally jointed. Seeds difperfed in the coats of cluftered inflated vefícles.

1. M. *lumbricalis*. Roth as above. (Ulva lumbricalis; Linn. Mant. 311. Syft. Veg. ed. 14. 972. Thunb. Prod. 180.)—Gathered by Koenig, as well as by Thunberg, upon fubmarine rocks at the Cape of Good Hope. The *root* confifts of many flender entangled fibres, attaching themfelves to fhells and ftones. *Fronds* feveral, three or four inches high, cylindrical, bluntifh, tapering at the bafe, determinately branched, the thicknefs of a crow's quill, or more, greenifh-yellow, or purplifh, compofed of a thickifh coriaceous coat; internally fpongy, and interrupted by very frequent tranfverfe reticulated partitions, which are fcarcely difcoverable at the outfide. *Fructification* generally axillary, rarely lateral, confifting of numerous crowded, obovate, or oblong, vefícles, proceeding from a flightly elevated flefhy bafe, or *receptacle*. Each of thefe is jointed internally like the frond, but their coat is rather thinner and more pellucid, lodging very numerous, fcattered, roundifh-oval, cryftalline *feeds*. The fpecimens in the herbarium of Linnæus juftify his defcription of the fructification being terminal, but Roth afferts that it becomes fo only by accidental injuries to the frond. The internal partitions are confidered by this great cryptogamift of a fpurious nature, as originating from cellular fubftance only, which dilates into a tranfverfe web or net. The *feeds* are difperfed under the external cuticle, exactly as in real *Ulvæ*, though confined to the above-mentioned veficular excrefcences, which however feem materially different from branches, nor do they appear ever to be extended into fuch.

MERTHYR TYDVIL, or *Tudfyl*, in *Geography*, a large and populous market-town, fituated in the cwmwd of Senghenydd, cantref of Brenhinol, now the hundred of Caerphilly, and county of Glamorgan, South Wales. It is a place of great antiquity, and is faid to derive its name from Tydvil, the daughter of Brechan, prince of Brecknockfhire, who was murdered here, along with her father and brother, Rhun Dremrudd, by a party of Saxon marauders, about the clofe of the fifth century. Tydvil was the wife of Cyngin, fon of Cadell, prince of the vale royal and part of Powys, and is reckoned among the number of the ancient Britifh faints. After her death, the Saxons having been expelled by the prowefs of her nephew, Nevydd, a church was erected and dedicated to her at this place, and called the church of Merthyr Tydvil, which in Welfh fignifies "the Martyr Tydvil."

From this period, nothing occurs deferving of notice relative to Merthyr Tydvil, till about the year 1620, when it was diftinguifhed for its zeal in the caufe of non-conformity. Though then trivial in extent and political importance, it was neverthelefs a fort of hot-bed, which contributed in no fmall degree to engender and keep alive, for more than a century, thofe religious diffentions, the effects of which ftill continue vifible in the feparation of the greater proportion of the inhabitants of Wales from the eftablifhed church. In 1755 a new era commenced in the hiftory of this place. The extenfive and valuable mines in its immediate vicinity had hitherto attracted but little notice. At this time, however, Mr. Bacon particularly directed his attention towards them; and having obtained a leafe of a diftrict, extending about eight miles in length, and four in breadth, at the moderate rent of 200*l.* *per annum*, immediately began operations, and erected extenfive works for the fmelting and forging of iron. This gentleman continued increafing his eftablifhment till the year 1783, when he deemed it proper to let out the greater part of his property to Mr. Crawfhay, and the remainder to Mr. Hill: at the fame time, he referved to himfelf a certain tonnage on all the iron manufactured above a fpecified quantity. The new proprietors foon augmented the works; and the part belonging to Mr. Crawfhay, at Cyfartha, are now by far the largeft in this kingdom, and probably in Europe. He employs no fewer than 1500 men, at an average of 30 fhillings a week *per* man. The weekly wages paid for labour amount to 1500 pounds.

The

The average of iron produced from these works is from 180 to 200 tons a week. Six furnaces and two rolling-mills are employed. For procuring blast for the furnaces and working the mills, there are four steam-engines; one of fifty, one of forty, one of twelve, and one of seven horse power. The first engine is connected with the four upper blast-furnaces, to which is a water-engine annexed of nearly the same power. The machinery of this establishment is truly gigantic; and that part of it worked by water is curious, and certainly highly powerful. The great water-wheel is a most extraordinary piece of mechanism: it was constructed under the superintendance of Watkin George, and measures 50 feet in diameter. W. George was then a carpenter employed about the works: he was afterwards taken into partnership, and received 20,000*l*. to give up his share. Besides these works, and those of Mr. Hill, there are two others at Pendarren and Dowlais; the former producing about 140 tons of iron weekly, and the latter about three fourth-parts of that quantity. The total number of smelting-furnaces near this town is seventeen, *viz.* Dowlais four, Pendarren three, Plymouth (Mr. Hill) four, and Cyfartha six.

No fact can better illustrate the magic influence of trade on the condition of a country, than the rapid change which has been effected at Merthyr Tydvil and its neighbourhood. Forty years ago, this town was an inconsiderable village, and contained only a few hundred inhabitants; whereas, by the sole operation of its iron-works, it has risen to be by far the largest and most populous town in Wales. The inhabitants of this parish were estimated at 7705, in 1801; but the population is conjectured to amount to 10,000 persons. In 1803 the money raised for the poor rates, at 6*s*. 6*d*. in the pound, was 1453*l*. 17*s*. 10½*d*. The streets in general are close and confined, and have no proper outlets behind the houses. Considerable improvements, however, have already been made within these last five or six years. Such streets as have been built since that period are much better arranged, and wider than those which were erected earlier. At Pendarren is a large and elegant house, surrounded by beautiful gardens and pleasure-grounds, belonging to Mr. Homfray. The parish church, rebuilt in 1806, is a large and handsome building; and besides it, there is a spacious chapel built by Mr. Crawshay. The meeting-houses for dissenters of different sects are about eleven in number: three Baptists, two Presbyterian, two Independents, two in the Wesley connection, and two in that of Whitfield. A theatre has been lately erected here. There is likewise a philosophical society here, as well as a printing-house, and a book-seller. The inhabitants of this town are chiefly Welsh, and the language spoken in it almost entirely so. Less immorality prevails than might be expected in a place where the population consists chiefly of the lower orders. This is partly owing to the circumstance of the iron-masters and clergymen being usually magistrates for the county, and partly to the effect of religious instruction. These magistrates have the power of nominating the requisite number of constables, and must submit all their proceedings to the quarter and great sessions. A court of conscience, for the recovery of small debts, has been instituted here by act of parliament, within these three years. This town has three market-places, which are well supplied twice every week, on Wednesdays and Saturdays. It has likewise several fairs during the year.

The weighty and valuable productions of Merthyr Tydvil find an easy conveyance to the sea, by means of a canal which extends hence to Penarth harbour, in the Bristol channel, being navigable as far as Cardiff for vessels of 300 tons, and above that town for barges of 100 tons. This canal, begun about 22 years ago, was completed in 1798. At the Cyfartha works, where it terminates, it is 568 feet above the level of the sea; which elevation is effected by means of about 40 locks. A new tram road runs nearly by its side, through its whole course, extending altogether 26 miles in length.

Besides its iron ores, the neighbourhood of this town is abundantly productive of other minerals useful in the arts, and consequently subservient to the convenience and happiness of man. Coal, so indispensibly necessary in the manufacture of the iron, is supplied in immense quantities, and of excellent quality. Good mill-stones and stones for paving are likewise abundant; and in the lime-stone rocks are found beds of black and variegated marble, not inferior to any in the kingdom.

About two miles from the town, on the summit of a lofty mountain, is situated a very ancient market-place, where weekly markets have now been held for upwards of 800 years, during the summer season, from the 14th of May till the 14th October. This singular market is still much frequented. Several fairs are likewise held here for cattle, though the houses in the place do not exceed six in number.

Morlais castle stands about three miles to the north-west. It is situated on the summit of a hill, about half a mile from the ancient road over the mountains from Cardiff to Brecknock, overlooking a ravine of great depth, in the bottom of which runs a branch of Taff Vechan river. The area of this castle forms an irregular pentagon, defended on the south and east sides by a very large and deep trench cut in the solid rock. On the north and west sides it is rendered sufficiently strong, by the bold and rugged precipices which overhang the dingle. The whole of this castle is now in ruins. It was built by Ivor Petit, or Ivor Bach, the son of Cedevor, who was no less distinguished for his valour than for the uncommon smallness of his stature. Malkin's Scenery, Antiquities, and Biography of South Wales, 2 vols. 8vo. 1807. Carlisle's Topographical Dictionary of Wales, 1 vol. 4to. 1811.

MERTOLA, a town of Portugal, in Alentejo, seated on the Guadiana, containing about 2400 inhabitants; 24 miles S.S.E. of Beja. N. lat. 37° 36′. W. long. 7° 37′.

MERTON, a village in the west half-hundred of Brixton, in the county of Surrey, England, is situated on the Epsom road, nine miles distant from London. It contained in the year 1801, according to the return then made to parliament, 151 houses, occupied by 813 persons. The manor, which before the Conquest was the property of earl Harold, and was afterwards held by the crown, was granted by Henry I. to Gilbert Norman, sheriff of Surrey, who, in the year 1115, built a convent for canons regular of the order of St. Austin. The establishment was patronised by the king and his queen Matilda. In 1130, Merton abbey, as it was then called, was built with stone; and in 1136 the canons entered on the possession of it. The benefactions to it were numerous and ample. In the year 1236 a parliament was held at the abbey, wherein were enacted the statutes which take their name from that place. In this house also was concluded the peace between Henry III. and the dauphin of France. The abbey was surrendered in 1538; and the scite was afterwards granted to the newly-established monastery at Shene. After the dissolution, it was leased out to private persons; and during the civil war of Charles I. it appears to have been used as a garrison. At present there is no other vestige of the abbey than the east window of a chapel of crumbling stone, which seems, from its style, to have been built in the fifteenth century. The walls which surround the premises, including a space of about 60 acres, are

are nearly entire. The scite has long been occupied by two extensive manufactories for printing calicoes; and a copper mill is also established here.

The parish church of Merton was built, early in the twelfth century, by Gilbert Norman, the founder of the abbey. It is constructed of flints, and consists of a nave and chancel; and at the west end is a low spire. From the style of architecture, it is presumed to be the original structure, which has undergone but little alteration. In the chancel window are some remains of painted glass; and against the north wall of the church is a large picture of Christ bearing the cross.

Merton-Place, the seat of the late admiral Nelson, is in this parish; as is Cannon-hill, the villa of William Mollesson, esq. Sir Richard Hotham had a seat here, which was purchased by —— Graves, esq. Lysons's Environs of London, vol. i.

MERTVOI Kultuck, a bay at the north extremity of the Caspian sea. N. lat. 46°.

MERTZA, a small island in the north part of the gulf of Bothnia. N. lat. 65° 27'. E. long. 22° 9'.

MERTZBACH, a town of the duchy of Wurzburg; 6 miles N.N.E. of Ebern.

MERU, a town of France, in the department of the Oise, and chief place of a canton, in the district of Beauvais; 12 miles S.S.E. of Beauvais. The place contains 1800, and the canton 7131 inhabitants, on a territory of 165 kiliometres, in 20 communes.

Meru, a very celebrated mountain, in the mythological fables of the Hindoos. The word in Sanscrit signifies an *axis*, or *centre*; and hence, perhaps, it has been applied to the north pole, which, being deemed the most elevated region, led the poets to describe Meru as the highest mountain in the world. It is also, by way of pre-eminence, called Sū-merū, denoting its fairness or beauty. In the 15th chapter of the first book of the Mahabarat, it is thus described: "There is a fair and stately mountain, and its name is Mĕroo; a most exalted mass of glory, reflecting the sunny rays from the splendid surface of its gilded horns. It is clothed in gold, and is the respected haunt of dews and gandharvas (deities and celestial choristers). It is inconceivable, and not to be encompassed by sinful man; and it is guarded by dreadful serpents. Many celestial medicinal plants adorn its sides; and it stands, piercing the heavens with its aspiring summit, a mighty hill, inaccessible even by the human mind. It is adorned with trees and pleasant streams, and resoundeth with the delightful songs of various birds." (Gita, p. 146.) The above is the introduction to the story of the Kurmavatara, given by the learned translator in a note on the Gita. (See Kurmavatara and Brachmans.) This may be deemed sufficiently extravagant; but it is tame, compared with some of the ravings of Hindoo mystics, who find, in the contemplation of this mysterious mountain, types and symbols of every thing in and out of nature. Here follows a specimen of the Brahmanda Purana, taken from Mr. Wilford's dissertation on the Sacred Isles in the West, in vol. viii. of the Asiatic Researches. "Meru is the sacred and primeval Linga, and the earth beneath is the mysterious Yoni, open like the Padma or Lotos. The convexity in the centre is the Os tincæ, or navel of Vishnu: and the Hindoos often represent the physiological mysteries of their religion by the emblem of the Lotos, where the whole flower signifies both the earth and the two principles of fecundation; the germ is both Meru and the Linga; the petal and filaments are the mountains which encircle Meru, and are also the type of the Yoni; the four leaves of the calyx are the four vast regions towards the cardinal points; and the leaves of the plant are the different islands in the ocean round Jambu." At the end of this ingenious essay are curious plates, representing Meru under the fanciful semblance of a lotos, and other geographical extravaganzas of the Hindoo Puranicas, or poetical fabulists. "Brahma, Indra, and all the gods, declare that this largest of mountains is a form consisting of jewels of a hundred colours; the abode of various tribes; like gold; like the dawning morn, resplendent, with a thousand petals; like a thousand water-pots, with a thousand leaves. Within it is adorned with the self-moving cars of the gods, all beautiful; in its petals are the abodes of the gods, like heaven; in it thousand petals they dwell with their consorts. There resides above Brahma, god of gods, with four faces. There in the east is Indra, for ever to be praised; the lord of wealth, with a thousand eyes, the destroyer of towns." (See Indra.) On this Olympia of the Hindoos are all the gods assembled in their magnificent palaces, under different designations. Kailasa is the paradise of Siva. (See Kailasa.) Meru is the grand-father of the river Ganges, as noticed under Mera, the name of his daughter. Under the articles Linga, Lotos, and Yoni, some mention is made of this wonderful mountain; and the reader, desirous of farther accounts of it, and of mysticisms connected with it, is referred to vol. viii. of the Asiatic Researches, and to Moor's Hindoo Pantheon.

MERVILLE, Michael Guyot de, in *Biography*, a French writer, was born at Versailles in 1696. After travelling through various countries, he settled as a bookseller at the Hague, where he published a literary journal. His affairs becoming embarrassed, he went to Switzerland, and drowned himself in the lake of Geneva in 1765. He wrote, 1. Voyage Historique, 2 vols. 12mo. 2. Several Comedies, &c. published at Paris, in 3 vols. 12mo.

Merville, in *Geography*, a town of France, in the department of the North, and chief place of a canton, in the district of Hazebrouch; 15 miles W. of Lille. The place contains 5302, and the canton 16,608 inhabitants, on a territory of 60 kiliometres, in 5 communes.

MERUIT Quantum, in *Law*. See Quantum.

MERULA, George, in *Biography*, a critic and historian, one of the revivers of ancient literature, was a native of Alessandria in Italy. He acquired the rudiments of Latin and Greek under able preceptors, was soon distinguished for his classical attainments, and passed the greatest part of his life in teaching the languages and rhetoric at Venice, Milan, and Pavia. He died at Milan, at an advanced age, in 1494. He was celebrated as an original writer, and as an editor and commentator. Under the patronage of Lewis Sforza he wrote "Antiquitates Vicecomitum, sive de Gestis ducum Mediolanensium," of which the first decade was published in his life time, and four books of the second decade were given in the 25th vol. of the "Scriptores Rerum Ital." He also composed a description of Montserrat, and of the eruption of mount Vesuvius, and a small historical tract entitled "Bellum Scodrense," descriptive of the siege of Scutari by the Turks in 1474. He was the first who gave an edition of the four Latin writers on agriculture, *viz.* Cato, Varro, Columella, and Palladius, with notes, 1472. In the same year he gave the first edition of the "Comedies of Plautus." He likewise either first published or illustrated "Juvenal;" "Martial;" "Ausonius," and the "Declamations" of Quintilian. He translated from the Greek, the lives of Trajan, Nerva, and Adrian. To him the world is indebted for the discovery of many ancient MSS. in the monastery of Bobbio in 1494. Gen. Biog.

Merula, Paul, was born at Dordrecht, in Holland, in the

the year 1558. He acquired in his own country a profound knowledge of law, hiſtory, and polite literature, and then travelled for improvement into France, Italy, Germany, and England. On his return he was appointed to ſucceed the famous Lipſius as profeſſor of hiſtory at Leyden, an office which he held for fifteen years. He died in 1607; leaving behind him ſeveral learned works, as "The Fragments of Ennius, with a Commentary:" "Eutropius:" "The Lives of Eraſmus and Junius:" "Coſmographia," a work on ancient geography: "A Treatiſe on Law:" "A Treatiſe on Hunting, with the Laws reſpecting it:" the two laſt are in the Dutch language. After his death his works were collected and publiſhed under the title of "P. Merulæ Opera varia poſthuma," 1684.

Merula, Claudio, da Correggio, (a ſmall town in the ſtate of Modena,) organiſt of the church of St. Marc at Venice in the time of Zarlino, and one of the interlocutors in the "Raggionamento primo" of his "Dimoſt. Harm." where he is called "il gentiliſſimo M. Claudio Merula, ſuaviſſimo organiſta del ſuo tempo"—the ſweeteſt organiſt of his time. He had been maeſtro di cappella to the duke of Parma, and publiſhed "Toccate," or preludes for the organ, engraved on copper plates. The firſt book of his "Cantionum ſacrarum" appeared at Venice in 1578, in 4to.; after this he publiſhed maſſes, pſalms, motets, magnificats, madrigals in three, four, and five parts.

Claudio Merula was one of the firſt who attempted dramatic muſic. In 1574, he compoſed a theatrical piece at Venice, which was performed in the grand council chamber, for the entertainment of Henry III. of France, when he returned from Poland on the death of his brother, Charles IX. This piece was called a tragedy, and was probably declaimed, with madrigals and choruſſes intermixed.

Merula, Tarquinio, *il Cavalier*, a whimſical compoſer of Bergamo; in the tenth vol. of whoſe works, printed at Venice in 1655, moſt of his inſtrumental movements are compoſed on a ground-baſe, which ſoon after became a common practice with Stradella, Purcell, and others. This maſter was a church compoſer, and a madrigaliſt; but his favourite ſtyle ſeems to have been the burleſque: in his cantata of Curtius for a baſe voice, publiſhed in 1638, the poet, after adviſing Curtius againſt ſo raſh a ſtep, tells him, that though he may eaſily find his way to the bottom of the gulph into which he was about to plunge, yet, he adds, *quanto al ritornare, ſarà un difficile* PASSO; to which laſt word a diviſion of ſix bars, of ſixteen ſemiquavers in each, is given, in the courſe of which, the finger is carried from D on the ſixth ſpace in the baſe, down to the abyſs of double C. There is another diviſion of ſeven bars at the laſt cloſe, in which the paſſages are echoed, piano, and the trill of the times in iterations of the ſame note, in ſemiquavers, is written twice at full length.

The cavalier Merula's compoſitions are almoſt all ſo tinctured with caprice and buffoonery, as to render them more ſingular and new at leaſt than thoſe of his contemporaries. In his "Libro ſecondo della Muſiche concertate," publiſhed in 1635, he has publiſhed a three-part ſong, with ritornels for two violins and a baſe, ſopra la ciacona, with his cantata of "Curzio precipitato." Among other capricious things in this publication, there is a Canzonetta ſpirituale ſopra la Nanna, or Lullaby, conſiſting of only theſe two notes in the baſe:

He has compoſed a learned fugue in four parts, on the declenſion of *Hic, hæc, hoc;* and another upon *Quis vel qui: nominativo qui, quæ, quod, &c.* This laſt conſiſts of ſeveral movements which are ſupported with vivacity, and imitations of the cant and ſtammering of ſchool-boys in repeating their grammatical leſſon. The ſingle vocal airs of this period by Merula and others, which we have examined, in order to trace the progreſs of Italian melody, *ab ovo*, are dull, monotonous, and inelegant. Imagination, as yet, was too much fettered by canto fermo, canon, fugue, and eccleſiaſtical modes, to attempt the uſe of her wings.

Merula, in *Ichthyology*, a ſpecies of *Labrus;* which ſee.

Merula *Fluviatilis*, a name given by Schoneveldt, and ſome other writers, to the common tench. See Cyprinus *Tinca*.

Merula, in *Ornithology*, the *Black-bird*, a ſpecies of *Turdus*, of which there are ſeveral varieties. See Turdus *Merula*, &c. For other ſpecies of *Merula*, ſee Alauda, Corvus, Gracula, Lanius, Muscicapa, Oriolus, Paradisea, Sturnus, and Tanagra.

Merula *Aquatica*, the name of a bird called the *water-ouzel* in Engliſh. Sea Sturnus *Cinclus*.

Merula *Saxatilis*. See Turdus *Saxatilis*, Lanius *Infauſtus*, and Corvus *Caryocatactes*.

MERULIUS, in *Botany*, a name of far-fetched etymology and meaning; adopted by Haller, for the genus which now retains it, from John Bauhin, who in his *Hiſtoria* v 3. 807, mentions ſome fungi as called by the name of *Merulius* or *Metulius*, from *Meta*, a pillar or boundary-poſt with a round top, which their ſhape reſembles. Such fungi, no doubt, are numerous, belonging to various genera; but the idea is leſs ſuitable to our preſent *Merulii*, than to moſt others. —Hall. Hiſt. v. 3. 150. Perſ. Syn. 488. (Cantherellus; Juſſ. 4. Lamarck Illuſtr. t. 883.)—Claſs and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi*.

Eſſ Ch. Cap fleſhy or membranous. Receptacle veiny, with ſuperficial ſwelling plaits.

Perſoon defines 25 ſpecies of this very well-marked genus, whoſe fructifying membrane reſembles the gills of an *Agaricus* in appearance only, being totally diſtinct in nature. Its ſurface is perfectly continuous, but pinched up, as it were, into ſimple or branched tumid plaits.—The genus is divided into three ſections; 1ſt, the true *Cantherelli*, which have an entire, rather cup-ſhaped cap, with or without ſtalk, and conſiſt of 20 ſpecies; 2d, *Serpulæ*, four ſpecies, which ſpread indeterminately, fructifying on the upper ſide, and have no ſtalk; 3d, *Gomphus*, one ſpecies, of a club-like but truncated ſhape, which we think might be referred to the firſt ſection.

Examples of the firſt ſection are,

M. *Cantharellus*. Common Chanterelle. Perſ. n. 1. (M. n. 2326; Hall. Hiſt. v. 3. 150. Agaricus Cantharellus; Linn. Sp. Pl. 1639. Hudſ. 609. Fl. Dan. t. 264. Bull. t. 505. f. 1. Sowerb. t. 46. Bolt. t. 62. A. n. 73; Schæff. t. 82, and n. 95. t. 206. Fungus anguloſus, et velut in lacinias diſſectus; Vaill. Paris. 60. t. 11. f. 14, 15.) —Cluſtered, deep yellow all over. Cap fleſhy, ſmooth, depreſſed.—Very frequent in fir woods. It varies in the breadth of its top, from one to near three inches, and is entirely of the colour of yolk of egg, with an agreeable ſcent like a plum or apricot, eſpecially when drying. This fungus is eaten in many countries, and ſeems to be no otherwiſe unwholeſome, than as its toughneſs renders it indigeſtible. Haller reports the flavour to be excellent, though ſomewhat acrid, and ſays he had often eaten this *Merulius* dreſſed in meat broth, without any bad effects.

M. *nigripes*. Black-ſtalked Chanterelle. Perſ. n. 3. (Agaricus cantharelloides; Bull. t. 505. f. 2.)—Cap funnel-ſhaped, yellowiſh. Stalk elongated, black, and ſooty.

—Native of France. Persoon seems to have adopted it from Bulliard. The taller, more slender, black *stalk*, and more excavated top of the *cap*, seem the principal marks of distinction between this and the first species, of which Mr. Sowerby esteems it a variety only.

M. *lutescens*. Yellowish-stalked Chanterelle. Pers. n. 4. (Agaricus cantharelloides; Sowerb. t. 47. Helvella cantharelloides; Bull. t. 473. f. 3.)—Cap umbilicated, smooth; yellowish-brown above; reddish ash-coloured beneath. Stalk yellow, hollow.—Not uncommon in woods in autumn, according to Persoon, but it seems to have been first observed in England by Mr. Sowerby, Nov. 1794, in Peckham wood. This is clearly distinguished by its hollow pale-yellow *stalk*, and the reddish buff of its fructifying membrane, contrasted with the light brown of the upper surface.

M. *cornucopioides*. Cornucopiæ Chanterelle. Pers. n. 8. (Peziza cornucopioides; Linn. Sp. Pl. 1650. Sowerb. t. 74. Bull. t. 150. Bolt. t. 103. Elvela, n. 17. Schæff. t. 165, and n. 18. t. 166.)—Clustered, blackish, trumpet-shaped, with a wavy reflexed margin; the upper surface scaly; fructifying membrane blueish, with obsolete plaits.—Common in woods in autumn. Distinguished by its invertedly conical trumpet-like shape, with scarcely any *stalk*, the central hollow of the *cap* running down the middle, almost to the root, so as to form a funnel, the outside of which is really the under side of the *cap*, and bears a blueish powder, presumed to be the seed. The plaits of this part are in general sufficiently obvious to mark the genus, though often evanescent. An essential difference exists between this fungus and *Peziza*, the latter producing its seeds from the strongly-coloured upper side of the cap, or cup.

M. *retirugus*. Reticulated Sessile Chanterelle. Pers. n. 16. (Helvella retiruga; Bull. t. 498. f. 1.)—Sessile, vertical, roundish, thin and membranous; smooth and pale grey above; ash-coloured, with radiating reticulated plaits beneath.—This pretty species was found in France by Richard, growing parasitically upon mosses and other plants, affixed by its smooth upper side. The margin is entire when young, but subsequently torn or lobed. The *stalk* is wanting in this, and two or three others of the first section, and Persoon seems doubtful whether they ought not to range in the next. Their membranous nature, and determinate form, with the presence of a proper upper surface, surely justify their remaining where he has placed them.

The second section (which is Persoon's third, as he divides the former into two, because some have a central stalk, and others a lateral one, or none at all) comprises four species, whose shape is quite indeterminate, the whole fungus being reversed, or laid on its back, without any stalk, and almost without any upper surface. The fructification is rare, or tardily produced. The most remarkable is

M. *destruens*. Dry-rot Merulius. Pers. n. 21. (Boletus lachrymans; Wulf. in Jacq. Misc. Austr. v. 2. 111. t. 8. f. 2. Dicks. Crypt. fasc. 1. 18. Sowerb. t. 113.)—Widely spreading, indeterminate, yellowish-red, with a white downy edge. Plaits widely reticulated. The nature of this formidable fungus has not been known till within a few years, though its effects have been but too notorious in countries where much fir wood is used for building. The plant insinuates itself in the form of a fine web, like a sort of mouldiness, amongst the timbers or wooden walls of a house, which it speedily and effectually destroys, so that in Sweden, where houses of fir are common, their unexpected downfall is by no means unfrequent. Mr. Sowerby informs us of this pest having lately attacked some ships in the British navy, concerning which he has been consulted by the navy commissioners. The cure for this evil is the admission of air into all such structures, which is fatal to the growth of the plant. Where this vegetable thrives, but meets with a check to its increase by walls or otherwise, it thickens greatly, and produces a sort of orange-coloured honey-comb structure, containing the *seeds*, and discharging large drops of fluid here and there, as expressed in Mr. Sowerby's plate, justly commended by Persoon.

M. *vastator*, Pers. n. 22, seems very nearly akin to the last.

The third section consists of only one species,

M. *clavatus*. Club-shaped Chanterelle. Pers. n. 25. (Clavaria truncata; Schmid. Ic. t. 60.)—Club-shaped, abrupt, solid, with lateral plaits.—Found in grassy places in Germany, generally growing in tufts. The colour is violet, dull purple, or brownish. The shape is that of a *Clavaria*, either simple or branched; the top abrupt and flat, evidently, though narrow, analogous to the usual upper surface of the cap of a *Merulius*; the sides of the club-shaped body below being plaited or veiny, like the fructifying part of the other species.

MERY, John, in *Biography*, a distinguished anatomist and surgeon, was born at Vatau, in Berry, where his father practised surgery, in January 1645. From his earliest years he displayed an exclusive attachment to the profession of his father, and at the age of eighteen went to the great hospital at Paris, the Hôtel Dieu, where he pursued the study with extraordinary ardour. So earnest, indeed, was he in this pursuit, that whenever he could procure a body, he conveyed it to his bed-room, and passed the night in dissection. In 1681 he was promoted to the office of queen's surgeon; and in 1683 he was appointed surgeon-major to the invalids, at the instance of M. de Louvois, who justly estimated his zeal and talents. In the following year, when the king of Portugal applied to Louis XIV. to send a surgeon to Lisbon to attend upon the queen, he was sent post to that capital; but the queen died before his arrival. Both the courts of Spain and Portugal attempted, by very advantageous offers, to induce him to remain in the peninsula, but he declined them, and returned to Paris. He was now, 1684, received into the Academy of Sciences; and he was soon afterwards sent on a journey to England, by order of the court; but the object of this mission was never made public. He was also chosen by the monarch to attend upon the duke of Burgundy, then a child. Attendance on a court, however, as Fontenelle remarks, was not less irksome to him at home, than in Spain or Portugal, and he returned as soon as it was in his power to the hospital of invalids, and to the dissecting room.

He lived in retirement from all society, as far as it was possible, shutting himself in his closet as soon as he had performed the ordinary duties of his office, which he transacted very methodically: he was not seen even by his family, except at his hours of repast; and declined all solicitations to engage in private practice, except for the service of a few friends. In 1700 he was appointed first surgeon to the Hôtel Dieu, which gratified his utmost ambition, and afforded him abundant opportunities of gratifying his zeal in the pursuit of knowledge, for which he voluntarily sacrificed all considerations of rank and emolument. His high reputation for anatomical knowledge brought many requests from foreigners to give lectures upon that subject; which, however, he declined. But he procured for the students of the Hotel Dieu the erection of a theatre, in which they might obtain a regular course of anatomy, instead of the casual instructions which they had hitherto received; and he expected no additional

 tional

tional recompence for his increased trouble. It was a great part of the labour of his life to form an anatomical museum, which at length he rendered extremely curious and complete. For this purpose, he secluded himself in the most minute and patient dissections; and no man surpassed him in the accuracy with which he investigated facts relative to the construction of the human body. Nevertheless, he justly entertained a very humble opinion of the extent of information, which the knife of the anatomist can bring before the mind, in regard to the minute operations of the animal economy; and was accustomed to say ingenuously, "we anatomists are like the porters of Paris, who are well acquainted with all its streets, as well as its lanes and alleys, but know nothing of what passes within the houses." From the steady occupation of the investigation of facts, he was not in the habit of inventing theories, and did not readily admit the reasonings of others; at the same time, he did not easily renounce his own, when he thought them well founded on observation. Being little used, likewise, to the forms of polite conversation, he stated his views with great plainness, and used no ceremony in contradicting opinions and assertions, which he thought absurd or unfounded in fact; whence he sometimes gave offence at the meetings of the Academy without intending it. In his moral habits he was extremely regular, and always had a high sense of religion. He was married, and had several children. About the age of seventy-five, he suddenly lost the use of his legs, without any other indisposition; but from that time his health and strength began to be impaired, and he died in 1722, in his seventy-seventh year.

In addition to a great number of valuable communications, which were printed in the Memoirs of the Academy of Sciences, Mery published the following works separately. 1. "Description de l'Oreille de l'Homme," Paris, 1681, which was annexed to Laney's work "De l'Ame sensitive," by which he anticipated Duverney, who was known to have been long employed on the same subject. 2. "Observations sur la Manière de Tailler dans les deux Sexes, pour l'Extraction de la Pierre, pratiqueé par Frère Jacques," ibid. 1700, 12mo. This is a very scientific and candid discussion of that celebrated empiric's method of cutting for the stone, the general principle of which he approves, while he points out many mischiefs in his operations, occasioned by his ignorance of anatomy, and the rudeness of his instruments. 3. "Nouveau Systeme de la Circulation du Sang, par le trou ovale, dans le Fœtus humain, avec les Reponses aux Objections de M. M. Duverney, Tauvry, Verheyen, Sylvestre, et Buissiere," ibid. 1700, 12mo. The controversy upon this question was carried on with ardour. Mery controverted the received opinion, that part of the blood passes from the right to the left ventricle, through the foramen ovale, and maintained that its passage was in the opposite direction; and, therefore, that the greater part of the blood in the fœtus circulated through the lungs, and the smaller portion through the rest of the body. It is singular, as Senac remarks, in his treatise on the heart, that Mery, who was in error, had the greater number of partizans; but Duverney and the rest defended the question ill. 4. His last work, "Problèmes de Physique," ibid. 1711, 4to., relates to the connection of the fœtus with the mother, and its nutrition, which he maintains, in opposition to Falconet, to be effected by means of the maternal blood alone, and not by any lacteous fluid, produced in the uterus for that purpose. Eloy Dict. Hist. de la Med. Fontenelle, Eloges des Acad. Gen. Biog.

MERY-*sur-Seine*, in *Geography*, a town of France, in the department of the Aube, and chief place of a canton, in the district of Arcis-sur-Aube; 15 miles N.W. of Troyes. The place contains 1164, and the canton 9849 inhabitants, on a territory of 330 kiliometres, in 26 communes. N. lat. 48° 30′. E. long. 3° 58′.

MERYTA, in *Botany*, from μηρυω, *to collect in clusters*, alluding to the situation of the flowers. Forst. Gen. t. 60. Juss. 442. Lamarck Illustr. t. 803. Class and order, *Dioecia Triandria*. Nat. Ord. uncertain.

Gen. Ch. Male *flowers* aggregate in close heads. *Cal.* Perianth in three deep, ovate, acute segments. *Cor.* none. *Stam.* Filaments three, capillary, the length of the calyx; anthers oblong, with four furrows.

Female *flowers* not discovered.

1. M. *lanceolata*. Forst. Prod. 92.—Native of the Society isles.—The male flowers are represented in an hemispherical, lateral, sessile head. This is all the information extant respecting the genus in question; except that we find, by a note of the younger Linnæus, that sir J. Banks and Dr. Solander had likewise described it as new, by the name of *Neasa*.

MERZAPOUR, in *Geography*, a town of Bengal; 15 miles N.N.W. of Moorshedabad.—Also, a town of Hindoostan, in the country of Benares, seated on the Ganges; 24 miles W.S.W. of Benares. N. lat. 25° 10′. E. long. 82° 50′.

MERZBERG, a town of Silesia, in the county of Glatz, which has a silver mine; 10 miles S. of Glatz.

MERZIFOUR, a town of Asiatic Turkey, in Natolia; 30 miles S. of Samsun.

MES, a river of Persia, which runs into the Tab, near Ragian.

MESA, CHRISTOVAL DE, in *Biography*, a Spanish poet, who lived five years in habits of intimacy with Tasso. He is the author of three heroic poems. 1. "Las Navas de Tolosa," 1598, upon the great victory won at Madrid by Alonzo VIII. over the Moors. 2. "La Restauracion de Espana," 1607, of which Pelayo is the hero. 3. "El Patron de Espana," 1612, in honour of Santiago. Besides these works he published some smaller pieces, as a tragedy upon Pompey, and a translation of the whole of Virgil; and he left in MS. a version of the Iliad. Gen. Biog.

MESA, in *Geography*, a river of Russia, which discharges itself in the Tazovskaia gulf, N. lat. 68° 12′. E. long. 79° 14′.

MESA, *La*, the southernmost of four isles in the Pacific ocean, near each other, and E. of the Sandwich isles. N. lat. 19°. W. long. 137° 10′.

MES-AIR, or MEZAIR, in the *Manege*, is a manege half *terra a terra*, and half *corvet*: so that the mezair is higher than the action of the former, and lower than that of the latter. In this action use the same aids as in working upon curvets. Give the aids of the leg with delicacy, and no stronger than is just necessary to carry your horse forward. Remember when you close your legs to make him go forward, to push with the outward in such a degree as to keep your horse confined, and to assist the other in driving him forward; as it is not necessary to lay so much stress on the inner leg, because that serves only to guide the horse, and make him cover and embrace the ground that lies before him. Berenger's Horsemanship, vol. ii. p. 116.

MESANA, in *Geography*, a town of Hindoostan, in Guzerat; 35 miles N. of Amedabad.

MESANGE of Buffon, in *Ornithology*. See MOTACILLA and PARUS.

MESANGIA, the name of a bird common in France and Italy; it is of the size and shape of the ficedula, and

and differs from it very little, except the having a black spot upon the head. This seems to be the melancoryphos of the ancients, who supposed, as many do at this time, that the ficedula changed into this bird. The ficedula, or fig-eater, comes into the gardens in France only at the time when the figs, which are its proper food, are ripe: these it devours in an insatiable manner, and, as soon as it has done with them, goes away again. Soon after this the mesangia or black-cap appears, and is supposed to be the same bird, with the addition of this beautiful ornament. The ancients were very fond of this imaginary change of one bird into another; and Aristotle tells us, that the upupa is the same bird with the cuckoo, only changed in the colour and disposition of its feathers. Æschylus tells us in the same manner, according to the opinion of his times, that the cuckoo sings all the summer, and after that disappears; and that soon afterwards it comes again in a new form, with a plume upon its head, and is called the *upupa*.

MESARAIC, in *Anatomy*, a term applied to the blood-vessels, glands, &c. of the mesentery.

MESAYEH, in *Geography*, a town of the Arabian Irak, on the Euphrates; 50 miles S.S.W. of Bagdad.

MESAZONTES, μεσαζοντες, officers under the emperors of Constantinople. See MEDIATOR.

MESCHEDIZAR, in *Geography*. See MEDSHETISAR.

MESCHETWIND, a town of Bavaria, in the principality of Bamberg; seven miles S.W. of Forcheim.

MESCHID, a town of the Arabian Irak, near a large lake called "Rahemat," which communicates by a canal with the Euphrates. This is the place in which Ali, Mahomet's cousin and friend, and one of his successors, is said to have been interred; and his tomb is annually visited by a multitude of Persian pilgrims, who deem it a part of devotion equal to the pilgrimage to Mecca; 90 miles S. of Bagdad. N. lat. 32° 5'. E. long. 43° 34'.

MESCHID-*Hussain*, a town of the Arabian Irak, situated on a canal which passes from the Euphrates to the lake Rahemat; 53 miles S.S.W. of Bagdad. N. lat. 32° 36'. E. long. 43° 29'.

MESCHID, or *Maschid*, a city of Persia, in the province of Khorasan. Abas I. raised this place, which was small and called "Tus," to eminence, by erecting a magnificent mosque in honour of an Imam who was buried there, and which drew together a great number of pilgrims. This town has a manufacture of beautiful pottery, and also a manufacture of skins. In time of peace caravans pass continually through this town from Bucharia, Balk, Candahar, Hindoostan, and all parts of Persia. N. lat. 37° 35'. E. long. 57'.

MESCHIDABAD, a town of Asiatic Turkey, in Natolia; 25 miles S.S.W. of Amasreh.

MESCHIQUIEJOS, a town of South America, in the province of Carthagena; ten miles S. of Mompox.

MESCINZUNGH, a town of Thibet; 30 miles W. of Tankia.

MESCOLANZA, Ital. mixture: as mescolanza dell' antica e moderna, a mixture of ancient and modern music.

MESE, in *Geography*, a small island in the East Indian sea. N. lat. 6 55'. E. long. 131° 50'.

MESÉ, in the *Ancient Greek Music*, the name of the most acute sound of the second tetrachord. It implies *mean*: as it was in the middle of the great system, and an octave above the proslambanomenos.

Euclid calls mese the sound by which all other sounds are regulated. And Aristotle, in his 36th problem, sect. 19, says, that all the tones of a scale are accommodated or tuned to the mesé. See MUSIC *of the Ancients*.

MESEMBRIA, or MESSOURI, in *Geography*, a town of European Turkey, in Romania, at the mouth of a river which runs into the Black sea; formerly a bishop's see; 16 miles E.N.E. of Burgas. N. lat. 42° 38'. E. long. 27° 47'.

MESEMBRYANTHEMUM, in *Botany*, a vast genus of succulent plants, formerly known by the name of *Ficoides*, from its affinity to the Indian Fig, or *Cactus*. Breynius first named it *Mesembrianthemum*, meaning to express its flowers expanding at mid-day, which is true of many of the species, but not of all. Dillenius therefore, by altering one letter in the orthography, had recourse to another etymology, from μεσος, *the middle*, εμβρυον, *an embryo*, and ανθος, *a flower*; because the embryo (meaning the germen) is in the middle of the flower; which indeed, as that author most truly remarks, is the case with innumerable plants besides, but not exactly as in the present genus. He observes that the flower does not altogether stand on the top of the fruit, but is perforated, as it were, by the latter, whilst it so closely adheres to the middle, as not to be separable from it without laceration. We confess our predilection for the original idea of Breynius, which if not strictly applicable to all the species, one or more of which are night-scented flowers, is strikingly apposite to the generality, whose refulgent and radiating petals seem to welcome, as well as to emulate, the noon-tide sun, folding themselves up as it withdraws. Fig-Marigold.—Dill. Elth. 225. Linn. Gen. 252. Schreb. 340. Willd. Sp. Pl. v. 2. 1025. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 3. 212. Juss. 317. Lamarck Dict. v. 2. 474. Illustr. t. 438. Gærtn. t. 126. —Class and order, *Icosandria Pentagynia*. Nat. Ord. *Succulentæ*, Linn. *Ficoideæ*, Juss.

Gen. Ch. *Cal.* Perianth superior, of one leaf, in five acute, spreading, permanent segments. *Cor.* Petals numerous, linear-lanceolate, in many rows, rather longer than the calyx, slightly united into a tube by their claws. *Stam.* Filaments numerous, capillary, the length of the calyx, inserted into its fleshy part within the petals; anthers incumbent. *Pist.* Germen inferior, with five obtuse angles; styles generally five, sometimes four or ten, awl-shaped, spreading; stigmas simple. *Peric.* Capsule fleshy, roundish, marked with rays at the summit, the cells and valves each answering to the styles in number. *Seeds* numerous, roundish, affixed to the central column.

Eff. Ch. Calyx five-cleft. Petals numerous, linear, cohering at the base. Capsule fleshy, inferior, with many seeds.

Fifty species of *Mesembryanthemum* are defined in the 14th ed. of *Syst. Veg.* disposed in three sections, distinguished by the flowers being white, red, or yellow. Thunberg in his Prodromus has but 72; Willdenow mentions 86; but the new edition of the *Hortus Kewensis* enumerates 175. The labours of Mr. Haworth, who has published, in an octavo volume, an ample Monograph of the present genus, and who has, for many years, investigated and cultivated all the species he could procure, has thrown great light upon the subject, though we are not able to follow him in all that he describes, for want of having seen them so completely. They are almost exclusively the productions of the arid sands of the Cape of Good Hope; a very few only being found in New Holland, and New Zealand, or in the south of Europe. We shall therefore mention the native countries of such only of those we are about to particularize, as are found in other places, though even these are often likewise natives of the Cape; as the *crystallinum* and *nodiflorum*. There they are all at home. Their peculiarly succulent nature, like that of Aloes, is calculated to resist the

the burning ſun and long-continued drought of that climate, their cuticle allowing of very ſlow perſpiration, though of ready abſorption; ſo that however exhauſted they may be, they revive from the ſlighteſt ſhower. This wonderful proviſion of nature exiſts only in the living plant. When killed by momentary immerſion in hot water, theſe ſucculent plants dry nearly as quick as any others. The horticulturiſts of Europe are beſt acquainted with the numerous perennial ſpecies of the genus before us. There have indeed been ſome annual ones raiſed here, but we have reaſon to think there are many almoſt entirely unknown. Some of theſe bear very curiouſly-conſtructed capſules, which expand by moiſture, contrary to the nature of capſules in general, that their ſeeds may be diſperſed in the wet ſeaſon, when alone they would, in ſuch a country, have any chance of germinating. (See Sm. Introd. to Botany, 277. f. 178.) —We ſhall mention a few ſpecies of each of the 13 ſections into which this genus is diſtributed in *Hort. Kew.*

1. *Stemleſs; inverſely conical, or obcordate, or more rarely ſpherical, the leaves being extremely abrupt, and united even to their ſummits, the flowers ſolitary.* Seven ſpecies in Hort. Kew.

M. *minutum.* Tiny Fig-Marigold. Ait. n. 1. Sims in Curt. Mag. t. 1376.—Smooth, glaucous, ſpotleſs, nearly globoſe, umbilicated. Baſes of the petals forming a tube nearly as long as the borders.—This ſingular plant appears a congeries of glaucous balls, each about the ſize of a ſmall gooſeberry, hollowed out at the top, from whence ſprings a roſe-coloured, ſeſſile, ſolitary *flower*, larger than a daiſy, with yellow *ſtigmas*, and a pale tubular baſe, compoſed of the united claws of the *petals*, by which it is elevated much above the *calyx*. This ſpecies bloſſoms from the middle of November to near Chriſtmas, after which it muſt be kept without water through the winter, being preſerved from froſt.—Six more of this curious ſection are deſcribed by Mr. Haworth, and in *Hort. Kew.*, all ſent from the Cape at different times by the late Mr. Francis Maſſon. See Masson.

2. *Nearly ſtemleſs, with a perennial root.* Thirty-eight ſpecies.

M. *calamiforme.* Quill-leaved Fig-Marigold. Linn. Sp. Pl. 690. Willd. n. 20. Ait. n. 16. Dill. Elth. 239. t. 186. f. 228. (Ficoides capenſis humilis, cepæ folio, flore ſtramineo; Bradley Succ. Pl. t. 19.)—Leaves nearly cylindrical, acute, glaucous, finely dotted; flattened juſt above their baſe. Styles eight.—The numerous upright or aſcending *leaves*, about a finger's length, compoſe denſe glaucous tufts. *Flowers* large, of a brilliant white with pale lemon-coloured ſtamens, each on a very ſhort, ſolitary, ſlightly leafy, ſtalk, not ſo tall as the leaves. This is one of the oldeſt inhabitants of our gardens. Bradley publiſhed it in 1717.

M. *felinum.* Cat-chap Fig-Marigold. Haworth n. 35. Willd. n. 11. Ait. n. 29. (M. ringens β; Linn. Sp. Pl. 698. M. rictum felinum repræſentans; Dill. Elth. 240. t. 187. f. 230. Ficoides afra, folio triangulari enſiformi craſſo brevi, &c.; Mart. Dec. t. 30.)—Stem none. Leaves glaucous, fringed with vertical taper-pointed teeth; cartilaginous at the extremity.—This has been long known in England, and thrives well in the dry ſtove, flowering for ſome time during autumn. It is diſtinguiſhed by the idea which its oppoſite *leaves*, fringed with long vertical hooked teeth, convey of the widely-gaping mouth of a cat. The *flowers* are ſeſſile, large, lemon-coloured, opening in the afternoon, and cloſing at night.

M. *tigrinum*, and *caninum* are nearly akin to this; and the latter was confounded with it by Linnæus.

M. *prapingue.* Soft Tongue Fig-Marigold. Ait. n. 38. (M. heterophyllum; Andr. Repoſ. t. 540.)—Leaves tongue-ſhaped, very tender; the younger ones finely fringed, incurved at the point.—This flowered at Mr. Lambert's, at Boyton. The herbage is peculiarly ſucculent and tender, of a graſs green, and ſhining. *Flowers* large, yellow, on ſhortiſh ſtalks. *Capſule* cloſed when dry, expanding with moiſture, as in ſome annual ſpecies abovementioned, and, as it appears by the account in Andrews, (which, if we miſtake not, came from the pen of the late excellent Mr. George Jackſon, ſee Jacksonia), in many perennial ones; perhaps in all the genus.

M. *dolabriforme.* Hatchet-leaved Fig-Marigold. Linn. Sp. Pl. 699. Ait. n. 45. Curt. Mag. t. 32. (M. folio dolabriformi; Dill. Elth. 248. t. 191. t. 237. Ficoides capenſis humilis, foliis cornua cervina referentibus, petalis luteis, noctiflora; Bradl. Succ. Pl. t. 10.)—Stem ſhort. Leaves compreſſed, with a very prominent dilated keel, and a cylindrical baſe.—Although the growth of this ſpecies be very ſlow, it has always more or leſs of a decided thick woody much-branched *ſtem*, ſo that few ſtudents would ſeek it in this ſection. The *leaves* are very peculiarly formed, as above deſcribed, and are the only inſtance of the hatchet ſhape; ſee Sm. Intr. to Bot. 171. f. 98. The *flowers* are plentifully produced, yellow, on longiſh, ſolitary, terminal *ſtalks*, and expand in the evening and night only.

3. *Stems proſtrate. Leaves cluſtered, elongated. Petals yellow, either on both ſides, or on the upper one only.* Five ſpecies.

M. *loreum.* Leathery-ſtalked Fig-Marigold. Linn. Sp. Pl. 694. Willd. n. 48. Ait. n. 46. Dill. Elth. 264. t. 200. f. 255.—Leaves ſemicylindrical, ſomewhat triangular, elongated, recurved, rather glaucous, in round tufts. Stems lax, roundiſh, ſlender, whitiſh. Flowers axillary.—Though this has been generally cultivated in England for above 80 years, nothing is recorded of its blooming. Willdenow however deſcribes the *flowers* as very rarely produced in the collection of Engelbert Gother, each on a ſhort axillary ſtalk, from the lower *leaves* of the branch, with a purple *corolla*, and whitiſh *ſtamens*. The plant is known by its long trailing twine-like *ſhoots*, bearing ſeveral little tufts or knots of *leaves*, and generally dependent over the edges of the garden-pot.

4. *Leaves very long, alternate, cloſely crowded into tufts. Stem decumbent when old. Petals very narrow, fringed from the baſe to the middle.* Three ſpecies.

M. *capitatum.* Short Dagger-leaved Fig-Marigold. Haworth. Ait. n. 52. (M. pugioniforme; Linn. Sp. Pl. 699. Willd. n. 80. M. pugioniforme, flore amplo ſtramineo; Dill. Elth. 280. t. 210. f. 269. Ficoides capenſis, caryophylli folio, flore aureo ſpecioſo; Bradl. Succ. Pl. t. 14.)—"Leaves awl-ſhaped, triangular with equal ſides, glaucous. Membranes of the calyx pale. Petals yellow, as long as the calyx; the outer ones purpliſh. Styles briſtle-ſhaped, ſtraight."—A fine large branching ſpecies, diſtinguiſhed by the great ſize of its *flowers*, which are nearly as broad as the palm of the hand, of a brilliant ſtraw-colour, purpliſh underneath, opening in ſun-ſhine only. The *leaves* are numerous, curved, three or four inches long. This is the original *M. pugioniforme*, and we do not well underſtand why that name ſhould be transferred to another ſpecies, which it ſeems is ſo called in a French work on Succulent Plants, t. 72, and which has more compreſſed *leaves*, the membranes of the *calyx* brown, *petals* entirely ſtraw-coloured, ſhorter than the *calyx*, and linear-lanceolate expanded *ſtyles*.

5. *Leaves flat, often somewhat keeled beneath. Stems often decumbent or prostrate, widely spreading.* Seventeen species.

M. *cryſtallinum.* Ice-plant. Linn. Sp. Pl. 688. Willd. n. 25. Ait. n. 54. (M. cryſtallinum, plantaginis folio undulato; Dill. Elth 231. t. 180. f. 221. Ficoides africana, folio plantaginis undulato, micis argenteis aſperſo; Bradl. Succ. Pl. t. 48.)—Leaves alternate, ovate, waved, papillary. Flowers ſeſſile. Segments of the calyx ovate, broad.—Linnæus, not without reaſon, doubted whether this ſpecies came from Africa. Thunberg, however, found it at the Cape of Good Hope. The late Dr. J. Sibthorp gathered it about Athens. In gardens the plant has long been known, as a tender annual, much admired for appearing as if froſted over; or encruſted with ſugar. This appearance is cauſed by innumerable little bladders in the cuticle, filled with limpid juice. To the touch the whole herb is cold, and remarkably flaccid. Its *ſtem* ſpreads widely on the ground, in a rank mode of growth, bearing numerous broad undulated *leaves*, and copious, nearly ſeſſile, *flowers*, of a pale roſe or fleſh-colour. The *fruit* is dark purple.

M. *pinnatifidum.* Jagged-leaved Fig-Marigold. Linn. Suppl. 260. Willd. n. 23. Ait. n. 55. Curt. Mag. t. 67.—Leaves oblong, pinnatifid, papillary. Flowers axillary, on longiſh ſtalks.—This alſo is an annual, whoſe ſeeds, ſent by Thunberg from the Cape, vegetated in the Upſal garden. The pinnatifid *leaves*, and ſmall yellow long-ſtalked *flowers*, are its characteriſtics.

M. *cordifolium.* Heart-leaved Fig-Marigold. Linn. Suppl. 260. Willd. n. 24. Ait. n. 65. Sm. Spicil. t. 6. Jacq. Ic. Rar. t. 487.—Leaves ſtalked, papillary, heart-ſhaped or ovate. Stem round. Calyx often four-cleft.—Soon after the firſt introduction of this ſpecies, it was common in every green-houſe, but is now rather neglected. The *ſtems* are ſhrubby, though long and trailing. *Leaves* darkiſh green. *Flowers* ſmall, deep crimſon. It is readily propagated by cuttings.

6. *Leaves linear; the younger ones channelled above, convex beneath. Branches often ſomewhat ſhrubby. Root moſtly perennial; rarely annual.* Seventeen ſpecies.

M. *nodiflorum.* Neapolitan Fig-Marigold. Linn. Sp. Pl. 687. Willd. n. 56. Ait. n. 71. (Kali floridum repens Neapolitanum; Column. Ecphr. t. 73.)—Leaves alternate, nearly cylindrical, obtuſe; fringed at the baſe.—Native of the ſea-coaſts of the ſouth of Europe, and north of Africa. *Root* annual. *Stem* branched from the bottom, ſpreading, covered, like the *leaves*, with pellucid watery veſicles, as in *M. cryſtallinum*, but rather leſs glaucous. *Flowers* lateral or axillary, ſeſſile, ſolitary, ſmall and unornamental, with narrow white *petals* and yellow *ſtamens*. The ſegments of the *calyx* are oblong, obtuſe, leafy, very unequal in ſize.

M. *viridiflorum.* Green-flowered Fig-Marigold. Willd. n. 51. Ait. n. 74. Curt. Mag. t. 326.—Leaves ſemi-cylindrical, hairy, ſomewhat papillary. Calyx hairy. Petals capillary. Stem tumid. Branches diffuſe.—A ſhrubby ſpecies, ſingular in having green *petals*, which are very copious, and as narrow as a fine thread. The *herbage* is downy all over, ſlightly glaucous and papillary. It blooms from July to September, and is readily increaſed by cuttings. Mr. Maſſon ſent this from the Cape in 1774.

7. *Evening-flowering; with ſlender, ſhrubby, hard, greatly defoliated ſtems; nearly cylindrical undotted leaves; a four-cleft calyx; fragrant flowers, white on their upper ſide; roots much ſwelled with age, having very few fibres.* Two ſpecies.

M. *noctiflorum.* Night-flowering Fig-Marigold. Linn. Sp. Pl. 689. Willd. n. 41. Ait. n. 88. M. noctiflorum, flore intùs candido, extùs phœniceo, odoratiſſimo; Dill. Elth. 273. t. 206. f. 262.)—Leaves remote, obſcurely ſemicylindrical, diſtinct, glaucous. Bark white.—Highly deſirable for the ſake of its *flowers*, whoſe ſcent in an evening is like the Scarlet *Craſſula*, or the fineſt Bergamot Pear. The *ſtem* is ſhrubby, pale, upright, round, croſs-branched at the top. *Flowers* on longiſh ſtalks, from the ends or forks of the branches, with a thick pear-ſhaped *germen*, and ſhort four-cleft *calyx*, much exceeded by the numerous pale *petals*, whoſe under ſide is either red or yellow.

M. *ſtramineum.* Straw-coloured Sweet Fig-Marigold. Haworth. Ait. n. 89. (M. noctiflorum β; Linn. Sp. Pl. 689. Willd. n. 41. M. noctiflorum, flore intùs candido, extùs ſtramineo, odoratiſſimo; Dill. Elth. 274. t. 206. f. 263.)—Leaves remote, nearly cylindrical, diſtinct, rather glaucous. Bark grey.—Mr. Haworth agrees with Dillenius, who ſtrenuouſly inſiſted on this being ſpecifically diſtinct from the laſt, of which moſt writers make it a variety. The *flowers* are larger, very white above, pale yellow beneath. They expand only in an evening, like the laſt, and ſmell like the Dame's Violet, or Rocket (*Heſperis*).

8. *Flowers generally reddiſh. Branches ſhrubby, ſmooth. Leaves triangular and compreſſed* (except *M. læve*, Ait. n. 93), *naked, with ſtraight points.* Thirty-nine ſpecies.

M. *ſpectabile.* Showy Fig-Marigold. Haworth Meſembr. 385. Willd. n. 73. Ait. n. 98. Curt. Mag. t. 396.—Leaves crowded, triangular, elongated, glaucous, ſomewhat curved. Stem woody, aſcending.—Introduced by Mr. Maſſon in 1787. Its fine large crimſon *flowers*, produced all ſummer long, render this one of the moſt deſirable, nor is it difficult of culture. Mr. Curtis obſerves that the *leaves*, which are very glaucous, and often tinged with red, ſometimes acquire a prominent tooth or appendage on their upper ſide near the point.

M. *acinaciforme.* Scimitar-leaved Fig-Marigold. Linn. Sp. Pl. 695. Willd. n. 83. Ait. n. 116. Andr. Repoſ. t. 580, not 508. (M. acinaciforme, flore ampliſſimo purpureo; Dill. Elth. 282. t. 211. f. 270, and t. 212. f. 271.)—Leaves ſcimitar-ſhaped, dotleſs, combined at their baſe; their margins minutely undulated and rough. Petals lanceolate.—One of the firſt ſpecies brought to Europe, and one of the largeſt and moſt ornamental when it flowers, which unfortunately is but of rare occurrence. Andrews ſays this was accompliſhed by Mr. Trimmer of Brentford, by training the branches up againſt the glaſs, and watering the plant very ſparingly. The *leaves* are numerous, three inches long, very glaucous. *Flowers* terminal, ſolitary, as broad as the hand, formed of innumerable recurved bluntiſh *petals*, of a fine crimſon, with white *filaments* and yellow *anthers*.

M. *edule.* Eatable Fig-Marigold. Hottentot's Fig. Linn. Sp. Pl. 695. Willd. n. 85. Ait. n. 119. (M. falcatum majus, flore amplo luteo; Dill. Elth. 283. t. 212. f. 272.)—Leaves with three equal ſides, dotleſs, ſomewhat channelled; tapering at each end; keel finely ſerrated. Angles of the branches ſmooth and entire.—This is ſaid to have been one of the Cape plants, brought from Holland by the firſt Earl of Portland. It rarely flowers here, and not till the plant is old and woody. It nearly vies with the laſt in ſize, but the *flowers* are yellow. The *fruit* is reported to be eaten at the Cape, both by the Hottentots and the Dutch ſettlers.—The colour of this *flower* is an exception to the character of the ſection, but its cloſe affinity to ſome of the other ſpecies has ſuperſeded that one particular mark.

9. *Flowers yellow, orange, or ſcarlet. Stems rather ſhrubby, often erect. Leaves triangular, for the moſt part very ſhort.* Twelve ſpecies.

M. *aureum.*

M. *aureum.* Golden-flowered Fig-Marigold. Linn. Syst. Nat. ed. 10. v. 2. 1060. Willd. n. 75. Ait. n. 136. Curt. Mag. t. 262.—Leaves triangular, somewhat cylindrical, dotted, distinct. Petals orange. Styles deep purple.—A bushy species, long cultivated here, and easily increased, known by its rather large orange-coloured *corolla*, pale yellow *stamens*, and five purple *styles*, spreading like a star. The *leaves* are glaucous, tumid between their angles, about one inch and a half long. So great a similarity between the species of this section exists in the form of their *leaves*, that botanists are obliged to recur to the colours of the parts of fructification, which experience proves, in this case, to be constant. The *aureum* blossoms from February to May, being one of the earliest of its genus.

M. *tenuifolium.* Slender-leaved Fig-Marigold. Linn. Sp. Pl. 693. Willd. n. 45. Ait. n. 140. (M. tenuifolium procumbens, flore coccineo; Dill. Elth. 264. t. 201. f. 256.)—Leaves semicylindrical, awl-shaped, slightly compressed, green, smooth, longer than the joints of the branches. Petals scarlet. Stems decumbent.—Cultivated at Chelsea in 1700. Its procumbent habit, and slender scarcely glaucous *foliage*, mark this species. The *flowers* are plentiful about Midsummer, rather large, of a light brilliant scarlet, each lasting several days.

10. *Leaves more or less hooked at their points, distinct (without thickened sheaths) at the base. Petals reddish. Stems somewhat shrubby, very rarely creeping.* Ten species.

M. *tuberosum.* Tuberous-rooted Fig-Marigold. Linn. Sp. Pl. 693. Willd. n. 44. Ait. n. 146. (M. fruticescens, radice ingenti tuberosâ; Dill. Elth. 275. t. 207. f. 264.)—Leaves bluntly triangular, compressed, minutely papillary; recurved at the ends. Root tuberous, very large.—Brought from the Cape at the beginning of the last century. The *root* consists of several large ovate knobs, almost like those of a *Dahlia*. *Stems* woody, variously branched and curved. *Leaves* about an inch long, convex above. *Flowers* small, dull red, in terminal dichotomous panicles, whose permanent stalks often become spinous.

The *flowers* in this section are among the least beautiful of the genus.

11. *Leaves triangular, strongly united, so as to be perfoliate; their sheaths fleshy; their tips hooked. Stems hard, woody. Flowers mostly white, rarely reddish.* Twelve species.

M. *perfoliatum.* Great Perfoliate Fig-Marigold. Ait. n. 152. (M. uncinatum β; Linn. Sp. Pl. 692. Willd. n. 79. M. perfoliatum, foliis majoribus triacanthis; Dill. Elth. 251. t. 193. f. 240.)—Leaves strongly united at the base, pointed, dotted; their keel three-toothed at the summit.—A bushy plant, of rather slow growth, remarkable for two sharp teeth, besides the terminal one, at the back of its strongly perfoliate *leaves*. The *flowers* are purple, not frequent, produced after Midsummer.

M. *uncinatum* α of Linnæus and Willdenow, Dill. f. 239, differs in its smaller size, and having but one tooth below the point of the *leaves*.

M. *umbellatum.* Umbel-flowered Fig-Marigold. Linn. Sp. Pl. 689. Willd. n. 42. Ait. n. 162. (M. fruticescens, floribus albis umbellatis; Dill. Elth. 276. t. 208. f. 266. Ficoides africana erecta teretifolia, floribus albis umbellatis; Herm. Parad. 166. t. 166. Bradl. Succ. Pl. dec. 4. 12. t. 44, not 34.)—Leaves rather glaucous, rough with minute dots, remote, elongated, slender; their points recurved; their sheaths greatly thickened upwards.—This, according to Hermann, was early plentiful in the gardens of Holland. The *stem* is often two feet high. *Leaves* two inches long, spreading, channelled above, bearing axillary tufts of smaller ones. *Flowers* white, about as big as a daisy, many together in a forked umbel-like *panicle*, not a real *umbel*.

12. *Stems shrubby, their branches more or less rough.* Five species.

M. *micans.* Glittering Fig-Marigold. Linn. Sp. Pl. 696. Willd. n. 54. Ait. n. 163. Curt. Mag. t. 448. (M. micans, flore phœniceo, filamentis atris; Dill. Elth. 292. t. 215. f. 282.)—Leaves semicylindrical, bluntish, papillary, slightly recurved. Segments of the calyx rather pointed. Petals acute.—An old inhabitant of our greenhouses, distinguished by its glittering, glaucous, often purplish, *leaves* and *branches*, and the very rich orange scarlet of its *flowers*, which however are not so lasting as beautiful. The dark purple *stamens* form a striking contrast with the *corolla*.

Mr. Haworth's *M. speciosum*, Ait. n. 164, seems to us but a variety of this, with blunter *petals* whose claws are green.

13. *Branches, or leaves, or the tips of the leaves, more or less hispid.* Eight species.

M. *hispidum.* Purple Bristly Fig-Marigold. Linn. Sp. Pl. 691. Willd. n. 61. Ait. n. 168. Mill. Ic. t. 176. f. 3. (M. pilosum micans, flore saturantèr purpureo; Dill. Elth. 289. t. 214. f. 277, 278.)—Leaves cylindrical, blunt, papillary, without hairs, as well as the calyx. Stamens longer than the pistils. Branches very hairy.—Common in greenhouses, flowering most part of the year. The very bristly *stem* and *branches*; thick, deflexed, blunt *leaves*, and large *flowers*, of a shining violet purple, distinguish the present from all we have hitherto noticed.

Linnæus made several varieties of this, which are the *floribundum*, *striatum*, and perhaps *hirtellum*, Ait. n. 169, 171, and 170, all nearly akin, but we mean not to say they are one species. The citation of Willdenow under the *floribundum* in *Hort. Kew.* should be *M. hispidum* β.

M. *barbatum.* Trailing Bearded Fig-Marigold. Linn. Sp. Pl. 691. Willd. n. 63. Ait. n. 173. Curt. Mag. t. 70. (M. radiatum, ramulis prolixis recumbentibus; Dill. Elth. 245. t. 190. f. 234.)—Leaves remote, somewhat ovate, tumid, papillary; flattish above; tipped with five radiating bristles. Branches slender, smooth, straggling. Calyx five-cleft.—Very common in greenhouses, and even in the garret windows of many a humble collector. The radiating bristles at the end of the tumid *leaves* are remarkable, and are but about five in this species. The *flowers* appear in July, and are of a rich violet purple. Linnæus by mistake quotes Miller's t. 176. f. 3, for the present plant, instead of the *M. hispidum*. Willdenow has it under both.

M. *densum.* Dwarf Bearded Fig-Marigold. Haworth. Ait. n. 175. Curt. Mag. t. 1220. (M. barbatum γ; Linn. Sp. Pl. 691. Willd. n. 63. M. radiatum humile, foliis majoribus; Dill. Elth. 248. t. 190. f. 236.)—Stem very short. Leaves densely crowded, semicylindrical, papillary, tipped with many radiating bristles; their base somewhat fringed. Calyx six-cleft, very hairy, as well as the flower-stalks.—Dillenius says this was plentiful with him, but he never remembered its blooming. Mr. Haworth kept it 21 years without seeing a flower. We perfectly agree with Dr. Sims that this gentleman has shewn his judgment in separating this, as well as his *hirsutum*, Dill. f. 235, from the *barbatum*, under which Linnæus had confounded them all. The *flower* of the *densum* is twice as large as that of either of the others, with conspicuous yellow *anthers*; and the white membranous starry bristles, at the end of each leaf, are very striking.

Mesembryanthemum, in *Gardening*, comprehends plants of the succulent flowery exotic kinds, of which the species cultivated are, the diamond fig marigold, or ice plant (M. crystal-

cryſtallinum); the pinnated fig marigold (M. pinnatifidum); the plane-leaved fig marigold (M. tripolium); the ſmall flowered fig marigold (M. caducum); the angular-ſtalked fig marigold (M. pupuloſum); the jointed fig marigold (M. geniculiflorum); the night-flowering fig marigold (M. noctiflorum); the ſhining fig marigold (M. ſplendens); the umbelled fig marigold (M. umbellatum); the houſeleek-leaved fig marigold (M. expanſum); the quill-leaved fig marigold (M. calamiforme); the daiſy-flowered fig marigold (M. bellidiflorum); the delta-leaved fig marigold (M. deltoides); the bearded fig marigold (M. barbatum); the briſtly fig marigold (M. hiſpidum); the hairy-ſtalked fig marigold (M. villoſum); the rugged fig marigold (M. ſcabrum); the creeping fig marigold (M. reptans); the hook-leaved fig marigold (M. uncinatum); the thorny fig marigold (M. ſpinoſum); the tuberous-rooted fig marigold (M. tuberoſum); the ſlender-leaved fig marigold (M. tenuifolium); the upright-ſhrubby fig marigold (M. ſtipulaceum); the thick-leaved fig marigold (M. craſſifolium); the ſickle-leaved fig marigold (M. falcatum); the cluſtered fig marigold (M. glomeratum); the two-coloured fig marigold (M. bicolorum); the ſerrate-leaved fig marigold (M. ſerratum); the glittering fig marigold (M. micans); the ſpit-leaved fig marigold (M. veruculatum); the glaucous-leaved fig marigold (M. glaucum); the horned fig marigold (M. corniculatum); the ringent fig marigold (M. ringens); the hatchet-leaved fig marigold (M. dolabriforme); the various-leaved fig marigold (M. difforme); the white fig marigold (M. albidum); the tongue-leaved fig marigold (M. linguiforme); the dagger-leaved fig marigold (M. pugioniforme); the twiſted-leaved fig marigold (M. tortuoſum); the notch-flowered fig marigold (M. emarginatum); and the bracteated fig marigold (M. bracteatum).

In the ſeventh ſpecies there is a variety in which the flowers are ſomewhat larger, and of a very pale yellow on the outſide.

The thirteenth ſort has different varieties; as the great delta-leaved, and the ſmall delta-leaved marigold.

The fourteenth ſpecies has alſo ſeveral varieties; as the ſhrubby, bearded, the ſmall dwarf-bearded, and the great dwarf-bearded.

And in the fifteenth kind there are different varieties; as the purple-flowered, the pale-flowered, and the ſtripe-flowered.

The nineteenth ſpecies likewiſe affords different varieties.

It may be noticed, that the twenty-ſixth ſpecies is very variable, aſſuming different appearances, according to its treatment, and the different ſtages of its growth: its very numerous beautiful purple flowers, covering the whole plant, and produced every ſeaſon, make it a valuable ſpecies in all caſes.

The twenty-ninth ſpecies varies with paler and ſmaller flowers.

And the thirtieth varies with ſhorter and more manifeſtly three-ſided leaves and fewer flowers.

The thirty-ſecond ſpecies has a variety which throws out many procumbent branches, tough at the lower part, but not properly woody, herbaceous at the upper part, about three inches in length, round or ſlightly angular, jointed at ſhort intervals, with bluntly triangular leaves, from which other leaves ſpring in bundles, of the ſame form but ſhorter; the root-leaves and thoſe at the baſe of the branches remarkably long: the leaves bend like the horns of kine, whence the trivial name.

In the thirty-third ſpecies there is a variety which is entirely ſeſſile, of a whitiſh glaucous colour, with the leaves pale at the baſe, with frequent round whitiſh dots, eſpecially towards the end; they are ſhorter than thoſe of the original, more reſupine, leſs triquetrous, but with a rounder back, and more frequent, longer incurved prickles, terminated by ſlender harmleſs ſpinules, which are ſometimes white, ſometimes reddiſh: the leaves have a white line at the end, which is continued towards the back: there is firſt a flower in the middle, and afterwards ſeveral come out ſucceſſively at the ſides, all ſeſſile. This is called *Cat-chap marigold.*

Mr. Haworth has two other varieties; the *Tiger-chap fig marigold*, which is ſtemleſs in all the ſtages of its growth; being more ſucculent and groſs than the following: the leaves are rather ſhorter, beſet with much longer hairs on the ſides, and having numerous whitiſh ſpots: the flowers are ſeſſile, yellow, and large; and the *Mouſe-chap fig marigold*, in which the branches in very old plants are ſome inches long, and numerous, forming a fine tufted plant; the flowers ſmall and of a yellow colour.

The thirty-ſeventh ſpecies has ſeveral varieties.

In the firſt the leaves are wide and compreſſed about the edge; the flowers ſomewhat large, with blunt petals, ſcattered and not numerous, with ſcarcely any peduncle; one plant has ſeveral heads, from each of which are produced cluſters of leaves in pairs, diſpoſed like thoſe of the Tongue aloes, but with the edges not horizontal but oblique; there are generally three or four pairs of theſe leaves; they are broad and thick, flat above, pillowed below, bright green, ſmooth and ſhining, ſometimes blunt, ſometimes a little pointed, generally in the ſhape of a ſhoemaker's knife; the younger leaves in this and the other *varieties*, are folded together and obliquely inſerted into each other; the flowers come out ſucceſſively in Auguſt and September from the axils, beginning with the loweſt; they are ſubſeſſile, large, yellow, ſomewhat paler than in the following variety, ſhining in the ſun; petals ſomewhat blunter, entire, or ſometimes cut here and there.

The *Broad tongue-leaved* variety has thick leaves, flat above, convex beneath, with the margins thicker and leſs upright than in the preceding, ſmooth and ſhining, pale green, eſpecially towards the baſe, when held up to the light appearing to be compoſed of innumerable veſicles; three or four pairs of theſe leaves lie in the ſame inclined plane; theſe are ſometimes flatter and blunt at the end, ſometimes very much cut at the edge; from the lower pair firſt, and then from the next, a ſhort peduncle ariſes, obtuſely triquetrous, bearing a large flower of a ſhining golden colour, with many ſtamens, having oblong golden anthers.

The *Narrow tongued-leaved* variety is very like the preceding, but the petals have a ſlight tinge of red on the outſide; the older leaves are more reflex; the younger ones, which are cloſer and more luxuriant, are ſomewhat twiſted in and excavated, and are of a fuller green colour, the fruit is ſmaller and ſofter, not elevated, but rather depreſſed, roundiſh, and commonly ſtreaked with eleven angles; it is generally eleven-celled; the cells being the ſame in number as there are horns of the ſtyle, which are depreſſed at the bottom of the flower under the ſtamens, and are curled and wrinkled; the petals in two or three rows, almoſt of the ſame length, of a ſhining yellow colour.

There is another variety, which is diſtinguiſhed from the others by the leaves being longer and more erect; the peduncles of the flowers longer; the capſules leſs globular, commonly divided into nine cells; the calycine ſegments four, three longer and narrower, one ſhorter and broader, with a membranaceous margin; the flowers have a double or triple row of petals, ſhining in the ſun with the ſplendour of of gold; the ftamens numerous, with oblong faffron-coloured anthers.

Method of Culture.—Thofe of the annual and biennial kinds may be increafed by fowing the feeds in the early fpring months on a frefh hot-bed, covered with fandy earth, or in pots of fine fandy mould. And when the plants have attained a few inches in growth they may be planted on frefh hot-beds, or in pots plunged in them, to bring them forward; and as foon as they have taken root, they fhould have very little water; when of fufficiently large fize, each fhould be planted in a fmall pot, filled with light frefh earth, but not rich, plunging them into a hot-bed of tan, fhading them in the heat of the day until they have taken new root, when they fhould have plenty of frefh air. About the beginning of fummer fome of the plants may be inured to the open air, and afterwards be turned out of the pots, and planted with balls of earth about them in a warm border, where they often thrive and fpread, but are not very productive of flowers in this way. Some muft alfo be continued in pots, and removed to the fhelves of the ftove, where they flower more plentifully.

The only culture which they afterwards require is, for thofe in the pots to have frequent flight waterings in dry weather, and the others to be kept clean, and their branches permitted to fpread upon the furface of the ground.

All the perennial forts may be readily increafed by cuttings planted during the fummer months. Thofe having fhrubby ftalks and branches, readily take root when planted out in beds or in pots of light fandy foil, covered with mats or glaffes; in the latter cafe, being fhaded when the fun is warm. The cuttings of thefe forts need not be cut from the plant more than five or fix days before they are planted, during which time they fhould be laid in a dry room, not too much expofed to the fun, that the parts which are feparated from the old plants may heal over and dry, otherwife they are apt to rot. They may then be planted at about three inches diftance from each other, the earth being preffed very clofe to them, and none of their leaves buried in the ground, as from their abounding in moifture, when they are covered with the earth, it is apt to caufe them to rot, which often deftroys the cuttings. When they are taken from the old plants, they fhould therefore be divefted of their lower leaves, fo as to allow a naked ftalk of fufficient length for being planted in the earth.

Thofe in pots may be plunged in a hot-bed, or in a warm border, due fhade and fhelter being given, and flight waterings in dry weather. When they have ftricken good roots, they fhould be removed with balls of earth into other feparate fmall pots of light fandy mould, being placed in a fhady fituation, a very flight watering being given to fettle the earth about them. After they become well rooted, they may be removed, fo as to have more fun; when they may be kept till autumn, being watered very flightly twice a week in fummer and once afterwards, care being taken to prevent their roots fhooting through the pots, by fhifting them two or three times in the fummer feafon in order to pare them off.

In the autumn and winter they fhould be protected in the greenhoufe.

The cuttings of the more fucculent forts fhould be left to heal over a much longer time, being a little freed from leaves, and covered with glaffes to prevent the wet. They fhould have lefs water, and be removed lefs frequently. They fucceed well in an airy glafs cafe during the winter, when fcreened from frofts and fevere weather.

And fuch forts as do not afford cuttings, may be increafed by planting and managing the bottom fide-heads or off-fets in the above manner. They may likewife be increafed by feeds or cuttings readily in the ftove department.

The only culture neceffary afterwards is, merely to give water frequently in fmall quantities in fummer, and very fparingly in winter, fhifting the plants occafionally into larger pots.

Thefe are moftly plants which afford a fine variety in greenhoufe collections, and among other potted plants of fimilar growths.

MESEMMA, or Bousemmo, in *Geography*, a town of Africa, in the kingdom of Fez, inhabited by Arabs.

MESENTERIC, in *Anatomy*, from mefentery, an epithet ufed in defcribing parts connected with the mefentery. There are a fuperior and inferior mefenteric artery, branches of the abdominal aorta (fee Artery): a fuperior and inferior mefenteric vein joining the vena portarum. (See Liver.) The glands connected with the lacteals and with the abforbents of the large inteftine, are called mefenteric, and the fame term is applied to the nerves of the inteftines.

MESENTERICA, in *Botany*, a genus of the fungus tribe, fo called by Tode, from its refemblance to the human mefentery.—Perf. Syn. 706. Tode Fung. Mecklenb. fafc. 1. 7.—Clafs and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi*.

Eff. Ch. Creeping, gelatinous, veiny; the ramifications of the veins joined by a thin membrane.

1. M. *lutea*. Perf. n. 1. (M. tremelloides α, lutea; Tode fafc. 1. 7. t. 2. f. 12.)—Lemon-coloured, or of a golden yellow.—Found after rain in the fpring, fometimes in autumn, upon rotten wood, fpreading to the breadth of two or three inches, like a fine veiny web, of a yellow colour, more or lefs deep; fometimes greenifh. The margin at length fwells, and affumes a bright yellow hue; whence Tode concluded that part to be the feat of the fructification. The whole is fo delicate, that if expofed for twelve hours to a warm air, it decays entirely, leaving nothing but a few very minute fcales.

2. M. *cærulea*. Perf. n. 2. (M. tremelloides β, cærulea; Tode fafc. 1. 8.)—Entirely of a glaucous blue.—Found once only, in September, on a half-rotten board. *Tode*.

3. M. *argentea*. Perf. n. 3. (Corallo-fungus argenteus, omenti formâ; Vaill. Parif. 41. t. 8. f. 1.)—White, very broad; the margin tumid and downy. On old boards or pofts in cellars, fpreading from a little foft and tender tuft, as white as fnow, into a membrane from four to twenty-four inches in extent, full of beautifully branching veins, and fringed at the margin. After fome time, the whole turns reddifh and decays.

MESENTERIUM, Mesentery, in *Anatomy*, the procefs of peritoneum, by which the fmall inteftine is retained in its pofition in the abdomen. See Intestine.

MESERCAN, in *Geography*, a town of Perfia, in Chufiftan; 36 miles S.S.E. of Sufter.

MESERJEEN, a town of Algiers; 5 miles S.W. of Oran.

MESERITSCH, or Meserzicz, a town of Moravia, in the circle of Prerau; 30 miles E. of Olmutz. N. lat. 49° 26′. E. long. 18° 2′.

MESERITSCH, Great, a town of Moravia, in the circle of Iglau; 18 miles W. of Olmutz. N. lat. 49° 23′. E. long. 15° 55′.

MESERITZ, a town of the duchy of Warfaw; 40 miles W. of Pofen.

MESEWITZ, a town of Pruffia, in the palatinate of Culm; 21 miles E.S.E. of Culm.

MESHES *of Nets*, the openings or interftices between the threads.

MESHTA, in *Geography*, a town of Egypt, on the left bank of the Nile; 7 miles N. of Tahta.

MESIANO, the name of two towns of Naples, in Calabria Ultra; one six miles N.E. of Bova, and the other three miles N. of it.

MESINAN, a town of Persia, in the province of Mazanderan; 50 miles S. of Afterabad.

MESIRE, a name given by Avicenna to a distemperature of the liver, attended with a sense of heaviness, tumour, inflammation, and pungent pain, and always with thirst, a dry mouth, and a parched black tongue.

MESITICUM, among the Romans, a toll paid for a place to sell goods in the forum.

MESKOUTEEN, Hammam, *i. e.* the *silent* or *enchanted baths*, celebrated baths of Algiers, in the province of Constantina, situated on a low ground, surrounded with mountains. The water furnished by several fountains is intensely hot, and falls afterwards into the river Ze-nati. Other baths at a small distance are, comparatively, intensely cold; and still farther, nearer the banks of the Ze-nati, are the ruins of a few houses, built probably for the convenience of persons who came thither for the benefit of the waters; 36 miles E. of Constantina. Shaw's Travels.

MESLAY, a town of France, in the department of Mayenne, and chief place of a canton, in the district of Laval. The place contains 1173, and the canton 10,154 inhabitants, on a territory of 245 kiliometres, in 14 communes.

MESLE-sur-Sarthe, a town of France, in the department of the Orne, and chief place of a canton, in the district of Alençon. The place contains 648, and the canton 9364 inhabitants, on a territory of 157½ kiliometres, in 20 communes.

MESLIN-Corn, in *Agriculture*, a term applied to wheat and rye produced in a state of mixture.

MESMARCHURES, in the *Manege*. See Pastern.

MESMES, Claude de, *Count d'Avaux*, in *Biography*, an eminent French negociator, descended from an illustrious family, was trained from an early period of life to public business, and was appointed counsellor of state in the year 1623. In 1627 he was sent as ambassador to Venice, in which quality he visited Rome, Mantua, Florence, and Turin. He next passed into Germany, where he held conferences with most of the princes of the empire. Soon after this he was dispatched upon public business to the more northern kingdoms of Poland, Denmark, and Sweden. In every undertaking he obtained a high character for probity as well as talents, and thus acquired an almost unlimited confidence with the foreign ministers, with whom he treated. This enabled him to act with considerable effect as plenipotentiary, from his court, at the general peace, concluded, in 1648, at Munster and Osnaburg. He did not confine himself wholly to the affairs of the state, but also maintained a regular correspondence with men of letters, of whom he was the friend and protector. He died at Paris in 1650. Moreri.

Mesmes, John Antony de, *Count d'Avaux*, and a nephew of the preceding, passed through a similar course of public employments with his uncle. He was appointed ambassador extraordinary to Venice from 1671 to 1674, and in the following year was one of the plenipotentiaries at the peace of Nimeguen. Some time after this he was ambassador in Holland, where he effected the truce with Spain by which Luxemburgh was ceded to France. In 1689 he was the French ambassador to James II. while in Ireland. In 1692 he went out in the same quality to Sweden, and was very useful in settling the preliminaries of the peace of Ryswick. He died in 1709, at Paris, at the age of sixty-nine, having passed an active and very useful life in the service of his country. A collection of his "Letters and Negociations" was published in 1752, in six volumes 12mo. Moreri.

MESN, or Mesne, a term in *Law*, signifying him who is lord of a manor, and so hath tenants holding of him; yet he himself holds of a superior lord.

All the land in the kingdom is supposed to be holden, mediately or immediately of the king; who is styled the lord "paramount," or above all. Such tenants as held under the king immediately, when they granted out portions of their lands to inferior persons, became also lords with respect to those inferior persons, as they were still tenants with respect to the king; and, thus partaking of a middle nature, were called *mesne*, or middle lords. So that if the king granted a manor to A, and he granted a portion of the land to B, now B was said to hold of A, and A of the king; or, in other words, B held his lands immediately of A, but mediately of the king. The king was therefore styled lord paramount; A was both tenant and lord, or was a mesne lord; and B was called tenant "paravail," or the lowest tenant; being he, who was supposed to make "avail," or profit of the land. It is in this manner all the lands of the kingdom are holden, which are in the hands of subjects. Bl. Com. b. ii.

The word is properly derived from *maisne, quasi minor natu*; because his tenure is derived from another, from whom he holds: or perhaps *mesn* is the same as *mean* or middle between two extremes, either in time or dignity.

Mesn also denotes a writ, which lieth where there is lord mesn and tenant; and lies, when upon a subinfeudation the mesn or middle lord suffers his under-tenant, or tenant paravail, to be distrained upon by the lord paramount, for the rent due to him from the mesne lord. F. N. B. 135.

This is in the nature of a writ of right; and in this case the tenant shall have judgment to be acquitted or indemnified by the mesne lord; and if he makes default therein, or does not appear originally to the tenant's writ, he shall be forejudged of his mesnalty, and the tenant shall hold immediately of the lord paramount himself.

Mesn, or *Mesne process*. See Process.

MESNA, in *Geography*, a city of Africa, capital of Begarmee; 170 miles S. of Bornou. N. lat. 17°. E. long. 22° 12′.

MESNAGER, Nicholas, in *Biography*, an able negociator, was born at Rouen, in 1658, of a rich commercial family. He was sent by Louis XIV. to Spain on some important missions relative to the commerce of the Indies, and afterwards to Holland; on which occasions he gave so much satisfaction as to be created a chevalier of the order of St. Michael, with patents of nobility. In 1711 he signed the preliminary treaty of peace between France and England at London, and he was next employed with the abbé Polignac as plenipotentiary at Utrecht. He died at Paris in 1714. His memoirs have been printed. Moreri.

MESNARDIERE, Hippolytus Julius Pilet de la, a French poet, was born at Loudun in 1610, and died in 1663. He was a member of the French Academy, and patronized by cardinal Richelieu. His works are, 1. "A Treatise on Melancholy," 8vo.; 2. "Poetique," 4to.; 3. "The Tragedies of Alinde and La Pucelle de Orleans;" 4. "A Collection of Poems," &c.; 5. "Relations of War," &c. Moreri.

MESNEVY, or Masnavi, in *Oriental Literature*, is a very celebrated work in the Persian language. The author is Jelal ud Din; Rumi is often added to his name, denoting that he was of Lower Asia. He died in 1262, and was buried in a monastery founded by him in the city of Konyeh (Iconium)

(Iconium) for an order of Dervishes. His work is the most esteemed of that numerous class of writings containing the doctrines of Sufism, (see SUFI,) or emblematical theology, and for several centuries his tomb was visited by his devout countrymen, who consider his works as the effect of inspiration, and inferior only to the Koran. As well as religion and morality, the Mesnevy comprises also history and politics. The following character of it is taken from the last volume of sir William Jones's works. "So extraordinary a book as the Mesnavi was never, perhaps, composed by man. It abounds with beauties and blemishes equally great; with gross obscenity and pure ethics; with exquisite strains of poetry and flat puerilities; with wit and pleasantry mixed with dull jests; with ridicule on all established religions, and a vein of sublime piety. It is like a wild country in a fine climate, overspread with rich flowers and with the odour of beasts. I know of no writer to whom the Maulavi can justly be compared, except Chaucer or Shakspeare." The term Maulavi, here used, is usually applied to this great writer, denoting his literary reputation. Commentaries on his works, and abridgments, translations, and imitations of them, are very numerous in the different dialects of the East. See MYSTICAL *Poetry*.

MESNOI, in *Geography*, an island of Russia, in the straits of Vaigatskoi, N. lat. 70° 4'. E. long. 60° 14'.

MESOCHOROS, μεσοχορος, among the ancients. The mesochori were musicians who presided in concerts, and by beating a desk in a regular manner with their feet, directed the measure of the music. For this purpose in the theatre they wore wooden clogs on their feet, that they might be better heard, which were called by the Greeks *crupezia*.

MESOCHORUS, among the Romans, was also used for a person in public assemblies, appointed to give the signal for acclamation at the proper time, that all might join in it at once.

MESOCOLON, in *Anatomy*, the peritoneum connecting the colon in its situation. See INTESTINE.

MESOCUROS, μεσοκουρος, in *Antiquity*, an actress in tragedies, who had the middle part of her head shaven: but others think that mesocuros signifies a girl or very young woman.

MESODMES, or MESOMEDES, in *Biography*, a Greek lyric poet and musician, to whom the hymn to Nemesis, the last of the three hymns published in Dr. Fell's Oxford edit. of Aratus, with the original music, has been ascribed. It is not satisfactorily settled who this Mesomedes was, or at what time he lived. See MUSIC *of the Ancient Greeks*, for conjectures on the subject.

MESOGASTER, MESOGASTRION, in *Anatomy*, a name sometimes given to the lesser omentum. See EPIPLOON.

MESOGLOSSI, a name given by some writers to the muscles of the tongue, more usually called by anatomists the geniogloffi.

MESOIDE, in the *Greek Music*, a kind of melopœia, the notes of which were confined to the two middle strings of the meson tetrachord.

MESOIDES, mean sounds, or sounds taken in the middle of the system. See MELOPŒIA.

MESOLA, or MEZOLA, in *Geography*, a town of Italy, in the department of the Lower Po, near the coast of the Adriatic, on an island formed by a branch of the Po; 30 miles E.N.E. of Ferrara.

MESOLABE, MESOLABIUM, a mathematical instrument, invented by the ancients for finding two mean proportionals mechanically, which they could not come at geometrically. See PROPORTIONAL. It consists of three parallelograms, moving in groove to certain intersections. Its figure is described by Eutocius, in his commentary on Archimedes.

MESO-LOGARITHM, a term used by Kepler to signify the logarithms of the co-sines and co-tangents; the former of which lord Napier calls *antilogarithms*, and the latter *differentiales*.

These are also called *artificial sines* and *tangents*.

MESON, in the *Ancient Greek Music*, is the name given to the second tetrachord from the bottom, and it was likewise the name by which the four strings of that tetrachord were distinguished: as the first string was called hypate-meson, the second parhypate-meson, the third lichanos-meson, or meson-diatonos, and the fourth mese. Meson is the genitive case plural of mese, mean or middle; because the meson tetrachord is the middle between the first and third tetrachord, or rather because the string or sound mese gives the name to the whole tetrachord, of which it is the highest note. See *Plate of the Greek Diagram*.

MESONYCTICUM, Lat., μεσονυκτικον, Gr., a midnight hymn in the Greek church.

MESO-PLEURII, derived from μεσος, *middle*, and πλευρον, *rib*, in *Anatomy*, the intercostal muscles.

MESO-PLEURII is sometimes also used for the intermediate spaces between the costæ, or ribs.

MESOPOTAMIA, in *Ancient Geography*, an extensive province of Asia, the Greek name of which denotes "between the rivers," and on this account Strabo says, "οἱ κεῖται Μεταξυ τȣ Ευφρατȣ και τȣ Τιγρος," that it was situated between the Euphrates and the Tigris. In Scripture this country is called "Aram," and "Aramæa." But as Aram also signifies Syria, it is denominated "Aram Naharaim," or the Syria of the rivers. This province, which inclines from the S.E. to the N.W., commenced at N. lat. 33° 20', and terminated near N. lat. 37° 30'. Towards the south it extended as far as the bend formed by the Jordan at Cunaxa, and to the wall of Semiramis which separated it from Messene. Towards the north, it comprehended part of Taurus and the Mesius, which lay between the Euphrates and the Tigris. The modern name, given by the Arabs to this part, is of the same import with the ancient appellation; they call it "isle," or in their language, "Al-Dgézera." In this northen part is found Osrhoéne, which seems to have been the same place with Anthemusia. The northern part of Mesopotamia is occupied by chains of mountains passing from N.W. to S.E., in the situation of the rivers. The central parts of these mountains were called "Singaræ montes." The principal rivers were Chaboras (Al Kabour), which commenced at Charræ (Harran), E. of the mountains, and discharged itself into the Euphrates at Circesium (Kirkisieh) (see CHABOR); the Mygdonius (Hanali), the source of which was near Nisibis, and its termination in the Chaboras. (See MYGDONIUS.) The principal towns, in the eastern part along the Tigris and near it, are Nisibis (Nisibin), Bezabde (Zabda), Singora (Sindja), Labbana on the Tigris (Mosul), Hatru (Harder), and Apamea-Mesenes. At some distance to the south, upon the Tigris and on the borders of Mesopotamia, was the town of Antiochia, near which commenced the wall that passed from the Tigris to the Euphrates, under the name of "Murus Mediæ," or "Semiramidis." In the western part were Edessa, called also Callin-Rhæ (Orfa), Charræ (Harran), Nicephorium (Racca), Circesium at the mouth of the Chaboras, Anatho (Anah), Neharda (Hadith Unnour) upon the right of the Euphrates. There are several other towns of less importance, which our limits will not allow us to mention. According to Strabo, this country was fertile in vines,

vines, and afforded abundance of good wine. According to Ptolemy, Mesopotamia had on the north a part of Armenia, on the west the Euphrates, on the side of Syria, on the east the Tigris, on the borders of Assyria, and on the south the Euphrates which joined the Tigris. Mesopotamia was a satrapy under the kings of Syria. See SYRIA.

MESOPYCNI, μεσοπυκνα, in the *Ancient Music*, was an appellation given to such chords as formed the middle notes of the spissa. There were five mesopycni in the scale. See PYCNI and SPISSUM.

MESORECTUM, in *Anatomy*, the process of peritoneum attached to the sigmoid flexure of the colon, and upper part of the rectum. See INTESTINE.

MESORO, in *Ichthyology*, a name given by Salvian to that fish which we call the butterfly-fish, the blennus or blennius of other authors.

MESORO is also used by the Italians for the fish commonly called the *uranoscope*, or *star-gazer*.

MESOTHENAR, in *Anatomy*, a name given by Winslow to a muscle of the thumb. It includes the adductor pollicis, and a part of the flexor brevis. See ADDUCTOR and FLEXOR.

MESOTYPE, in *Mineralogy*. See ZEOLITE.

MESPILEUS LAPIS, in *Natural History*, a name given to some species of the echinitæ, from their resemblance to the ripe fruit of a medlar. This was a name given them before they were much known, and they were some time afterwards called, from their five lines on the surface, *pentexoche*.

MESPILUS, in *Botany*, μεσπιλη of the Greeks, the Medlar-Tree. Linn. Gen. 251. Schreb. 339. Willd. Sp. Pl. v. 2. 1010. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 3. 205. Sm. Fl. Brit. 529. Juss. 335. Lamarck Dict. v. 4. 437. Illustr. t. 436. Michaux Boreal-Amer. v. 1. 291. Gærtn. t. 87. (Cratægus; Linn. Gen. 250. Schreb. 338. Willd. Sp. Pl. v. 2. 1000. Mart. Mill. Dict. v. 2. Ait. Hort. Kew. ed. 2 v. 3. 200. Juss. 335. Lamarck Illustr. t. 433. Michaux Boreal-Amer. v. 1. 287. —Class and order, *Icosandria Pentagynia*. Sm. Intr. 427. Nat. Ord. *Pomaceæ*, Linn. *Rosaceæ*, Juss.

Gen. Ch. *Cal.* Perianth superior, of one leaf, concave, in five deep, spreading, permanent segments. *Cor.* Petals five, roundish, concave, with short claws, inserted into the calyx. *Stam.* Filaments about twenty, awl-shaped, inserted into the calyx, not longer than the corolla; anthers simple, roundish. *Pist.* Germen inferior; styles from two to five, (occasionally solitary,) simple, erect; stigmas capitate. *Peric.* Berry roundish, umbilicated, crowned with the closed calyx, but almost perforated in the centre. *Seeds* equal in number to the styles, bony, gibbous at the outer side, each with two kernels.

Ess. Ch. Calyx five-cleft. Petals five. Berry inferior. Seeds two to five, with two kernels.

Botanists have differed concerning the limits of this genus. The *Cratægus* of Linnæus is distinguished from his *Mespilus* solely by the former having but two styles, and occasionally, on the same tree, some flowers with but one; while the latter has five. *Sorbus* is supposed to differ from both in having three styles and as many seeds. Linnæus was well aware of the close relationship between all the three genera, and hints that there is scarcely any sufficient distinction between them. He adds however that "the leaves in *Sorbus* are usually pinnate, in *Cratægus* angular, in *Mespilus* undivided." This would indeed be a character in the habit too important to be overlooked, but unfortunately it is not founded in fact. *M. tanacetifolia* has not merely angular, but pinnatifid leaves, with the fructification of a perfect *Mespilus*, and is so naturally allied to the Hawthorn, *Cratægus Oxyacantha* of Linnæus, that nothing ought to disjoin them. As to *Sorbus*, the *domestica* is shewn in *Engl. Bot.* v. 5. 350, to be a complete *Pyrus*, both by number and structure of all the parts; nor can the *aucuparia* or the *hybrida* (more properly *pinnatifida*) be separated from it, as the number of their styles and cells is variable, though the coats of the latter are rather more coriaceous than in the *domestica*. Other acknowledged species of *Pyrus* indeed have pinnate or pinnatifid leaves. (See PYRUS.) The writer of the present article therefore sees no reason to abrogate what is settled in the *Flora Britannica*, though Willdenow, not having seen that work till he got as far as *Tetradynamia*, has not adopted this correction; and the authors of the new edition of the *Hortus Kewensis* in general follow him, where they themselves have not particularly studied any subject. Hence five of the fourteen species of *Cratægus* in the last-mentioned work are defined with five styles or five seeds, one with three and another with four; a sufficient evidence of their being *Mespili*, in spite of their more or less angular foliage. It is scarcely necessary to observe that the fruit of these two supposed genera is exactly of the same nature. We now follow Linnæus and Gærtner in calling it a *bacca*, or berry, because it is found most convenient to restrict the term *drupa* to pulpy fruits with a solitary nut.

The number of styles is so ill calculated for a generic distinction in this case, that we cannot take advantage of it even to divide *Mespilus* into any tolerably natural sections. The form of the leaves, whether undivided, lobed, or pinnatifid, might serve better. None of this genus is known to have really pinnated leaves.

The species of *Cratægus* are nineteen in Willdenow, of *Mespilus* six; in all twenty-five. They are all either *trees* or *shrubs*, with very hard wood, often thorny; and they have stalked, alternate, almost always deciduous, *leaves*. Their *flowers* are corymbose, sometimes solitary; white with an occasional tint of red. *Fruit* mealy, red or yellow, seldom eatable. The whole genus is very patient of cold, partly American, partly European and Alpine, well calculated and much used for the adorning of shrubberies in this climate. It is remarkable that none of them have been published in that useful and deservedly popular work, the Botanical Magazine.

We shall indicate a few of the most valuable.

M. *coccinea*. Great American Hawthorn. (Mespilus apii folio virginiana, spinis horrida, fructu amplo coccineo; Pluk. Phyt. t. 46. f. 4. Cratægus coccinea; Linn. Sp. Pl. 682. Willd. n. 1. Ait. n. 1.)—Thorny. Leaves ovate, with angular incisions, serrated, smooth; heart-shaped at the base. Footstalks and calyx glandular. Styles five.—Native of Virginia and Canada. Cultivated by bishop Compton at Fulham in 1683. This is a spreading tree, with broad light green *leaves*, strong thorns, large white copious *flowers*, which appear in May, and scarlet *fruit*, as big as a small damson. Linnæus and Willdenow cite under this, synonyms of Miller (*Ic. t.* 179.) and the *Hort. Angl. t.* 13, which belong to *Mespilus cordata*, their *Cratægus*, n. 2.

M. *parvifolia*. Small-leaved Hawthorn. (M. Xanthocarpus; Linn. Suppl. 254. Cratægus parvifolia; Willd. n. 8. Ait. n. 7.)—Thorny. Leaves somewhat wedge-shaped, crenate, cut. Flowers nearly solitary. Segments of the calyx leafy, cut and serrated, as long as the fruit. Styles five.—Native of Virginia. Cultivated here in the time of bishop Compton. We are indebted to Messrs. Lee and Kennedy for a knowledge of this species, for Willdenow quotes a heap of erroneous synonyms, amongst others the

the *Cratægus tomentoſa*, Linn. Sp. Pl. 682. The preſent ſhrub is remarkable for its ſtout, rigid habit; ſtraight dark *thorns*, often two inches in length; ſmall *leaves*, about an inch long, more or leſs downy; rather large *flowers*, moſtly ſolitary, at the end of each ſhort lateral ſhoot, with a long, leafy, green *calyx*. The *fruit* is ſaid to be pale yellow, dotted with little black warts, and containing five ſeeds.

M. *Oxyacantha*. Common Hawthorn, White-thorn, or May. Gærtn. v. 2. 43. t. 87. Sm. Fl. Brit. 529. (Cratægus Oxyacantha; Linn. Sp. Pl. 683. Fl. Dan. t. 634. Bulliard. t. 333, with the flowers of *Prunus ſpinoſa!* C. monogyna; Jacq. Auſtr. t. 292. Oxyacanthus; Ger. em. 1327.)—Thorny. Leaves obtuſe, deeply three-cleft, ſerrated, ſmooth. Styles one or two.—Native of dry, open, ſtony countries in all parts of Europe, flowering in May or June. In the rich deep ſoil of Marſhland it is particularly luxuriant, and the bloſſoms, uſually white, aſſume there a pink hue. Double and roſe-coloured varieties are often cultivated, as well as one with yellow, not ſcarlet, fruit. This tree is one of the greateſt ornaments of our parks and hedges.

M. *odoratiſſima*. Downy Oriental Hawthorn. Andr. Repoſ. t. 590. (M. tanacetifolia β; Sm. Prod. Fl. Græc. Sibth. v. 1. 342.)—Thorny. Leaves deeply five-cleft, jagged; very downy on both ſides. Styles five.—Native of the Levant. In Greece, and the ſouth-weſtern part of the Crimea. Cultivated by Meſſrs. Lee and Kennedy for ſome years paſt. Rather ſtouter than the Common Hawthorn, and diſtinguiſhed by its very ſoft deep-cut *leaves*, larger highly fragrant *flowers*, and globular ſcarlet *fruit*, as big as a ſmall gooſeberry. Mr. Lambert diſcovered, by Pallas's herbarium, that this is the *Cratægus orientalis* mentioned by that intelligent traveller; ſee the Engliſh edition of his Travels, v. 2. 174. and 181.

M. *tanacetifolia*. Tanſy-leaved Hawthorn. Sm. Exot. Bot. v. 2. 51. t. 85. Ait. Hort. Kew. ed. 2. v. 3. 206. Andr. Repoſ. t. 591. (M. orientalis, tanaceti folio villoſo, magno fructu pentagono e viridi flaveſcente; Tourn. Cor. 44. Voy. v. 2. 171. t. 172.)—Thorny. Leaves obtuſe, pinnatifid, cut; downy on both ſides. Styles five. Bracteas permanent.—Native of all the high mountains of Greece. A very deſirable ſhrub for plantations, on account of its large highly-ſcented corymboſe *flowers*, and yellow *fruit*, which reſembles a ſmall apple, and has the ſcent of one. By culture and grafting, it promiſes to become an acquiſition to our tables. From the deſcription in Dioſcorides of his μεσπιλον, "a ſpinous tree with leaves like hawthorn, fruit like a little apple, ſweet, with three hard ſeeds," this ſhould ſeem, as the number of ſeeds varies, to be the very plant; while his μεσπιλον ἕτερον, from Italy, "a tree like an apple tree, but with ſmaller leaves, and a round eatable fruit, with a broad depreſſion, ſlightly aſtringent, and long in ripening," can only be our common garden *Meſpilus germanica*. Tournefort did not obſerve the thorns of the *M. tanacetifolia*, but he deſcribes the eagerneſs with which his Armenian companions collected and ate the fruit, and he mentions the trees as of the ſize of oaks. He notices alſo our preceding *M. odoratiſſima*, as diſtinguiſhed by its red fruit, varying in ſize, rather acid, and more agreeable than that of the *tanacetifolia*.

M. *Azarolus*. Neapolitan Medlar or Azarole. (M. Aronia veterum; Bauh. Hiſt. v. 1. 67. M. prima; Matth. Valgr. v. 1. 229. M. n. 13; Duham. Arb. v. 2. 16. t. 5. (Cratægus Azarolus; Linn. Sp. Pl. 683. Willd. n. 19. Ait. n. 14. Andr. Repoſ. t. 579.)—Somewhat thorny. Leaves obtuſe, nearly ſmooth, in three or five entire-edged ſegments. Styles two.—Native of Italy, the ſouth of France, and Carniola; rare in our gardens. It is akin to the two laſt, but the *leaves* are ſmoother, entire at the edges, and the *ſtyles* but two; though Scopoli ſays the fruit has five cells, which cauſed him to refer this ſpecies to *Pyrus*. We have no doubt that the number of the *ſtyles* and *cells* is the ſame, and therefore this perhaps affords another example of the variableneſs of that number. The *fruit* is ſaid to be auſtere in flavour, and hence Matthiolus found a difference between his plant and the μεσπιλον of Dioſcorides, which, as they had never ſeen the true one, he, and other botaniſts of his time, took this to be; nor were they very wide of the mark. When cultivated, the Azarole is ſpoken of as an agreeable fruit. We have never heard of its ripening in England, nor does the tree often bloſſom.—The old wooden cut of Matthiolus, uſed again by Duhamel, is by far the beſt repreſentation of this ſpecies; that in Ger em. 1454 is more like the *Oxyacantha*.

M. *germanica*. Common, or Dutch Medlar. Linn. Sp. Pl. 684. Willd. n. 1. Ait. n. 1. Engl. Bot. t. 1523. Pallas Roſſ. v. 1. p. 1. 29. t. 13. f. 1. (M. altera; Matth. Valgr. v. 1. 230. M. ſativa; Ger. em. 1453.)—Thorns none. Leaves lanceolate, ſomewhat downy. Flowers ſolitary, ſeſſile, terminal. Styles five.—Native of the warmer parts of Europe. Common in gardens, for the ſake of its fruit, which is not eatable till it becomes quite mellow, and is almoſt as variable in ſize and flavour as any other. The *leaves* are a ſpan long, moſt downy beneath, dark green above, a little ſerrated at the top. *Flowers* the largeſt of the genus, white, as broad as a crown piece. *Fruit* broad, depreſſed, brown when ripe.

M. *grandiflora*. Large-flowered Barren Medlar. Sm. Exot. Bot. v. 1. 33. t. 18. Ait. n. 5.—Thorns none. Leaves elliptic-oblong, ſlightly downy, unequally ſerrated. *Flowers* nearly ſolitary, terminal. Styles three.—Cultivated in Chelſea garden by Mr. J. Fairbairn, who is unacquainted with its native country. The *tree* much reſembles the *M. germanica*, but the *leaves* are ſtrongly ſerrated, and more elliptical. *Flowers* white, ſcentleſs, almoſt as big as thoſe of the *germanica*, and much exceeding thoſe of all the other ſpecies, *tanacetifolia* approaching them moſt nearly in this reſpect. They grow moſtly ſolitary, rarely two together, at the ends of ſmall lateral branches. *Styles* never more than three; often but two. *Fruit* ſmall, reddiſh, with little pulp, rarely perfected in England.

M. *japonica*. Japan Medlar, or Loquat. Thunb. Jap. 206. Willd. n. 2. Ait. n. 2. Banks. Ic. Kæmpf. t. 18. Vent. Malmaiſ. t. 19. (Bywa; Kæmpf. Amœn. 800.)—Leaves obovate, acute, ſerrated; downy beneath. Cluſters aggregate, terminal. Styles five.—Native of Japan; hardy with us, flowering in ſpring and autumn, and often ripening its *fruit*, which is globular, an inch in diameter, yellow, not bad eating. Thunberg ſays this is a very large tree in its native country. The *leaves* are rigid, a foot long, evergreen, ſmooth, and ſhining on the upper ſide, white or ruſty beneath. *Flowers* very numerous, white, on ruſty ſtalks.—This plant remained for ſome time in our ſtoves without flowering, and was taken for a *Volkameria*.

MESPILUS, in *Gardening*, comprehends plants of the deciduous tree flowering ſhrubby and evergreen kinds, of which the ſpecies cultivated are; the Dutch or common medlar (M. germanica); the arbutus-leaved meſpilus (M. arbutifolia); the alpine meſpilus (M. amelanchier); the baſtard quince, or meſpilus (M. chamæ-meſpilus); the ſnowy meſpilus (M. canadenſis); the dwarf meſpilus (M. cotoneaſter); the quince-leaved meſpilus (M. tomentoſa); and the evergreen thorn or meſpilus (M. pyracantha).

In the firſt ſort it is obſerved, that the wild tree differs from the cultivated one in having more ſlender, ſtrigoſe, thorny branches, and much fmaller leaves, flowers, and fruits.

And there are two varieties, the narrow-leaved and the broad-leaved; the firft growing to a large tree, rifing with a ftraighter ftem, and the branches growing more upright than thofe of the Dutch medlar: the leaves are narrower and not ferrate, the flowers fmaller, and the fruit fhaped like a pear. This is a native of Sicily.

The latter never rifes with an upright trunk, but fends out crooked deformed branches at a fmall height from the ground, the leaves are very large, entire, and downy on their under fide: the flowers very large, as alfo the fruit, which is rounder, and approaches nearer to the fhape of an apple: this, bearing the largeft fruit, is now generally cultivated; but there is one with fmaller fruit, called the Nottingham medlar, of a much quicker and more poignant tafte. There are alfo other varieties in the fruit, which are now little attended to by the cultivators of this fruit.

The fecond fpecies varies with red, with black, and with white fruit.

Method of Culture.—They are all eafily raifed by feeds, layers, grafting and budding; but it is the beft practice to raife the medlar kinds principally by grafting or budding, in order to continue the forts.

When they are raifed in the firft method, the feeds fhould be fown in autumn, in a bed of common earth, as they ufually lie a year, or more, before they germinate, as in the haw and holly-berries, &c.

As foon as the plants appear they fhould be watered frequently in dry weather; and in the autumn or fpring following, the largeft be thinned out and planted in nurfery rows, two feet by one afunder; and in another year all the reft may be fet out in the fame manner; and in three or four years they will be proper for being planted out in the garden or fhrubbery grounds.

But in the fecond mode the young branches fhould be laid down in the autumn in the common method; and they will be properly rooted by the autumn following, when they fhould be planted out in nurfery-rows in the fame way as the feedlings.

And the two laft methods fhould be performed on the ftems or ftalks of the larger medlar kinds, or fometimes upon thofe of the white thorn, raifed from feed as above; but the pear-ftock is to be preferred for the common medlars, when intended as fruit trees. The operations are performed in the ufual way, low in the ftocks to form dwarfs; and for half or full ftandards, training the firft fhoot for a ftem, or the ftock may be let form a ftem, and then be wrought at from about three or four to five or fix feet in height. See BUDDING and GRAFTING.

Thofe plants intended for fruit-trees, whether dwarfs, half or full ftandards, in training, fhould, for dwarfs, have the firft fhoots from the graft or bud headed down fhort in fpring, if neceffary, in order to force out a proper fupply of bottom branches, which muft be trained as other dwarf fruit-trees, either for ftandard-dwarfs or efpaliers. When for half or full ftandards, and wrought low in the ftocks, the firft fhoot of each fhould be trained for a ftem, topping it afterwards at the proper height to force out lateral fhoots to form the head; but when wrought high in the ftock, the firft fhoots may either be fhortened or fuffered to grow, as may feem moft proper, according to the natural difpofition of the leading fhoot, in refpect to its furnifhing lateral branches. After this training for the firft year or two, to give the trees their firft proper formation, there fhould not be any further general fhortening of the branches, practifing it only occafionally to particular fhoots, to procure more wood, when neceffary, to fill vacancies, to reduce any irregular growth, or to cut off dead parts. But in other refpects the branches fhould be principally left at full length, and the ftandards left to affume nearly their own natural way of branching. See PRUNING and TRAINING.

Thefe plants are all hardy, fucceeding in any common foil and fituation.

It may be noticed that the firft fort and varieties are cultivated as fruit trees, principally as ftandards, but fometimes as efpaliers for variety; and are often introduced into the fhrubbery plantations. All the other fpecies are proper for ornament in fhrubbery or other plantations, where they effect a fine variety by their different foliage and flowers, as well as their fruit in autumn and winter, which remains long on the branches. They fhould be difpofed—the deciduous kinds principally in affemblage with others of that fort, and the ever-green kind alfo chiefly with thofe of their own kind, arranging each fort according to its height of growth; but the laft fort, being agreeably ornamental, both as an ever-green and in its numerous clufters of fine red berries in winter, fhould have a confpicuous fituation. From its being of a rather flender growth, it is however commonly trained againft walls or the fronts of houfes, for the fupport of its flexible branches, as well as to exhibit its berries more ornamentally. It may however be trained as a ftandard fhrub, like the other forts, in the open fhrubbery; in which cafe it fhould be generally trained with fhort fingle ftems, and be permitted to branch out upwards into fpreading heads, which have a good effect.

MESS, in *Sea Language*, denotes a particular company of the officers or crew of a fhip, who eat, drink, and affociate together, whence *mefs-mate*, denoting one of thefe with refpect to another.

MESS, in *Military Language*. The principal military mefs in Great Britain is kept, and provided for in the extraordinaries of the army, at the Horfe-guards. This mefs confifts of the field officers in waiting, of the life and foot guards, officers in the king's life and foot guards; officer of the queen's guard and tilt picket, and adjutant of the battalion of foot guards that mounts. The colonel of the foot guards is allowed to invite three vifitors. Two breakfafts are likewife provided every morning, one for the guard coming on, and one for the guard going off, together with a fupper every night.

MESSA, in *Geography*, a town of Morocco, fituated on the river Sus, not far from the foot of the Atlas. It is large, divided into three parts, and furrounded with walls. In its vicinity is a mofque, containing the bones of a whale, which the fuperftitious inhabitants confider as thofe of the whale which fwallowed Jonah; 165 miles S.W. of Morocco. N. lat. 29° 56′.

MESSA, *Meffe*, plural. Ital.; *Meffe*, *Meffes*, plu. Fr., the title given in the Romifh liturgy to the high mafs in mufic, confifting of the *Kyrie*, *Chrifte*, *Credo*, *Sanctus*, and *Agnus Dei*. Thefe portions of the church fervice have been fet in the ftyle of our cathedral fervices by every great compofer in Catholic countries, ever fince the laws of counterpoint were fettled, that is, from the latter end of the 15th century to the prefent time. For common occafions the mafs is fet for the choral eftablifhment, accompanied only by the organ: in thefe, folo verfes are feldom introduced; but for feftivals, in Italy, the compofition is more elaborate and fecular, when an additional band and fingers of the firft clafs are employed. Aleffandro Scarlatti, Leo, Pergolefi, Durante, Perez, Jomelli, Sacchini, &c. have compofed maffes, which will be regarded by true judges of compofition as mafter-pieces of the art.

Messa *Bassa*, silent mass whispered by the priest during a musical performance.

Messe *de Capella*, in the *Italian Music*, is used for masses sung by their grand chorus. In these, various fugues, double counterpoints, and other ornaments are used.

Messe *Concertati*, masses wherein the parts reciting are intermixed with chorusses.

MESSALA, M. Valerius Corvinus, in *Biography*, an illustrious Roman, of an ancient and noble family, who distinguished himself in youth by his eloquence and patriotism, and joined the republican army under Brutus and Cassius against the triumvirs. He is described in very high terms by Cicero, in a letter to Brutus, as being almost, or altogether unequalled for integrity, constancy, and the affection which he displayed for the commonwealth. Of his eloquence, Quintilian says, it is splendid, fair, and bearing the stamp of his nobility. At the battle of Philippi he had a distinguished command, and with his legion was the first that turned the left wing commanded by Octavianus Cæsar. After the death of the two republican chiefs, he made his peace with the victor, and, according to one of the historians of Rome, there was no circumstance of the victory more pleasing to Cæsar than the preservation of Messala, nor did any man ever give proof of greater attachment and gratitude than Messala towards Cæsar. Yet, to his honour, it is asserted, that he never, and on no occasion, was backward in shewing his regard to the memory of his earlier friends, and his decided preference of their cause. When he recommended Strato to Cæsar, he said, with tears flowing from his eyes, "this, sir, is the man who performed the last kind office for my beloved friend Brutus;" and at another time, when Cæsar reminded him that he had been no less zealous for him at Actium, than *against* him at Philippi, he answered, "I always espoused the most just side of every question." In the year 31 B.C. he was the emperor's colleague in the consulate, and was sent as his legate into Asia a year or two afterwards. In 37 he obtained a triumph over the Aquitanians; after this, he for a short time held the office of prefect, which he resigned, finding it ill adapted to his habits. He was addicted to literary pursuits, and was a patron of literary persons, particularly of Tibullus, who commemorates him in his elegies, and has left an express panegyric upon him. In old age he composed a work "De Familiis Romanis," cited by Pliny. At the age of seventy, about two years prior to his decease, the faculties of his mind underwent a total decay, and his memory so completely failed him, that he forgot his own name. Plutarch.

MESSALIANS. See Euchites.

MESSALINA, Valeria, in *Biography*, a daughter of Messala Barbatus, married the emperor Claudius, and disgraced herself by her cruelties and scandalous incontinence. Her husband's palace was not the only seat of her lasciviousness, but she even prostituted herself in the most public manner. Her extravagancies at last irritated Claudius so much, that he was obliged to summon her to answer to all the accusations which were brought against her, upon which she attempted to destroy herself, and when her courage failed, one of the tribunes dispatched her with his sword in the year 48. The satirist, in speaking of her, says,

"Et lassata viris, necdum satiata, recessit."

There was another person of this name called also Statilia, who was descended of a consular family, and married the consul Atticus Vistinus, whom Nero murdered. She received with tokens of tenderness her husband's murderer, and married him. She had married four husbands before she came to the imperial throne; and after the death of Nero retired to literary pursuits and peaceful occupations. Otho, after this, paid his addresses to her, but before the consummation of marriage he destroyed himself. In his dying moments he wrote her a pathetic and very consolatory letter.

MESSANA, in *Ancient Geography*. See Messina.

MESSAPIA, a country of Italy, which, though scantily watered, was covered with trees and pastures. Its principal towns were Brundusium, Rudiæ, Lupiæ, Hydruntum, Callipolis, and Tarentum. It was also called Iapygia.

MESSAR, in *Geography*, a small island in the Red sea, N. lat. 17° 26′.

MESSARA, a province of the island of Crete, which lies south to that of Candia, and which is the most fertile, and the most agreeable of the island; it has, among others, a very beautiful plain, six leagues in extent, in which are found an abundance of wheat, barley, flax, cotton, and a variety of fruits. It is crossed by a small river called at this day "Malognithi," and formerly known by the name of "Lethe." It passes by the side of the ruins of Gortyna, and empties itself into the sea facing the Paximadi islands. The wheat of Messara yields a great quantity of flour, which makes excellent bread; it is conveyed on the backs of asses to Candia, Retimo, and Canea; while the inhabitants themselves live all the year on a very coarse barley bread. Messara is reckoned the granary of Crete: its wheat is one of the best in Turkey. The Turks are here more numerous than the Greeks.

MESSASAGUES, or Missasagas, a tribe of Indians in America, on a river of this name, which discharges itself into the N.W. part of lake Huron. This tribe, a few years ago, numbered 500 warriors, but now 80.

MES-SEELAH, a town of Africa, in the kingdom of Algiers; 80 miles S.S.E. of Dellys.

MESSEGNA, a town of Naples, in Otranto; 21 miles N.W. of Lecce.

MESSENE, Maura-Mathi, a town of European Turkey, in the Morea, on a river which runs into the gulf of Coron; 30 miles N.W. of Misitra. This was the ancient Messene or Mycene, the capital of Messenia, N. of Æchalia and S. of Ithome. It was founded by Epaminondas, and peopled about the year 369 B.C. It was a large and magnificent town, embellished by the temples of Neptune, Venus, Ceres, Lucina, &c. by a variety of statues, &c. Strabo represents it as one of the strongest places among the ancients, and compares it with Corinth, being defended by a fortress built on mount Ithome, as the latter city was by a double citadel. On the path which led to this citadel was a fountain called Clepsydra, signifying concealed water. It was pretended, that the nymphs which reared Jupiter came to bathe secretly in this fountain, whence it derived its name. N. lat. 37° 15′. E. long. 21°.

Messene, a kind of island, formed by the Euphrates on the W. and the Tigris on the E. It had, to the north, the wall of Semiramis, and to the south a canal, which separated it from Babylonia, and the Seleucide territory.

MESSENGERS, in the *English Polity*, are carriers of letters and messages; or, more particularly, certain officers, chiefly employed under the direction of the secretaries of state, and always in readiness to be sent with all manner of dispatches, foreign and domestic.

They are always employed with the secretaries warrants to take up persons for high treason, or other offences against the state, which do not so properly fall under the cognizance of the common law; and, perhaps, are not properly to be divulged in the ordinary course of justice. The prisoners they apprehend are usually kept at their own houses, for each

each of whom they are allowed by the government a compenſation. Although it is the conſtant practice to make commitments to meſſengers, it is ſaid that it ſhall be intended only in order to the carrying of offenders to gaol. (1 Salk. 347. 4 Hawk. P. C. c. 16. § 9.) An offender may be committed to a meſſenger, in order to be examined before he is committed to priſon; and though ſuch commitment to a meſſenger is irregular, it is not void. (Skin. 599.) When they are diſpatched abroad, they have an allowance for their journey.

MESSENGERS *of the Exchequer*, are officers attending the exchequer, in the nature of purſuivants; their buſineſs is to attend the chancellor and auditor, &c. and to carry their letters, precepts, &c.

MESSENGER *of the Preſs*, a perſon, who, by order of the court, ſearches printing-houſes, bookſellers' ſhops, &c. in order to diſcover ſeditious books, &c.

There are alſo other officers diſtinguiſhed by this appellation; as the meſſenger of the lord chancellor, of the privy council, of the great wardrobe, the two meſſengers of the yeomen of the guards, meſſenger to the gentlemen penſioners, four meſſengers to the board of commiſſioners for India, meſſenger of the board of longitude, nine meſſengers of the navy pay-office, four meſſengers of the victualling office, meſſenger of the war-office, three meſſengers of the army pay-office, meſſengers of the ordnance-office, meſſengers of the office for auditing the public accompts, meſſengers of the cuſtom-houſe, of the ſtamp-office, of the general poſt-office, ſeven meſſengers to the commiſſioners of bankruptcy, &c.

MESSENGER, in *Mechanics*, the endleſs rope employed in the *capſtan;* which ſee.

MESSENIA, in *Ancient Geography*, a country of Greece, which occupied the S.E. part of the Peloponneſus; it was 13 or 14 leagues in its largeſt dimenſion, and 10 from S. to N. It was bounded, on the north, by the Elide and Arcadia; on the E. by Laconia, on the S. in great meaſure by the Meſſenian gulf, and on the W. by a part of the Ionian ſea. This country was mountainous and unfertile: its principal river was the Pamiſſus, and Meſſene was its capital. It is ſaid by Pauſanias to have derived its name from a princeſs, called Meſſéne, a native of Argos, daughter of Triopas, and granddaughter of Phorbes. She married Polycaon, the youngeſt ſon of Lelex, and perſuaded her huſband to take poſſeſſion of a country ſituated to the W. of Laconia, and inhabited by a ſavage race. Having done this, he gave to the country the name of his wife, and built in it many towns. When the family of Polycaon became extinct; it paſſed under the dominion of ſeveral ſucceſſive ſovereigns; till at length, after the battle of Leuctra, Epaminondas recalled the deſcendants of the Meſſenians, and built Meſſene.

MESSERAG, in *Geography*, a town of the duchy of Courland; 38 miles E. of Goldingen.

MESSEROF, a town of Poland, in the palatinate of Braclaw; 40 miles N.W. of Braclaw.

MESSERSBURG, a poſt-town in Franklin county, Pennſylvania; 168 miles W. by S. from Philadelphia.

MESSERSCHMIDIA, in *Botany*, received its name from Linnæus, in honour of Daniel Theophilus Meſſerſchmid, a German botaniſt who was ſent out by the Ruſſian government to explore the natural hiſtory of Siberia, prior to the expedition under Pallas. He was born in the year 1685, and died about the age of 30. His reſearches were never publiſhed, and he is only known as an author, by a paper which he left, giving an account of the "*Camelus Bactrianus, binis in dorſo tuberibus.*" This was edited by John Amman, and publiſhed in the 14th vol. of the Tranſactions of the Peterſburg Academy. Linn. Mant. 5. Schreb. 103. Willd. Sp. Pl. v. 1. 789. Mart Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 1. 303. Juſſ. Gen. 129. Lamarck Illuſtr. t. 95. Gærtn. t. 109.—Claſs and order, *Pentandria Monogynia.* Nat. Ord. *Aſperifoliæ*, Linn. *Boragineæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, erect, permanent, deeply cloven into five, ſomewhat linear ſegments. *Cor.* of one petal, funnel-ſhaped, tube cylindrical, of a rude texture, longer than the calyx, globoſe at the baſe; limb five-cleft, folded, membranous at the ſides; throat naked. *Stam.* Filaments five, minute, in the lower part of the tube; anthers awl-ſhaped, erect, within the middle of the tube. *Piſt.* Germen ſuperior, nearly ovate; ſtyle cylindrical, very ſhort, permanent, ſtigma capitate, ovate. *Peric.* Berry dry, corky, of a roundiſh cylindrical form, abrupt at the ſummit, which is ſurrounded with four, obtuſe teeth; when ripe it ſeparates into two parts. *Seeds* two in each diviſion of the berry, oblong, bony, incurved, rounded on the outſide, angular within.

Eſſ. Ch. Corolla funnel-ſhaped, with a naked throat. Berry corky, diviſible into two parts, with two ſeeds in each.

1. M. *fruticoſa.* Linn. Suppl. 132. Syſt. Veg. ed. 14. 190.—Stem ſhrubby. Leaves on ſtalks. Corolla ſalver-ſhaped.—A native of the Canary iſlands, eſpecially in the northern parts of Teneriffe, where it was found by Mr. Francis Maſſon, who introduced it into Kew gardens in 1779, where it flowers from June to October.—The *ſtem* of this ſhrub is lofty, rugged, rough with hairs, branched; branches panicled at the top. *Leaves* alternate, on long ſtalks, lanceolate, entire, veined, hairy. *Spikes* of flowers compound, directed one way, forked, at the ends of the twigs on the upper part of the ſtem. Linnæus obſerves that this ſpecies has the corolla of *Tournefortia,* to which the genus is nearly allied, but its fruit is that of a *Meſſerſchmidia.* It is very ſimilar to the following ſpecies *M. Arguzia,* differing only in its ſhrubby ſtem, ſtalked leaves, ſhorter calyx, and ſmaller, ſalver-ſhaped corolla, with a flat limb.

Profeſſor Martyn has quoted a figure of this ſpecies as being in the ſecond volume of *L'Heritier's Stirpes Novæ*, on the authority of the editor of the firſt edition of *Hortus Kewenſis;* and we know that this quotation, in the latter work, aroſe from a communication of L'Heritier to Mr. Dryander. The ſecond volume however of *Stirpes Novæ* never appeared, and therefore Mr. Dryander repented of having quoted it, determining never to refer to an unpubliſhed figure again; accordingly the reference is ſuppreſſed in the ſecond edition of *Hortus Kewenſis.*

2. M. *Arguzia.* Linn. Mant. 42. Suppl. 132. (Meſſerſchmidia; Hort. Upſ. 36. Gmel. Sib. v. 4. 77. Arguzia; Amman. Ruth. 29. Tournefortia ſibirica; Linn. Sp. Pl. 202.)—Stem herbaceous. Leaves ſeſſile. Corolla funnel-ſhaped. A native of dry, gravelly, ſunny places in Siberia. *Root* creeping. *Stem* erect, three or four inches high. *Branches* alternate, ſterile. *Leaves* alternate, ſeſſile, ovate-oblong, veined, downy, whitiſh. *Corymbs* or *tufts* of flowers frequently two. *Calyx* ſhorter than the tube of the *corolla,* which is white, larger than in the preceding, with the throat naked and pervious; the limb plaited and its ſides membranous.

3. M. *cancellata.* Willd. n. 3. D'Aſſo. Synop. n. 162. t. 1. f. 2. (Cerinthe foliis lanceolatis, caulibus ramoſis, floribus vix calycem ſuperantibus, fructibus cancellatis; Quer. Hiſp. v. 4. 145. t. 25.)—Leaves ſeſſile, linear, obtuſe, hiſpid. Capſules reticulated.—A native of Spain.—We adopt this

this on the authority of Willdenow, without being able to conſult his references. " *Plant* a foot high. *Root* fibrous, reddiſh. *Stems* hairy, branched. *Radical-leaves* lanceolate, rather obtuſe, hiſpid, thoſe of the ſtem ſimilar, but narrower. *Flowers* on ſtalks, in cluſters, of a blue colour."—D'Aſſo obſerves that one *ſeed* in each diviſion of the berry is abortive.

MESSI, in *Geography*, a town of Aſiatic Turkey, in Natolia, built on the ſcite of *Halicarnaſſus*, which ſee; 50 miles S.W. of Mogla. N. lat. 37° 46′. E. long. 27° 22′.

MESSIAH, a term ſignifying *anointed*, or *ſacred;* and, in that ſenſe, applied to kings and prieſts; but, particularly, by way of eminence, to Jeſus Chriſt, the ſaviour promiſed by the prophets of the old Jewiſh law.

The word comes from the Hebrew מָשׁוּחַ, *maſcuach*, *anointed*, of the verb מָשַׁח, *maſchach, to anoint;* whence Jeſus Chriſt claims the title on a manifold account; 1, as having been anointed king of kings from all ages; 2, as chief of the prophets; 3, as high prieſt of the law of grace, or prieſt for ever after the order of Melchizedech.

The prophecies in the Old Teſtament, which relate to the coming of the Meſſiah, are very numerous; ſome of which may be found in Gen. iii. 15. xlix. 10. Iſaiah, vii. 14. c. xi. c. lii. liii. which the Targum of Jonathan interprets of the Meſſiah. Dan. ix. 25. Micah, iv. 1—5. c. v. 2—4. Haggai, ii. 6, 9. Zech. iii. 8—10. vi. 12, 13. ix. 9—12. Mal. iii. 1—4. iv. 2—6, &c.

It has been alſo urged, that there are ſome remarkable paſſages in Joſephus, Philo, Tacitus, Suetonius, and Celſus, which ſhew that the expectation of the Meſſiah, agreeable to the ſcripture prophecies, prevailed in ſome degree among the heathen nations; and many have ſuppoſed that there is ſome reference of this kind in the fourth eclogue of Virgil. We ſhall only add farther, that the beſt Chriſtian writers lay little ſtreſs on the prophecy of Chriſt cited by Abulpharagius, out of the books of Zerduſh or Zoroaſter, nor on the pretended prophecy of Confucius, among the Chineſe; nor on thoſe of the Sibylline oracles, among the Romans.

The Jews ſtill wait for the coming of the Meſſiah, being infatuated with the notion of a temporal Meſſiah, that is to be a mighty conqueror, and to ſubdue all the world. Moſt of the modern rabbins, according to Buxtorf, believe that the Meſſiah is already come, but that he keeps himſelf concealed, and will not manifeſt himſelf becauſe of the ſins of the Jews. Some of the Jews, however, in order to reconcile thoſe prophecies that ſeem to contradict each other, as to the character and condition of the Meſſiah, have had recourſe to the hypotheſis of two Meſſiahs, who are yet to ſucceed each other; one in a ſtate of humiliation and ſuffering; the other of glory, ſplendor, and power. The firſt, they ſay, is to proceed from the tribe of Ephraim, who is to fight againſt Gog, and to be ſlain by Annillus, Zech. xii. 10. The ſecond is to be of the tribe of Judah, and lineage of David, who is to conquer and kill Annillus, and reſtore the kingdom of Iſrael, reigning over it in the higheſt glory and felicity.

Jeſus Chriſt aſſerts himſelf to be the Meſſiah. In St. John iv. 25. the Samaritan woman ſays to Jeſus, " I know that when the Meſſiah comes, who is called the Chriſt, he will tell us all things. Jeſus anſwered her, I that ſpake to thee am he." There are ſeveral impoſtors, who have endeavoured to paſs for Meſſiahs, as Chriſt himſelf predicted. J. Lent, a Dutchman, has written a hiſtory of *falſe* Meſſiahs, " De Pſeudomeſiis." The firſt he mentions was one Barcochab, who appeared under the empire of Adrian. The laſt was rabbi Mordecai, who began to be talked of in 1682. A little before him; *viz.* in 1666, appeared Sabbethai Sebi, who was taken by the Turks, and turned Mahometan.

MESSIEURS, a French title of honour, or civility, lately introduced into our language; being the plural of *monſieur*, and equivalent to the Engliſh ſirs, or gentlemen.

The French lawyers always begin their pleadings and harangues with meſſieurs; which word is alſo frequently repeated in the courſe of their ſpeeches; on which occaſion it anſwers to our Engliſh word *gentlemen.*

The French ſay, *Meſſieurs du parlement; du conſeil; des comptes*, &c.

MESSILLONES, or MUSCLE-*Bay*, in *Geography*, a bay on the coaſt of Chili or Peru, in South America; 8 leagues N. by E. of Morrenas bay, and 5 S. by W. of Atacama. It forms part of Atacama bay, and at its entrance, or the anchoring place, ſhips may ride in 15 fathoms, clean ground, and ſecured from moſt winds.

MESSINA, a city and ſea-port of Sicily, in the valley of Demona, the ſee of an archbiſhop, ſituated on the E. coaſt towards the narrow ſea, called " The Straits of Meſſina," formerly called " Zancle," which name it received, according to Thucydides, from the form of its harbour, that reſembles a hook. This author ſuppoſes that the city was founded by the pirates of Cuma. Other writers trace its origin to a higher antiquity, and date it 530 years before the ſiege of Troy, and 964 years before Romulus laid the foundation of Rome. They add, that when the inhabitants were moleſted by the pirates of Cuma, they ſought the aſſiſtance of the Meſſenians, a people of Greece, who haſtening to their ſuccour, cleared their coaſts, entered into an alliance with them, and hence the city was called by the Greeks " Meſſene," and by the Latins " Meſſana." Pauſanias ſays, that Anaxilas, tyrant of Rhegium, having formed an alliance with the Meſſenians of Greece againſt the Zancleans, with their aſſiſtance took poſſeſſion of the city, which, in compliment to them, he called " Meſſene." This event is ſaid to have taken place in the year of Rome 94. This city was afterwards ſeized by the Mamertini, and being made their capital, it became one of the moſt wealthy and powerful cities of Sicily. The Mamertini transferred it to the Romans, and from them it was taken, in the firſt Punic war, by the Carthaginians. Under the Romans it enjoyed a long interval of peace, and was ſpared by the rapacious Verres. In the civil wars it took part with Sextus Pompeius. After the fall of the Roman empire it was for ſome time in the poſſeſſion of the Saracens: and, in 1060, was taken by Roger, count of Calabria, who alſo aſſumed the name of the count of Sicily. In 1139, Richard I. king of England, made himſelf maſter of it in his way to the Holy Land. It was afterwards betrayed to Louis XI., king of France, who was compelled to ſurrender it. The harbour of this city has been much admired, and the quay is decorated with a range of buildings, nearly uniform in its whole length, and interrupted only by a number of arches, which ſerve as entrances into the correſponding ſtreets that terminate upon it. At the bottom of the port is the king's palace, the reſidence of the governor of the city, before whoſe door the veſſels of the royal navy lie at anchor. Near this is a covered walk, which leads to the citadel, which is almoſt impregnable, and cannot be attacked by ſea, on account of the currents and the difficulty of anchorage, nor is it overlooked on the land ſide, whilſt it commands the city and harbour. This was built by Charles XI. after a revolt of the inhabitants. There is a communication by a covered way, and a wide ſubterranean paſſage formed under the jettee, between the citadel and two forts;

forts; one that of the Lantern, which points out the channel in the Calabrian coast, and that of St. Salvador, which defends the entrance of the port. It seems as if nature had designed even the whirlpools of Scylla and Charybdis to serve as guards to this superb port; which is capable of containing all the ships of Europe, and where vessels arrive at the very door of the merchant, finding any required depth of water, and needing not to move an anchor, if it were not for the violence of the Sirocco, the only wind to which it is exposed, and by which the ships are in danger of being driven out to sea. In the middle of the haven are a light-house and lazaretto. Within the city are handsome streets, elegant marble fountains, equestrian and pedestrian statues of bronze, large and handsome churches, vast convents, tolerably well built hotels, a magnificent general hospital, called "La Loggia," another large and rich hospital, and near it a well-regulated as well as spacious Lombard house. The population formerly corresponded with these appearances; but the plague of 1743 and 1744 reduced it from 100,000 to 30,000. In 1780 and 1782 it suffered much from an earthquake. The calamities which this city has suffered have not only diminished its population, but occasioned the decay of many houses and the desertion of their occupiers, as well as the decline of their trade, which, however, is still considerable. In August an annual fair is held, at which great quantities of foreign goods are exposed to sale. The air at Messina is temperate, being continually freshened by the sea, purified by the mountains, agitated by the currents, and moderated by the shade and shelter. So that, as De Non says, it is rendered one of the healthiest and most agreeable habitations of the whole world. Messina claims the prerogative of being styled the capital of the kingdom, though Palermo disputes the precedency with it; 104 miles E. of Palermo. N. lat. 38° 10'. E. long. 15° 40'.

MESSINES, a town of France, in the department of the Lys, and chief place of a canton, in the district of Ypres. The place contains 3155, and the canton 17,956 inhabitants, on a territory of 167½ kiliometres, in 8 communes.

MESSING, a town of Bavaria, in the bishopric of Aichstatt; 14 miles N.N.E. of Aichstatt.

MESSIS, a town of Asiatic Turkey, in Caramania; 15 miles E.S.E. of Adana.

MESSUAGE, Messuagium, in *Law*, a dwelling-house, with some land adjoining, assigned for its use.

By the name of messuage may a garden, shop, mill, cottage, chamber, cellar, or the like, pass.

In Scotland, messuage denotes what we call the *manor-house, viz.* the principal dwelling-house within the barony.

MESSUBY, in *Geography*, a town of Sweden, in Tavastland; 34 miles N.W. of Tavasthus.

MESTA, in *Geography*, a town and cape on the W. coast of the island of Scio. N. lat. 38° 25'. E. long. 30° 54'.

Mesta, a Spanish term, which, in its general acceptation, signifies a mixture of two or more sorts of grain, and is equivalent to the English word "Meslin," denotes, in a more restricted sense, the union of the flocks belonging to several different proprietors into one collective body, which does not strictly attach to any country, but travels backward and forward twice in the year, passing part of it at one place, and part in another. This collection is formed by an association of proprietors, consisting of the nobles, persons in power, members of rich monasteries and ecclesiastical chapters, who feed their flocks on the waste lands, as is done on the commons in England. These flocks they call *Merinos*, or *transhumantes*.

This custom, first introduced by circumstantial necessity, in process of time was converted into a claim, which long possession has now changed into a prescriptive right. It rests at present upon the support of those laws and ordinances which have favoured, protected, and perpetuated the usurpation.

The origin of this custom must be referred to the era in which the great plague ravaged Spain, and destroyed two-thirds of the population. The few persons who survived that destructive scourge took possession of the lands which had been vacated by the death of their former occupiers. These they united with their own for the purpose of forming large properties; but not possessing sufficient means for the cultivation of such extensive domains, they were obliged to convert nearly the whole into pasturage, and confine their attention principally to the care and increase of their flocks. Hence has arisen the vast quantity of pasture lands which occupy the greater part of Estramadura, the kingdom of Leon, and other provinces. To this cause, among others, may be attributed the prodigious quantity of uncultivated lands discoverable through the whole kingdom; and hence so many proprietors, who possess extensive tracts of territory, yet have no titles to their estates, and are therefore denominated *Dueñosfvoceros*.

The flocks which, when united, form the Mesta, usually consist of about ten thousand sheep in each. Every flock is conducted by an officer, called a *mayoral*, who superintends the shepherds, and directs the route. It is essential that he should be an active man, well acquainted with the kinds of pasturage, the nature of sheep, and methods of treatment. The mayoral is allowed a horse and one hundred *doublons*, or fifteen hundred livres tournois (thirty pounds eight shillings sterling) *per annum*. Placed under him are fifty shepherds, who are divided into four classes. The wages amount to one hundred and fifty reals, or thirty-seven livres ten sols (one pound eleven shillings and three-pence) *per* month, for the first class; one hundred reals, or twenty-five livres (one pound and eleven-pence) for the second; sixty reals, or fifteen livres (twelve shillings and ten-pence) for the third; and forty reals, or ten livres (eight shillings and four-pence) for the fourth: exclusive of these wages, each is allowed a daily ration of bread, weighing two pounds. They receive individually twelve reals, or three livres (two shillings and sixpence) for travelling expences, when they commence their journey in the month of April or May; and the like sum on their return in October. To each shepherd is granted the privilege also of keeping a few sheep and goats, but the wool and hair belong to the proprietor of the flock; he takes himself the increase, the flesh, and the milk; but he cannot take any part of these away. The number of persons thus employed in the care of the whole of the flocks which compose the Mesta, are about forty-five or fifty thousand. The dogs are also numerous, fifty being the allowance to each flock.

The number of sheep which are thus made to migrate has varied at different periods. It very much decreased during the seventeenth century. It was again increased in the eighteenth. In the sixteenth the enumeration comprised seven millions. At the commencement of the seventeenth, in the reign of Philip III., they were reduced to two millions five hundred thousand. Ustaria states the number in his time, about the end of the same century, at four millions; they amount at present to near five.

The flocks are put in motion the latter end of April, or beginning of May, leaving the plains of Estramadura, Andalusia, the kingdom of Leon, and Old and New Castile, where they usually winter; they repair to the mountains of the

the two latter provinces, and thoſe of Biſcay, Navarre, and Aragon. The mountainous diſtricts moſt frequented by theſe flocks in New Caſtile are thoſe of Cuença; and in Old Caſtile, thoſe of Segovia, Soria, and Buytrago. The ſheep, while feeding on the mountains, have occaſionally adminiſtered to them ſmall quantities of ſalt. It is laid upon flat ſtones, to which the flocks are driven, and permitted to eat what quantity they pleaſe. During the days the ſalt is adminiſtered, the ſheep are not allowed to depaſture on a calcareous ſoil, but are moved to argillaceous lands, where they feed voraciouſly.

At the end of July the ewes are put to the rams, after ſeparation has been made of thoſe already with lamb. Six or ſeven rams are conſidered ſufficient for one hundred ewes.

In September the ſheep are ochred, their backs and loins being rubbed with red ochre, or ruddle, diſſolved in water. This practice is founded upon an ancient cuſtom, the reaſon of which is not clearly aſcertained. Some ſuppoſe, that the ochre uniting with the oleaginous matter of the fleece, forms a kind of varniſh, which defends the animal from the inclemency of the weather. Others think the ponderoſity of this earth prevents the wool growing too thick and long in the ſtaple. But the more eligible opinion is, that the earth abſorbs the ſuperabundant perſpiration, which would otherwiſe render the wool both harſh and coarſe.

Toward the end of the ſame month the flocks recommence their march. Deſcending from the mountains, they travel towards the warmer parts of the country, and again repair to the plains of Leon, Eſtramadura, and Andaluſia. The ſheep are generally conducted to the ſame paſtures they had grazed the preceding year, and where moſt of them had been yeaned: there they are kept during the winter.

Sheep-ſhearing commences the beginning of May, and it is performed while the ſheep are on their ſummer journey, in large buildings called *Eſquileos*. Theſe, which are placed upon the road, are capable of containing forty, fifty, and ſome ſixty thouſand ſheep. They are erected in various places; but the principal are in the environs of Segovia, and the moſt celebrated is that of *Iturviaca*. The ſhearing is preceded by a pompous preparation, conducted in due form, and the interval is conſidered a time of feaſting and recreation. One hundred and twenty-five men are uſually employed for ſhearing a thouſand ewes, and two hundred for a thouſand wethers. Each ſheep affords four kinds of wool, more or leſs fine according to the parts of the animal whence it is taken. The ewes produce the fineſt fleeces, and the wethers the heavieſt: three wether fleeces ordinarily weigh on the average twenty-five pounds; but it will take five ewe fleeces to amount to the ſame weight.

The journey which the flocks make in their peregrinations is regulated by particular laws, and immemorial cuſtoms. The ſheep paſs unmoleſted over the paſtures, belonging to the villages, and the commons which lie in their road, and have a right to feed on them. They are not, however, allowed to paſs over cultivated lands; but the proprietors of ſuch lands are obliged to leave for them a path ninety *varas*, or about forty toiſes (eighty-four yards) in breadth. When they traverſe the commonable paſtures, they ſeldom travel more than two leagues, or five and a half miles a day; but when they walk in cloſe order over the cultivated fields, often more than ſix, or near ſeventeen miles. The whole of their journey is uſually an extent of one hundred and twenty, thirty, or forty leagues, which they perform in thirty or thirty-five days.

The price paid for depaſturing the lands, where they winter, is equally regulated by uſage, and is very low; but it is not in the power of the landed proprietors to make the ſmalleſt advance. The Meſta has its peculiar laws, which were originally made by the parties intereſted, the proprietors of flocks, and received the ſanction of ſeveral ſovereigns of Spain, among whom was Charles I., who approved and confirmed them in the year 1544. A particular tribunal alſo exiſts, under the title of "honrado conſejo de la Meſta," or *the honourable council of the Meſta*. This court, in which one of the council at Caſtile preſides, is compoſed of four judges, denominated "Alcaldes mayores entregadores," each having a fiſcal or exchequer, and an eſcheator or *Alguaſil mayor*. The cognizance of this court ſuperintends the preſervation of the privileges belonging to the Meſta. The judges levy upon the ſhepherds and their flocks pontage, parcage, and other tolls; they ſettle the diſputes and quarrels among the ſhepherds; direct the route the flocks ought to take in their journies to and from the mountains; regulate what occurs on their paſſage; ſettle what reſpects their paſturage; in a word, they adjuſt every concern in which the Meſta can be ſuppoſed intereſted in the ſlighteſt degree. The proprietors of flocks, and even the ſhepherds, poſſeſs, to a certain extent, a power of *committimus*, or commitment, which they very frequently abuſe. They have the improper privilege of citing all kinds of perſons, of whatever age or condition, before the Meſta, under a ſuppoſition, or pretence, that their altercations, or buſineſs, have ſome connection, however diſtant, with the juriſdiction of its court.

The public opinion throughout Spain is decidedly oppoſed to the Meſta, againſt the vexatious circumſtances to which it continually gives riſe, and the conſtant obſtacles it throws in the way of agricultural improvements. In fact, the grievances ariſing from its effects are numerous and ſevere.

1. The number of perſons it employs is very great, forty or fifty thouſand; which are ſo many ſubjects loſt to the ſtate, as to the purpoſes of agriculture and population; and this takes place principally in thoſe provinces where the ſtrength requiſite for the cultivation of the ſoil is moſt deficient.

2. An immenſe extent of highly valuable land is converted into paſturage; and produces comparatively nothing. The conſequence is, that the inhabitants of ſuch places find no employ, nor means of providing for their wants: they are refuſed the neceſſary articles for the ſupport of life, becauſe the lands on which they might be grown do not produce them.

3. The cultivated lands, which lie near the route the flocks take in their journies to and from the mountains, are ſubject to continual treſpaſs, which is committed with impunity; for in vain do the owners of thoſe lands appeal againſt ſuch abuſes and ſolicit indemnity. The damages ſuſtained on theſe occaſions is ſo much greater, owing to the ſeaſons of the year in which the journeyings of the flocks are made. The firſt is when the corn is generally far advanced in its growth; and the ſecond when the vines are loaded with grapes.

4. The commonable paſtures alſo, which are in the line of the route, are equally devaſtated; ſo that the flocks belonging to places in the vicinity can ſcarcely find a bare ſubſiſtence.

5. The flocks which compoſe the Meſta are unprofitable for agricultural purpoſes; for never being folded upon the arable lands, they conſequently contribute nothing towards their fertilization.

6. The directors and ſhepherds are dreaded in every place through which they paſs; for they exerciſe a moſt inſufferable

able despotism, the consequence of the improper privilege they possess of bringing whomsoever they may chuse to insult before the tribunal of the Mesta; whose decisions are almost invariably in favour of its servants.

These grievances have for time immemorial excited the most forcible protestations against them; the general states of the realm have incessantly requested the suppression of the Mesta, and the complaints and addresses of the people have been repeatedly presented at the foot of the throne. For a long series of years all appeals upon the subject were in vain. They at length, however, became so loud and pressing, towards the middle of the eighteenth century, that the government found itself obliged to pay some attention to the subject. A committee was formed to make the requisite inquiry, Whether it were more eligible for public utility to continue, or suppress the Mesta? and, provided the committee should determine on the former measure, what modifications might be proper to adopt for its better regulation. The persons interested were very powerful, and they made sure of evading this wise disposition for remedying the evils of the Mesta. The committee, though permanently established, have done nothing these thirty or forty years. Affairs remain in just the same state, and, as it too frequently happens, the interest of a few individuals still obtains the advantage over the public good. Laborde's View of Spain, vol. iv.

MESTERO, in *Geography*, a cape on the N. coast of Egypt; 10 miles N.E. of Rosetta. N. lat. 31° 25′. E. long. 30° 54′.

MESTI, a town of Austrian Poland, in Galicia; 6 miles E.S.E. of Belcz.

MESTRA, a town in the Trevisan; 8 miles N.W. of Venice.

MESTRE BAY, *Little*, a bay on the N.E. part of Newfoundland island, S. of St. Julian, and N. by W. of the islands Gros and Belle.

MESTREZAT, JOHN, in *Biography*, a celebrated French Protestant minister, was born at Geneva in the year 1592. When he was yet very young he was sent to the academy at Saumur, where he afforded such evidence of his abilities and proficiency, that he was offered a professorship of philosophy when he was only eighteen years of age. He became an eloquent and highly distinguished preacher, and there are said to be no sermons that contain more sublime theology than those which he preached upon the epistle to the Hebrews. He conducted the controversy concerning the authority of the church with forcible reasoning, and completely refuted all the subtilties of father Regourd and cardinal Perron on this subject. He died in 1657, leaving behind him a number of theological works that do honour to his memory: of these the chief are, "A Treatise on the Holy Scriptures, in which is shewn the Certainty and Fulness of Faith, and its Independence on the Authority of the Church;" and "An Exposition on the Epistle to the Hebrews, in a Course of Sermons," making five volumes 8vo. Bayle.

MESTURA, in *Geography*, a town of Africa, in the kingdom of Tunis.

MESUA, in *Botany*, a Linnæan genus, in honour of *Mesue*, the father and son, two celebrated Arabian physicians and botanists, who resided at Damascus, and who flourished in the eighth and ninth centuries. The works of the younger *Mesue*, medical and botanical, were published in folio, with annotations, at Venice, in 1581.—Linn. Gen. 268. Schreb. 471. Willd. Sp. Pl. v. 3. 843. Mart. Mill. Dict. v. 3. Juss. Gen. 258. Lamarck Dict. v. 4. 416.—Class and order, *Monadelphia Polyandria*. Nat. Ord. *Guttiferæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of four, ovate, concave, obtuse, permanent leaves, the two outward, opposite ones smaller. *Cor.* Petals four, abrupt, undulated. *Stam.* Filaments numerous, capillary, the length of the corolla, united at the base into a sort of cup; anthers ovate. *Pist.* Germen superior, roundish; style cylindrical; stigma thickish, concave. *Peric.* Nut roundish, pointed, marked with four, longitudinal, elevated sutures. *Seed* solitary, roundish.

Eff. Ch. Calyx simple, of four leaves. Corolla of four petals. Nut slightly four-sided, single-seeded.

1. M. *ferrea.* Linn. Sp. Pl. 734. Fl. Zeylan. 91. (Naghas; Herm. Zeylan. 7. Nagassarium; Rumph. Amboin. v. 7. 3. t. 2. Bellutta Tsiampakam, sive Castanea rosea indica; Rheed. Malab. v. 3. 63. t. 53.)—A native of the East Indies, and much cultivated, according to Rheede, in Malabar, for the beauty of its flowers, which expand there in July and August. It bears fruit in six years from the nut, and continues to bear during three centuries. The same author subjoins a long account of its medical virtues, and Rumphius says, it is planted in Amboyna, about houses, for the shade it affords, and for the odour of its flowers, which also, when dry, are mixed with other aromatics, such as the white sandal-wood, and used for perfuming ointments.

This *tree* grows to a large size, having a variegated, thick, hard, smooth, much-branched trunk, like that of a lime-tree. *Bark* smooth, brown, aromatic, of a sharp and bitter taste. *Root* fibrous, red, covered with a smooth, yellow bark, bitter, but sweet-smelling. *Leaves* opposite, on short stalks, smooth, thickish; of a shining green on the upper side; glaucous-blue underneath, like the bloom of grapes. *Flowers* in size and shape like those of the Sweet-briar or Eglantine, but with only four white petals. Their smell partakes both of the rose and violet. *Fruit* smooth and greenish, but reddish and wrinkled when ripe, with a rind like that of the chesnut, and three or four kernels within, the shape, size, substance, and taste of chesnuts.—The specific name is taken from the close texture and hardness of the wood.

MESUA, in *Gardening*, comprises a plant of the exotic shrubby kind, for the hot-house of which the species cultivated is the ferreous Indian mesua (M. ferrea.)

Method of Culture.—This plant may be increased by seeds, layers, and cuttings. The seeds should be sown in the spring, in pots of light earth, plunging them in a bark hot-bed in the stove. When the plants have attained some growth, they should be planted in separate pots and be re-plunged in the bark-bed, where they must be kept.

The layers should be made from the young branches, and should be laid down in the autumn or early spring, being taken off when well rooted, and planted in separate pots, having the same management as the others.

The cuttings should be taken from the young branches, and be planted in the summer in pots of light mould, and plunged in the bark-bed. When they have stricken root, they should be removed into separate pots, and be managed as the others.

Plants of this kind afford variety among other stove plants.

MESUA, in *Geography*, a town of Arabia, in the province of Yemen; 40 miles N. of Chamir.

MESUE, in *Biography*, one of the early physicians among the Arabians, was born at Nisabour, in the province of Khorasan, and flourished in the ninth century. He is said to have died in 846, or, according to other accounts, in 865. His father was an apothecary at Nisabour. Mesue was educated in the profession of physic by Gabriel, the son

son of George Backtishua, and through his favour was appointed physician to the hospital of his native city. Although a Christian of the Nestorian sect, he was in great favour with several successive caliphs, being reputed the ablest scholar and physician of his age. When the caliph Haroun al Raschid appointed his son, Almammon, to the viceroyalty of the province of Khorasan, Mesue was nominated his body physician, and was placed by him at the head of a college of learned men, which he instituted there. On his accession to the throne of the caliphs, in the year 813, Almammon brought Mesue to Bagdad, and made him a professor of medicine there, as well as superintendant of the great hospital, which situations he occupied a great number of years. He was also employed, under the auspices of the same caliph, in transferring the science of the Greeks to his own country, by translating their works. Freind is of opinion that Mesue wrote in the Syriac tongue, which prevailed in his native province, long before and after his time; for not only he, but the Backtishuas, are reckoned Syrians by Abulpharagius and Abi Osbaia, though born at Nisabour. He was the author of some works, which are cited by Rhazes and other writers, which appear to have perished: for the works, which are now extant in his name, do not correspond with these citations, nor with the character of them given by Haly Abbas; not to mention, that in these works the writings of Rhazes are quoted, who lived long after his time. Abi Osbaia enumerates thirty-seven books written by Mesue, among which is one upon purging, and another respecting decoctions. Freind's Hist. of Physic, vol. ii.

Mesue, *the Younger*. A writer of this name, or *Mesuach*, who was later than Rhazes, and a Christian of the sect of Jacobites, is mentioned by Leo Africanus. He studied medicine and philosophy at Bagdad, and practised at Cairo, where he died in the year 1015, at the age of 90. He wrote some treatises on potable liquors, and on the composition of medicines: and perhaps to him may be attributed the work entitled, "Joannis Mesue Damasceni de Re Medica, lib. iii." edited by Jac. Sylvius, Paris, 1549, folio, and often reprinted. Eloy Dict. Hist. de la Med. Gen. Biog.

MESURACA, in *Geography*, a town of Naples, in Calabria Citra; 8 miles S.W. of St. Severina.

MESURADA, a sea-port town of Africa, in the country of Tripoli, and residence of a governor: a considerable commerce is carried on at this place by means of the caravans that pass into the interior parts of Africa. This is the chief place of a district anciently called "Cyrenaica" and "Pentapolis," from its five cities; 100 miles E.S.E. of Tripoli. N. lat. 32° 10′. E. long. 15° 10′.

MESURADO, a river of Africa, which runs from the mountains that separate Negroland from Guinea, into the Atlantic, N. lat. 6° 25′. W. long. 10° 35′.

MESURE, Fr.; *Misura*, Ital.; measure, in *Music*. In poetry measure is expressed by *metre*; in music, by *time*. See Measure, Metre, and Time.

MESVRES, in *Geography*, a town of France, in the department of the Sâone and Loire, and chief place of a canton, in the district of Autun; 5 miles S. of Autun. The place contains 608, and the canton 6277 inhabitants, on a territory of 302½ kiliometres, in 12 communes.

MESYMNIUM, a name which the ancients gave to a part of their tragedy, or to certain verses in their tragedies.

The mesymnium was a kind of burden, as *Io Pæan; O Dithyrambe; Hymen, O Hymenæe;* or the like; which, when placed at the end of a strophe, was called *ephymnium;* and when inserted in the middle of a strophe, *mesymnium*. See Strophe, and Chorus.

MET, in *Rural Economy*, a term applied to a measure which contains a strike, or four pecks.

META, in *Geography*, a river of South America, which, after receiving several tributary streams, runs into the Oronoko; 30 leagues below the cataracts of Aturas, and 125 leagues from St. Thomas of Guiana. This river, says Depons, seems destined by nature to form vast commercial relations between the whole eastern part of the kingdom of Santa Fé and Spanish Guiana.

METAC, a town of Upper Siam; 130 miles N.W. of Porselouc.

METACAL, an Egyptian weight, used in the weighing of pearls, and consisting either of a carat and a half, or of two carats. Sixteen of these carats make a drachm, each of the carats weighing four grains, and twelve drachms an ounce.

METACARPIUS, in *Anatomy*, the name given by Winslow to the adductor ossis metacarpi digiti minimi; which see.

METACARPUS, one of the divisions of the bones of the hand, placed between the wrist and the fingers. See Extremities.

Metacarpus, *Fracture of*, in *Surgery*. See Fracture.

METACHORESIS, a word used by Galen, to express a recess of a morbid humour from one part of the body to another, a thing very common in many distempers.

METACHRONISM, formed of μετα and χρονος, *time*, in *Chronology*, an error in computation of time, either on the side of defect or excess.

METACINEMA, from μετα, and κινεω, *to remove*, in *Surgery*, a removal of the pupil of the eye from its natural situation.

METACISM, Metacismus, in *Grammar*, a defect in the pronunciation of the letter M.

Isidore represents the metacism as a final *m*, followed by a vowel, as *bonum aurum*, *Bethlehem erat*, &c.

METACOE, in *Botany*, a name given by the people of Guinea to a plant, of which they are very fond, because of its virtues as a balsamic and vulnerary. Its leaves, being bruised and applied to a fresh wound, cure it. They have also another use for it, twisting the dried leaves into a sort of match for their muskets. Phil. Trans. N° 232.

METACONDYLI is used by some authors for the outmost bones, or joints of the fingers, next the nails.

METADELO, plur. *Metadeli*, in *Commerce*, a corn and liquid measure at Florence. For corn, the moggio contains 24 stoja; and the stoja 16 metadeli; and the moggio contains about 16 English bushels. Oil is sold by the barile of 32 boccali or metadeli, the whole weighing 88lbs. of Florence, or about 66lbs. avoirdupois.

METAGITNION, μεταγειτνιων, in *Chronology*, the second month of the Athenian year. It contained twenty-nine days, and answered to the latter part of our July and beginning of August. The Bœotians called it *Panemus*, and the people of Syracuse, *Carnius*.

It is so called from *Metagitnia*, one of Apollo's festivals kept in it.

METAGONITÆ, in *Ancient Geography*, a people of Africa, who inhabited the environs of the promontory of Metagonium, on the west of Mauritania Tingitana.

METAKOONA, in *Geography*, a town of Hindoostan, in the province of Cattack; 60 miles S. of Cattack.

METALS, in *Chemistry*, a class of simple bodies possessing peculiar properties. The ancients, who valued these bodies

bodies most for their physical properties, did not bestow the exclusive name of metal on any body which was not malleable. Other bodies, which possessed similar characters, without being malleable, were called semi-metals. The peculiar brilliancy belonging to the metals is perhaps their most generally distinguishing character. The lustre exhibited by mica has some resemblance to the lustre of metals, but it is very inferior in degree, and is merely confined to the surface. The great specific gravity of most metals has been thought a sufficiently distinguishing character. This property, to a certain extent, was very striking. Till the late discoveries of Mr. (sir H.) Davy, the lightest of the known metals was of greater specific gravity than the densest body which was not a metal. The bases of potash and soda, however, have all the characters of metals, with the exception of being defective in the property just alluded to, since potassium and sodium are of less specific gravity than water. From these facts, therefore, we are no longer allowed to say that all metals are of greater specific gravity than other bodies.

In the present state of our knowledge there appear to be two classes of elementary matter, namely, oxygen, which constitutes one class, and oxydable bodies, or such bodies as combine with oxygen. Of the latter class, out of 45 varieties, there appear to be only five which are not metallic. The metals, therefore, comprise by far the greatest part of the elementary bodies.

Dr. Thomson has divided the metals into four classes: 1. Malleable. 2. Brittle and easily fused. 3. Brittle, and difficultly fused. 4. Refractory.

I. Malleable.

1. Gold.	8. Mercury.
2. Platinum.	9. Copper.
3. Silver.	10. Iron.
4. Palladium	11. Lead.
5. Rhodium.	12. Tin.
6. Iridium.	13. Nickel.
7. Osmium.	14. Zinc.

II. Brittle, and easily fusible.

1. Bismuth.	3. Tellurium.
2. Antimony.	4. Arsenic.

III. Brittle, and difficultly fusible.

1. Cobalt.	4. Molybdenum.
2. Manganese.	5. Uranium.
3. Chronium.	6. Tungsten.

IV. Refractory.

1. Titanium.	3. Cerium.
2. Columbium.	

Besides the metals arranged in this table, there are a number of others lately discovered by Mr. Davy, which are the bases of some of the earths, and the two fixed alkalies. If the whole of the earths, as well as the two fixed alkalies, have metallic bases, the number of metals to be added to the above will be 13. Those from potash, soda, barytes, strontian, zinc, and magnesia, have already been obtained, and have been named by Mr. Davy, potassium, sodium, barium, strontium, calcium, and magnesium. The four first of these appear to be malleable metals; the others are not sufficiently known.

Those metals which are not liable to be oxydated by exposure to the air, such as gold, platina, silver, &c. have been called noble; while those which become tarnished and corroded, were termed base metals. These distinctions have now become obsolete.

The metals have always, and must continue to be of the utmost importance in chemistry, in the arts and manufactures, and in domestic economy. Their malleability and hardness render them highly fitted for making various vessels and utensils, and their lustre and colour are agreeable to the eye. The properties of hardness and tenacity united, such as belong to iron and steel, are of great utility in various kinds of edge-tools, and the elasticity which is constituted by certain degrees of these two properties, could scarcely be furnished by any other substance than steel; hence its great usefulness for making springs.

The ductility of some metals is so great, as to admit of its being drawn into wires much finer than a hair. Gold, although the most laminable of all the metals, or which may be made into the thinnest leaves, does not admit of being drawn into the smallest wire, owing to its want of hardness. Iron, in consequence of possessing greater hardness, with a considerable portion of that property by which the particles of bodies attract each other in all situations equally, is capable of being drawn into finer wire than gold. Indeed pure gold is less ductile than when it contains a certain portion of copper. In treating of some of the physical properties of metals, such as malleability, ductility, hardness, and tenacity, much uncertainty has prevailed, from the want of some of these terms having definite meanings.

That property of a metallic bar or wire, by which it resists the action of a weight in the direction of its length, has been called tenacity, and this is always the measure of its strength. This power in metals, however, is evidently dependent upon two properties, one of which is its hardness, and the other a property for which philosophers have no precise word; perhaps the word flexibility may come the nearest. We mean, however, that property by which its particles can be changed into any situation, without separation. In the drawing of a piece of wire, some of those particles which constitute its thickness, before it passes through the hole of the wire-plate, are, by the process of drawing, brought into the direction of its length. This property in the greatest degree enables a piece of wire, or a thin slip of metal, to be bent backwards and forwards without breaking. A single experiment will satisfy any one of the propriety of these remarks. Take a piece of copper or iron wire, previously well annealed, and it will be found exceedingly flexible, and may be twisted or bent considerably, without breaking. If a weight be hung to it, with a view to break it, it will stretch considerably before it breaks. If a piece of the same wire be drawn through one or two holes, it will be found much stiffer and harder, and of course smaller: it will also be less capable of being bent or twisted without breaking. If, however, a trial be made of its strength, it will require a much greater weight to break it than in the annealed state; although its diameter is diminished. If the hardness be still increased by these means, a maximum of strength would be found under some joint proportion of the hardness, and the property of bending or twisting, which we may for the present call flexibility. It is on this latter property, with a certain degree of hardness, that the malleability and ductility of metals depend. It requires rather less hardness to make a metal to the best advantage into sheets, than to draw it into wire. This evil, however, of the wire breaking from being soft, may be remedied by making less difference in the size of the holes in the wire-plate. By this means the greatest ductility and malleability may exist under the same degrees of hardness and flexibility.

Metals, with regard to their hardneſs and flexibility, are very different under different circumſtances. Some metals, however, are more ſuſceptible of this change than others. Steel may be ſo ſoft and flexible as to bear much twiſting, and be eaſily penetrable by the file, which happens when it is newly annealed; while, if it is heated red-hot, and cooled rapidly, it becomes extremely brittle, and is ſufficiently hard to cut glaſs. Lead, on the contrary, under all circumſtances, has the ſame degree of ſtiffneſs and hardneſs. The ſame is pretty nearly the caſe with tin.

Some hints were given under the article LIQUIDITY, which may throw ſome light on this myſterious property of metals. It is there conjectured, that the particles of bodies may be capable of aſſuming two ſtates, one in which the particles attract each other equally in all directions. Hence whatever motion may take place among them, the ſame attraction ſtill exiſts. It is in this ſtate that bodies can be changed in their figure, without deſtroying their aggregation.

On the other hand, it is ſuppoſed that the particles of bodies, under certain circumſtances, may poſſeſs polarity; and that the ſtrongeſt attraction, and, conſequently, their greateſt hardneſs, may exiſt, when the particles are ſo arranged that oppoſite poles are preſented to each other. Any thing, therefore, which facilitates this change to polarity, will increaſe the hardneſs of a body. The cryſtalline form, which is common to ſome metals, ſtrongly favours this idea; ſince metals are always harder in this ſtate, than when their *fibrous form*, as it is called, is brought about. Metals ſeem to acquire the greateſt hardneſs by cooling rapidly, through a great range of temperature. It is in this change, therefore, that the particles acquire the greateſt polarity, and by which the body becomes the moſt brittle and elaſtic. Indeed it is on the principle of polarity only, that we are enabled to explain the elaſticity of bodies. Heat appears to be the moſt efficacious in deſtroying the polar property. The body would, however, regain it by rapid cooling; but by ſlow cooling, it is rendered ſoft to the greateſt degree of which it is capable, and in the ſame proportion malleable and inelaſtic.

The hardneſs of metals, when they have been annealed, may be conſiderably increaſed by hammering, rolling, or wire-drawing. This change appears to be brought about merely by condenſation. The ſmall degree of polarity left in the particles will exhibit itſelf in the elaſticity, when the particles are brought nearer together. It will be equally evident that the particles will be attracted with more force, and that the hardneſs will be increaſed. The hammering does not appear to increaſe the hardneſs of a body which has aſſumed the cryſtalline form, under which the greateſt polar power is ſuppoſed to exiſt, but rather to diminiſh it. If a piece of ſteel plate, which has been hardened and tempered, be hammered carefully, the elaſticity and hardneſs become leſs. Upon heating it, however, till it becomes blue, the elaſticity returns. The hammering, in this inſtance, deranges the poles of the particles, which the ſlight heat reſtores to their proper poſitions.

From what has been obſerved it will be eaſy to infer, that no metal can be malleable under its cryſtalline or polar form. Several of the metals are ſcarcely ſuſceptible of this form: among theſe we may enumerate gold, ſilver, and lead, and, in all probability, mercury. Others are deprived of it, and become malleable by hammering or rolling at a certain temperature. Of theſe are copper, braſs, iron, ſteel, tin, and zinc. There are other metals, indeed the greateſt part of them, which are not capable of any other than the cryſtalline form, and hence are not malleable. Of theſe we may mention antimony, biſmuth, arſenic, cobalt, and manganeſe. What ſtrengthens the idea that the cryſtalline form is the cauſe of the want of ſoftneſs and malleability, is the circumſtance of copper and tin being ſeparately very ſoft and malleable; though an alloy of theſe two metals is as hard as ſteel, and does not poſſeſs the leaſt malleability. Caſt ſteel and bliſtered ſteel are in the cryſtalline form, till they have been hammered at a certain temperature. In the firſt ſtate they are hard and brittle; in the latter, they are flexible, and are increaſed in tenacity.

Braſs wire appears to undergo ſome change in its arrangement, by hanging up in a damp room, or in ſituations where the fumes of acids prevail. It becomes ſo brittle as not to admit of bending to a right angle. This appears to ariſe from an increaſe in its polar form, for heating it red-hot partly reſtores its malleability.

The fuſibility of metals is a very valuable property, ſince it not only admits of their being caſt into almoſt any form, but the refuſe can be made into its original form, which allows of great economy.

Some metals are better fitted for caſting than others. It is obſerved, that all thoſe metals of which we have ſpoken as being ſuſceptible of the cryſtalline form, are the beſt calculated to take fine impreſſions. At that point in which the metal paſſes from the liquid to the ſolid form, a ſudden expanſion takes place, by which the volume is increaſed, and, in conſequence, preſſes more ſtrongly againſt the ſides of the mould. This is particularly the caſe with braſs, caſt iron, and copper with tin. In forming alloys the moſt fitted for caſting, a ſimple method offers itſelf. Let the ſpecific gravity of the ſolid be as much as poſſible leſs than the liquid. In ſuch bodies it will be found that the ſolid metals will float upon the liquid.

The property which metals poſſeſs of reflecting light, is highly important in the arts, ſciences, and in common life. The ſurfaces of many of the metals, when they are ſmooth and poliſhed, reflect almoſt all the light which falls upon them. White metals reflect more light than thoſe which are coloured. The hardeſt metals are beſt fitted for reflectors, becauſe they aſſume the fineſt poliſh. It has been thought that this property depended upon the denſity of theſe ſubſtances. This idea, however, ſeems incorrect, ſince ſodium and potaſſium, which are leſs denſe than water, appear to poſſeſs the power of reflecting light equal to many other metals. It is the great quantity of light which they reflect to which they owe their luſtre. The great facility with which metallic bodies conduct heat is of incalculable utility in the arts, and in the economy of human life. The boiling of moſt fluids would be almoſt impracticable in any other veſſels than thoſe of metal.

This property has been applied to great advantage in the proceſs of drying various articles. Large tubes of metal, being filled with ſteam, are kept conſtantly at nearly 212°. The goods to be dried are wrapped round the outſide of the tube.

The metal gives its heat with ſuch facility, as to dry the ſubſtances upon it in a very little time.

Metals are the beſt conductors of electricity, and hence are highly uſeful in electrical ſcience, as well as in preſerving the leſſer conducting ſubſtances from the effects of lightning.

The greater number of the metals are acted upon by the air, eſpecially when aided by heat. Metals were thought by the ancients to be compounds of an earth combined with phlogiſton. When theſe bodies were acted upon by the air, they ſuppoſed that the phlogiſton was ſeparated, leaving behind a calx, or earth. The ancients did not weigh their products, or elſe they would have found, that although this imaginary ſubſtance phlogiſton had eſcaped, yet the reſiduum was heavier than the original metal. By the greater accuracy

racy

Strahan and Preſton,
New-Street Square, London.

racy of modern experimenters, it has been found that the metal is the ſimple body, and that, by combining with the oxygen of the atmoſphere, the metal is converted into a ſubſtance of an earthy appearance, which, in modern chemiſtry, is called an oxyd of the metal.

The bodies formed by the combination of metals with oxygen, exhibit, as well as the metal, an ample field of utility to man. Theſe bodies, in various forms, are valuable auxiliaries in the healing art. Some of them conſtitute rich pigments of the utmoſt importance to the arts. Others are not leſs valuable to the dyer and the bleacher. Several metallic oxyds are uſed to great advantage for poliſhing marble, glaſs, and metals.

Metals *for Specula*. See Speculum.

Metals, *Colours from*. As metals have a ſtrong texture in their metalline form, ſo they preſerve their natural colours durable, unleſs corroded or diſſolved by particular menſtruums, after which their ſolutions ſtrike particular durable colours, or afford the ſtrongeſt ſtains.

Iron diſſolved in ſtale ſmall beer gives the beautiful yellow and different ſhades of buff colour, uſed in printing linens and cottons, &c. When ſublimed with ſal ammoniac it alſo affords a yellow; and the common iron-moulds made by ink are owing to the iron diſſolved in the copperas of which ink is made.

Copper melted with zinc appears of a gold colour; diſſolved in aquafortis, it affords a beautiful green; and in any alkali a beautiful blue. And theſe ſolutions may be reduced to dry colours by cryſtallization or evaporation; and the ſame metal, precipitated out of aquafortis with common ſalts, gives the turquoiſe colour to white glaſs. Tin, a white or colourleſs metal, affords a light blue colour, when fluxed with antimony and nitre. The ſame metal is neceſſary in ſtriking the ſcarlet dye with aquafortis and cochineal; and its calx, by ſtrong infuſion, turns to a glaſs of an opal colour.

Lead, corroded by the fumes of vinegar, gives the fine white ceruſs; burnt in a ſtrong naked fire, it becomes the ſtrong red-lead, or minium; and melted into a glaſs with ſand, is of the hyacinth colour. Shaw's Lectures, p. 171.

Silver being diſſolved in aquafortis, if chalk be put to the ſolution, turns of a beautiful purple or amethyſt colour; and its own ſolution, though pale as water, durably ſtains the nails, ſkin, or hair, brown or black.

Quickſilver, mixed with brimſtone, makes a black maſs, and this, by ſublimation, affords the beautiful red pigment called cinnabar, or vermilion; and the ſolution of quickſilver being precipitated with common ſalt, yields a ſnow-white powder, which alſo turns black by being mixed with ſulphur.

Gold, diſſolved in aqua regia, affords a fine yellow liquor, which ſtains animal ſubſtances beautifully purple; and if the ſolution be ſufficiently weakened with water, and mixed with a ſolution of tin, a fine red or purple powder may be procured, very uſeful for ſtaining of glaſs and paſtes to a beautiful red.

It appears, from the experiments of ſir Iſaac Newton, relating to the changes of colour that take place in pellucid colourleſs ſubſtances, that the leſs refrangible colours are exhibited by the greater thickneſs of air, water, and glaſs; and that as the thickneſs of thoſe ſubſtances is diminiſhed, they reflect the more refrangible colours. Hence he infers, that nothing more is requiſite for producing all the colours of natural bodies, than the ſeveral ſizes and denſities of their particles. Accordingly he attributes the colours of permanently coloured bodies to the ſame cauſe by which they were produced in colourleſs ſubſtances, *viz.* to the various thickneſſes of their component particles. But no experiments were made on permanently coloured bodies, in order to eſtabliſh the truth of ſir Iſaac Newton's opinion, till the ingenious Mr. Delaval directed his attention to this ſubject. From obſerving the circumſtances above recited, and more largely illuſtrated under the article Colours, it appeared to him, that, if permanently coloured bodies are ſubject to the ſame laws as tranſparent colourleſs ſubſtances are, all ſuch permanently coloured bodies, whenever the ſize of their particles is diminiſhed, ſhould undergo a change of colour, by aſcending from the leſs refrangible to the more refrangible colours; and that ſuch bodies, when the ſize of their particles is augmented, ſhould undergo a contrary change, their colour in this caſe deſcending from the more refrangible to the leſs refrangible colours. In order to confirm this concluſion, he made a great variety of experiments with vegetable, animal, and mineral ſubjects, whereby the ſize of their particles, upon which their colours depend, might be diminiſhed or increaſed. The methods which he uſed, in order to diminiſh the ſize of the particles of thoſe bodies which were the ſubject of inquiry, were by diſſolving, attenuating, &c. by means of chemical ſolvents, heat, putrefaction, dilution, &c. The contrary effects were brought about by ſuch means as are known to condenſe, incraſſate, or unite the particles of bodies into larger maſſes, as by coagulation, precipitation, evaporation, by diminiſhing the force of the ſolvents, &c. The metals afforded him numerous inſtances in confirmation of the doctrine above explained; for almoſt every operation, to which they are ſubject, exhibits a change of colour correſponding to this doctrine. This is particularly the caſe with regard to the imperfect metals; for every change of their texture is accompanied by a correſpondent change of colour. We can only enumerate ſome of the principal reſults which Mr. Delaval obtained from a great number of well-conducted experiments. Thus, the green vitriol of iron is changed, in proportion as it is deprived of its ſolvent part, by expoſing it to a ſtrong heat, &c. to yellow, orange, red, and purple; and by a contrary proceſs, *viz.* by a farther attenuation, by means of the phlogiſticated lixivium, in the proceſs of Pruſſian blue, &c. the colour of the iron aſcends from green to blue; ſo that all the primary colours are produced from the ſame metal, in proportion as its particles are attenuated or incraſſated. It appears, likewiſe, that when iron is divided into very ſmall parts by means of a large quantity of glaſs, and by a violent heat, its colour is blue; but in proportion as it is leſs divided, by the mixture of a ſmaller quantity of glaſs, or the application of leſs heat, its colours are green, yellow, and red. From iron diſſolved in its ſeveral menſtrua, colours are produced in proportion as the ſolvent power of thoſe menſtrua is greater or leſs. Thus, iron diſſolved in its ſtrongeſt acid ſolvent, the vitriolic acid, gives green; in its weaker acid ſolvents, the marine and nitrous acids, yellow and orange; and in its weakeſt acid ſolvents, the vegetable acids, red. The colours of the calces of iron precipitated from its ſolution in the vitriolic and nitrous acid, deſcend from green to yellow, and from yellow to red; whereas the changes of colour ariſing from the ſolution of theſe calces, proceed in a contrary order, and aſcend. Mineral ſubſtances are alſo frequently impregnated with iron, and their colours correſpond with the ſtate of the iron contained in them.

In the ſame manner the colours of the ſolution of mercury in the nitrous acid vary, in proportion as the ſolvent is extricated from it, from yellow to orange, and then to red. Thus alſo, thoſe ſubſtances which have the greateſt affinity with the acid of the corroſive ſublimate produced by

Strahan and Preſton,

by the solution of mercury in the marine acid, disengage from its solution a red precipitate; and those, whose affinity with it is less, produce a yellow one. But these colours are liable to some variation, according to the greater or less quantity of acid in the solution. Mercury dissolved in the vitriolic and in the vegetable acids, exhibits, in proportion as its solvent is taken from it, the same colours which, under similar circumstances, are afforded by that metal dissolved in the other acids. All these mercurial preparations become red, when they are deprived of the principal part of their menstruum; and mercury calcined by heat, without the addition of any acid, acquires the same colour. Its colour, however, is subject to variation, from the action of its solvents; and thus the phosphoric acid changes the red to yellow and white. The same law obtains in the changes of colour to which the mineral manganese is subject; for Mr. Delaval found, that by means of the different degrees of power in the several solvents, these colours were produced in their regular prismatic order, *viz.* yellow, green, blue, purple, and red. The various phenomena of the sympathetic ink of M. Hellot conform to the same law, and are urged by Mr. Delaval as arguments to establish it. Heat and cold, he observes, are not necessary agents in the production or suppression of the colour. But it appears, that the alterations are effected by the moisture of the air, attracted by the saline matter when cold, and expelled from it when heated. When this ink is exposed to a moderate heat, in a white China cup, and when the greater part of the water is evaporated, the saline matter becomes green. This colour arises from a superfluous quantity of the marine acid, which soon flies off, and leaves the remaining part blue, slightly inclining to green. It also forms a hard dry mass, which, in a few minutes after its removal from the fire, grows moist, and assumes a light red colour. These alterations may be often renewed, by alternately heating and cooling the coloured matter; which does not again become green, after the superfluous marine acid is once evaporated. But a drop of spirit of salt, added to the red or blue mass, immediately renders it green. When preparations of cobalt are acted upon merely by heat, the order of the changes of colour effected in them, is such as, in other instances, constantly arises from that means of attenuation. Thus, when the yellow solution of this mineral, in the marine acid, is heated, it assumes a green colour, passing from a less to a more refrangible colour. When this solution is cooled, the yellow is restored.

Mr. Delaval observes, that as the inflammable matter, in the entire metals, acts strongly on the rays of light, it is necessary to calcine or to divide them into extremely minute particles, in order to examine separately the action of the calx, or fixed matter, on the rays of light. In order, therefore, to examine all the metals in the like circumstances, by reducing them into the smallest particles, and depriving them of their phlogiston as much as possible, he exposed each of them, united with a proper quantity of the purest glass, without any additional ingredient, to the greatest degree of fire which they are capable of bearing, without having all colour whatever destroyed. In this state it appears, from a variety of experiments and facts, that they actually do, without any exception, exhibit colour in the order of their densities as follow: gold, red; lead, orange; silver, yellow; copper, green; and iron, blue. He has also shewn that the other preparations of the metals, *viz.* their solutions, precipitates, crystals, &c. do for the most part exhibit the same colour, in the order of their densities, though not so invariably as their glasses; some small variation of colour happening in the more imperfect metals, probably from a change of density in their different preparations. Thus, gold acquires a red colour, by a minute division of its particles, without any addition. In the process of calcining lead in the furnace, the first of the primary colours which it acquires is yellow; the calx passing from that colour through orange into red. This variety of colours proceeds from the imperfection of the metal; which, probably, during its calcination (as our author supposed), receives a small portion of phlogiston, as well as air; for the effect of such an union must probably be a change of colour from orange to red: as sir Isaac Newton has shewn, that bodies reflect more strongly in proportion as they possess more phlogiston; and that the less refrangible colours require a greater power to reflect them. The preparations of silver are yellow; the two most imperfect metals, copper and iron, being very easily acted upon by almost all menstrua, the colours of their solutions, &c. *viz.* green and blue, are apt to change into each other's order; the copper in some solvents becoming blue, and the iron green, and in other solvents *vice versâ*; which probably depends on the increase or diminution of their densities. The preparations, &c. of mercury have been already examined. The specific gravity of platina being nearly equal to that of gold, it is found, agreeably to the Newtonian doctrine, confirmed by Mr. Delaval, that the precipitates and crystals obtained from solutions of this metal are red; and that a solution of it in aqua regia to perfect saturation is of a dark red, though, when diluted, yellow. Delaval's Experimental Inquiry into the Cause of the Changes of Colours in opaque and coloured Bodies, &c. 1777, passim. Phil. Trans. vol. lv. art. 3, p. 10, &c.

METALS, *Fluxes of.* See FLUX.

METALS, *Granulation of.* See GRANULATION.

METALS in the *Materia Medica*, furnish medicines of considerable importance and utility. Although the operation of the pure metals on the animal system is merely mechanical, yet when they undergo oxydation, or are changed by acids into the state of salts, they acquire a high degree of activity, and become effectual remedies in many disorders, when they are judiciously administered. Mercury and tin have, indeed, been employed in their metallic state. For what purposes and with what effect they have been so used, we state under the articles MERCURY and TIN. But metals are more generally and with greater efficacy previously combined with oxygen, acids, sulphur, &c. This is the case with respect to antimony, arsenic, bismuth, copper, iron, lead, mercury, silver, and zinc. This combination, for medicinal purposes, is effected either by the action of atmospheric air, with an increased degree of temperature; or by deflagration with nitrate of potash; or by the action of water; or by solution in an acid, the acid being subsequently abstracted by an alkali, or by some substance for which it has a greater affinity than it has for the oxyd of the metal. When oxygen is united with a metallic base, or the combination denominated oxydation takes place, in whatever mode it is effected, and oxyds of metals are thus obtained, they are found to lose their lustre, tenacity, inflammability, and other metallic properties, and they are changed into earth-like substances, the weight of which is greater than that of the portion of metal that has been employed. The activity of the oxyds of metals on the animal system depends, with a few exceptions, on the quantity of oxygen with which they are combined. Metals, in consequence of oxydation, become capable of uniting with acids, and forming soluble salts. The "metallic salts," therefore, are oxyds combined with acids, whether the oxyd, previously prepared, be dissolved in an acid, or the salt be the product of the direct solution of a metal in an acid. In the latter case, the metal

metal first gains oxygen, either from a part of the acid itself, or from the water, or the air, which it decomposes; and the oxyd, thus formed, is then dissolved by the remainder of the acid. "The properties of the metallic salts are much varied by the previous degree of oxydizement of the metals; and this is a point, the fixing of which in pharmaceutical operations is of the first practical importance; for if in all the indefinite degrees of oxydizement the metallic oxyds combine with acids; the resulting salts must vary in as many shades as exist between the maximum and minimum of oxydizement. In the preparation of the metallic salts, therefore, the same strict attention is requisite in following one established and approved process."—"Many of the metallic salts are altered by exposure to the atmosphere; some effloresce and attract oxygen; some are altered in their properties by moisture; and others are reduced by the action of light; hence, all of them ought to be kept in well-stopped glass bottles; and perhaps these always should be either made of green glass, or otherwise rendered opaque. In compositions which require these salts to be dissolved in water, *distilled* or *filtered rain-water* should always be employed; and much attention is requisite to avoid combining them with incompatible substances, which may either chemically decompose them, or alter their medicinal properties." (Todd's London Dispensatory, 8vo. 1811.) For the principal metallic preparations used in medicine, see the several metals, *viz.* ANTIMONY, ARSENIC, &c. and also the names of these preparations as they occur in the order of the alphabet. But for a fuller account of them, with the instructions for combining them given in the London, Edinburgh, and Dublin dispensatories, we refer to the comprehensive and useful publication already cited. Part iii.

METAL, *Prince's*. See COPPER, GOLD-*coloured Metal*, and TOMBAC.

This metal derives its name from prince Rupert, whom some supposed to have been the inventor of it, in 1680. But the greatest perfection this metal was ever brought to, was by two Frenchmen, M. La Croix, and M. Le Blanc. Their methods of making the composition, though both beautiful, were very different. M. Le Blanc's was the brightest, and of the most elegant and lively colour; but M. La Croix's was greatly superior to that in ductility and softness, so that it was very easily malleable.

M. La Croix invented a sort of varnish or lacquer for his metal, which added a somewhat deeper tinge to it, as it was naturally rather too pale; and had this farther advantage, that while it remained on the metal, it preserved it from rust or decay. This is a very material point in regard to a metal of which copper is the basis, since that is, of all metals, most subject to be injured by the air, or by the contact of liquids of almost any kind. M. Le Blanc's metal is of a deeper, yet equally lively colour, and remarkably bright; and is of such a temper as to be admirably fitted for working. The whole history of these metals is, certainly, that they are composed of zinc and copper in different proportions the one to the other; but it is not easy, without the help of numerous experiments, to determine what is to be the true proportion for either.

The microscope, however, shews a manifest difference, which may lead somewhat towards it; for the metal of La Croix is seen to be composed merely of a number of irregular striæ, while the other is discovered to consist of always two regular beds of them, which meet in the centre of the piece; hence it is that this is always brittle, and will not well polish. The fabric of these metals was long kept a secret; but it was always to be discovered by melting it in a crucible in a strong fire, when it always sent up plain flowers of zinc, and the remaining metal appeared no other than copper altered by calamine; that is, common brass. Mem. Acad. Par. 1732.

METAL, *Bell*, is a composition of copper and tin melted together. See COPPER.

METALS, *Blueing of*. See BLUEING *of Iron*.

METALS, *Painting on*. See PAINTING.

METALS, *Rust of*. See RUST.

METALS, *Line of*. On Gunter's sector are sometimes two lines thus called, and noted with the characters of the seven metals, ☉, ☽, ☿, ♄, ♀, ♂, and ♃; their use is, to give the proportions between the several metals as to their magnitudes and weights. See SECTOR.

METALS, *Tincture of*. See TINCTURE.

METAL, *Over*, in *Gunnery*. When the mouth of a piece of ordnance, in disparting it, lies higher than the breech, it is then said to be "laid over metal."

METAL, *Under*, is when the mouth of a piece of ordnance lies lower than the breech.

METAL, *Right with*. When a piece of ordnance lies truly level, point-blank, or right with the breech, it is said to lie "right with its metal."

METALS, *Superficies of*, denotes the surface or outside of a gun.

METAL, in *Heraldry*. There are two metals used in heraldry, by way of colours, *viz.* gold and silver; in blazon called *or* and *argent*. See COLOUR.

In the common painting of arms, these metals are represented by white and yellow, which are the natural colours of those metals.

In engraving, gold is expressed by dotting the coat, &c. all over; and silver by leaving it quite blank.

It is a general rule in heraldry, never to place metal upon metal, nor colour on colour; so that if the field be of one of the metals, the bearing must be of some colour, and *vice versâ*; otherwise the arms are false: though this rule admits of some exceptions.

METALEPSIS, in *Rhetoric*, is a figure in which two or more tropes, and those of a different kind, are contained under one word; so that several gradations, or intervening senses, come between the word that is expressed, and the thing designed by it. Thus, when Sylla says of Julius Cæsar, *In one Cæsar there are many Mariuses*. Suet. in Vit. c. 1. This is a metalepsis. So when Virgil describing that part of the African coast, where Æneas arrived with his ships, says, *A dark wood hung over it*, Æn. lib. i. ver. 665; and in the words of Dido, Æn. lib. iv. ver. 664, the same figure is used. Thus, the Roman phrase of "Fuit," or "Vixit," expresses that a person was dead. "Fuit Ilium et ingens gloria Dardanidum" signifies, by metalepsis, that the glory of Troy is now no more.

METALLIC, or METALLINE, an adjective applied to any thing that bears a relation to metals.

METALLIC *Germination*, *Mines*, *Vegetation*, and *Vitriols*. See the respective substantives.

METALLIC *Solutions*, in *Agriculture*, such fluids as contain some sort of metal suspended in them in the state of solution or diffusion. These sorts of liquids were formerly supposed to have a highly noxious or poisonous effect when applied to plants as manures and taken up as food; but some late experiments made by Dr. George Pearson seem to lead to a different conclusion.

This is further confirmed by the remarks of professor Barton of America, who, in a letter to the doctor, states his having been several years engaged in an extensive series of experiments

riments relative to the effects of various stimulant substances, such as camphor, &c. upon vegetables, as well as on the absorption of certain powerful mineral substances into the organical system of vegetables. "In numerous instances, he has subjected the stems and leaves of plants, young and old, large and small, to the influence of the sulphats of iron and copper, and has found that both of these metallic salts are very greedily absorbed by vegetables, insomuch that he has detected the presence of iron in the vessels of a branch of a mulberry, at the height of five or six feet above the place of immersion in a solution of the sulphat of this metal."

He intends to communicate a full account of his experiments to the public in two memoirs. But suggests, in the mean while, that the sulphat of iron applied to vegetables in the manner he has mentioned, "is only a poison like almost every thing else, from the over dose," as mentioned by the doctor. "In several of his experiments, the branches of vegetables that were placed in vessels containing solutions of the sulphat of iron and copper, lived longer and exhibited more signs of vigour than similar branches that were placed in equal quantities of simple water. It is true, that in many other experiments these metallic salts proved fatal to his plants, but this was when he employed too large a dose. In like manner he has found several years ago that camphor, by greatly stimulating, often kills vegetables; and yet when properly dosed this is a very wholesome stimulant to plants; he had also found that large doses of nitre (which is unquestionably a powerful stimulant both with respect to animals and vegetables) produce an appearance like genuine gangrene in the leaves of vegetables; and yet it is certain that nitre, when it is judiciously dosed, may be made to greatly assist the healthy vegetation of plants.

METALLOID, in *Chemistry*, a name given to those metals which have been obtained from the fixed alkalies, and some of the earths. These bodies are so completely metallic, that they may, with the utmost propriety, be classed with the other metals, and such a distinction will therefore be unnecessary.

The metalloid said to be obtained from ammonia appears to have been given up by chemists. It was said to be produced by applying a globule of mercury at the negative end of a Galvanic battery, in contact with an ammoniacal salt. The mercury became of four or five times its original volume, and in the form of a soft solid. When this substance is exposed to the air, or thrown into water, the mercury assumes its original volume, and ammonia and hydrogen are exhaled. These appearances led Mr. (sir H.) Davy to conceive that the ammonia, like the other alkalies, contained a metallic base; and that during the Galvanic energy, this metallic base had been separated, and had alloyed itself with the mercury. From the great increase of volume, without a perceptible increase of weight, the specific gravity of this supposed base was deemed inconceivably small. Mr. Davy was more warranted in drawing this conclusion from some experiments, in which it appeared that ammonia contained oxygen. This fact, however, has been disproved by the experiments of Dr. Henry, and by those of Berthollet, jun. namely, that ammonia contains oxygen. The light amalgam produced in electrifying an ammoniacal salt with mercury, has been examined by Gay Lussac and Thenard, in their work entitled "Recherches Physico-Chimiques," tom. i. p. 52. The chemists consider the amalgam merely a compound of mercury, with hydrogen and ammonia. The phenomena which attend this process are in favour of such an opinion. Oxygen is given out in abundance at the positive wire, while a very little gas is observed at the negative wire, except when the mercury is removed. The writer of this article, seven years ago, discovered that when a wire coated with mercury is on the negative side in pure water, a much less quantity of hydrogen is evolved than what might be expected from the quantity of oxygen at the other wire; and if the battery be not of tolerable strength, no hydrogen at all appears.

In the decomposition of the amalgam, they found that the ammonia was to the hydrogen as 28 to 23.

On the ground that mercury has the property of combining with hydrogen, and from the great levity of the bases of potash and soda, Mr. Murray is of opinion that these substances are compounds of hydrogen with some metallic base, with which we are not as yet acquainted. In addition to this, he observes, that in the decomposition of potash and soda, no hydrogen is given out at the negative wire, although water is present; he therefore concludes that the hydrogen must combine with the metal. It must be remembered, however, that during the decomposition of any metallic oxyd by Galvanism, no hydrogen is given out, although water is present.

The metalloid obtained from barytes has not been noticed under that article, because these discoveries have all been made since that part of this work was published.

Soon after the discovery of potassium and sodium, Mr. Davy subjected barytes to the same decomposing power. He first exposed the moistened earth in contact with mercury to the Galvanic battery. He found that the mercury lost much of its fluidity by being alloyed with a metal. This amalgam, on being exposed to the air, became covered with a crust of barytes. When the same was thrown into water, hydrogen gas was evolved, and barytes formed. This proved the presence of a metallic substance, capable of decomposing water, which was the base of barytes. Mr. Davy next mixed the moistened earth with one-third its weight of red oxyd of mercury, and placed them upon a plate of platina in a small cavity, where was lodged a globule of mercury. These materials being covered with a thin film of naphtha, the plate was connected with the positive side of the battery, the mercury with the negative, the two metals being separated by the earth and the red oxyd of mercury. By the influence of a powerful battery an amalgam was soon formed. This amalgam was then introduced into a bent glass tube, and the mercury distilled off. Although the heat was raised to redness, it was still rather uncertain whether the base was perfectly pure.

Mr. Davy has given the name of barium to this metallic substance. It is a white metal of the colour of silver, different from potassium. It is solid at the common temperature, but becomes liquid at a heat a little short of redness. It is not volatile at a red heat. When exposed to the air it soon absorbs oxygen, becomes tarnished, and ultimately falls down in the state of white powder, having returned to its original state by the absorption of oxygen. When this metal is thrown into water, the latter is decomposed with great rapidity, hydrogen is evolved, and barytes formed. The specific gravity of this metal is greater than that of potassium or sodium, since it sinks in water, and even in sulphuric acid.

Mr. Davy thinks its specific gravity four or five times that of water. Barium appears to be a malleable metal, since it is capable of being flattened at the common temperature.

The proportion of oxygen with which it combines has not been ascertained. If barytes be the first oxyd of barium, and the weight of atom of barytes be 68, the proportion will be $\frac{68}{7} = \frac{100}{10.3}$, or 10 *per cent.* of oxygen, nearly.

For

For the rest of the metalloids, see the respective earths and alkalies.

METALLORUM *Crocus*, *Mater*, and *Sulphur*. See the respective articles.

METALLURGY, in a general sense, signifies the art of working metals under all circumstances. In its more limited meaning, it is confined to the art of separating metals from their ores. Since, however, these processes are given at full length under the heads of the metals respectively, it will be unnecessary to say more under this article. See ASSAYING and SMELTING.

METAMORPHISTS, in *Ecclesiastical History*, a sect of heretics in the sixteenth century, whose distinguishing tenet was, that the body of Jesus Christ was, upon his ascension into heaven, changed and metamorphosed into God.

METAMORPHOSIS, Μεταμορφωσις, formed of μετα, *change*, or removal from one place or state to another, and μορφη, *form*, or *figure*, *transformation*, the change of a person or thing into another form.

The ancients held two kinds of metamorphoses; the one real, the other apparent. The metamorphosis of Jupiter into a bull, and of Minerva into an old woman, were only apparent. That of Lycaon into a wolf, and of Arachne into a spider, and the like, they say, were of the real kind.

Most of the ancient metamorphoses include some allegorical meaning, relating either to physics or morality. Ovid's Metamorphoses is a collection of histories of such transformations, poetically related. Some authors are of opinion that a great part of the ancient philosophy is couched under them; and Dr. Hooke has made an attempt to unriddle and lay open the hidden meanings of several of them.

METAPARA, in *Geography*, a town of the island of Borneo; 70 miles S.E. of Nagara.

METAPEDIUM, in *Natural History*, a name given by some authors to a kind of stone, called by others *metatarsum*, and supposed to imitate a human foot. It is only a lusus naturæ in the formation of a common pebble.

METAPHOR, METAPHORA, μεταφορα, *translation*, or *displacing*, of μετα, *trans*, and φερω, *I bear*, or *carry*, in *Rhetoric*, a figure of speech, or a species of trope, whereby a word is transferred from its proper signification to another, different from it, by reason of some similitude between them; or whereby the proper denomination of one thing is applied to another: which other thing is more elegantly explained by this tralatitious or foreign name, than by that which naturally belongs to it. As, when we say, the light of the understanding; to burn with zeal; to float between hope and despair, &c.

The metaphor is the most common of all the figures of speech; and is that usually meant, when we say a thing is spoken figuratively.

The metaphor is a short simile; or, as Cicero calls it, a similitude reduced to a single word; an image being thereby called from its proper subject to give the resemblance of another. An allegory is no more than a continued metaphor.

Quintilian says, that a metaphor is a short similitude, and differs from it only in this, that the former is compared to the thing we design to express, and the latter is put for it. It is a similitude, when I say of a man, he has acted like a lion; and a metaphor, when I say, he is a lion. But though metaphors are usually taken from a similitude between two things; yet sometimes they are founded in the similitude which two things bear to each other, in some particular respect, by means of which what properly belongs to one of them is transferred to the other: the former of which are called *simple* metaphors, and the latter *analogous*. Hence the rudder of a ship may be called its reins; for what the reins are to a horse, that the rudder is to a ship, in guiding and directing it. Again, some metaphors are reciprocal in which the similitude holds either way. Thus to steer and govern are used reciprocally, both of a ship and a state; the proper expressions being to steer a ship, and govern a state, and the contrary metaphorical. From this account, therefore, of the nature of a metaphor, it may be defined, the application of a word, by way of similitude, to some other thing than what it properly signifies.

Quintilian distinguishes metaphors into four kinds: the first, when a word is transferred from one animal to another; as when Livy says, that Cato used to *bark* at Scipio; or when our Saviour calls Herod *fox*. To this class belong those forms of expression that occur in the sacred writings, by which the properties and affections of men are ascribed to the deity; as when God is said to hear, see, be angry, and repent, &c. The second, when the word is transferred from one inanimate to another; as *bridle* for *laws*; *floods* of fire, and *clouds* of smoke, denoting large quantities. The third, when inanimates are applied to animates; as the *flower* of youth. Thus, also, Homer calls Ajax the *bulwark* of the Greeks, and Cicero brands ill men with the character of being the *pest* of the state. And the last, when animates are applied to inanimates; as the river *disdained* its bounds. Thus Cicero speaking of Clodius says, the very altars, when they *saw* that monster fall, seemed to *move* themselves, and *assert* their right against him. Virgil, speaking of the impetuous force and rapidity of the river Araxes, says, it *disdained* a bridge. And it is a very usual epithet, which Homer gives to words, to call them πτεροεντα, or *winged*, to intimate the swiftness of speech. And metaphors of this kind, which give life and action to inanimate things, are esteemed the finest and strongest.

As the metaphor is intended to set things before the eyes, it becomes so much the more perfect, as it shews them the more vividly, by representing them in motion and action. Cicero, speaking of a metaphor, calls it the most florid manner of expression, and brightest ornament of language, that consists in single words. A metaphor should have nothing in it either coarse or shocking, or that may raise it above the simplicity of nature, so as to be forced and harsh; nor should it appear a metaphor to any, but those who view it very closely. A metaphor should never be carried too far; for, in that case, it degenerates into puerility. Metaphors should always be followed in the same kind; they become unnatural, when different images are introduced. In all metaphorical dictions, there should be a kind of suitableness to each other; different ideas are always absurd; as in this instance, the church was besieged with a deluge of troubles, where the two images, *siege* and *deluge*, have no relation.

The beauty of a metaphor is very strikingly exhibited in the following passages, extracted from lord Bolingbroke's Remarks on the History of England. Speaking of the behaviour of Charles I. to his last parliament, he says, "About a month after their meeting, he dissolved them; and as soon as he had dissolved them, he repented; but he repented too late of his rashness. Well might he repent; for the vessel was now full, and this last drop made the waters of bitterness flow."—"Here," he adds, "we draw the curtain, and put an end to our remarks." Nothing, as Dr. Blair observes, could be more happily thrown off. The metaphor, we see, is continued through several expressions. The *vessel* is put for the state or temper of the nation, already *full*, that is, provoked to the highest by former oppressions and wrongs; this

this *laſt drop* ſtands for the provocation recently received by the abrupt diſſolution of the parliament; and the *overflowing of the waters of bitterneſs*, beautifully expreſſes all the effects of reſentment let looſe by an exaſperated people.

There is nothing young writers are more faulty in, than the indiſcreet uſe of metaphors: thoſe who affect the marvellous, are eternally on the metaphorical ſtrain; nor know any bounds or reſtraint. They, who underſtand them beſt, uſe them with the greateſt reſerve. Mr. Addiſon propoſes it as a rule for writers, to imagine their metaphors actually painted before them, and to view and examine the juſtneſs of their application and aſſemblage under thoſe circumſtances; throwing every thing out of the writing, but what might be retained in the picture. Card. Perron preſcribes this general rule for metaphors, that they muſt always deſcend from the genus to the ſpecies; and never go backwards from the ſpecies to the genus: thus, we ſay figuratively, the *bonds of ſociety*, and not the *human cords*, which tie us together; *bond* being a genus, and *cord* a ſpecies.

We ſhall cloſe this article with a brief recital of the rules laid down by Dr. Blair as proper to be obſerved in the conduct of metaphors, which will alſo apply to tropes of every kind. Metaphors ſhould be ſuited to the nature of the ſubject of which we treat. They ſhould be neither too many, nor too gay, nor too elevated for it. The exceſſive or unſeaſonable employment of metaphors is mere foppery in writing; it gives a boyiſh air to compoſition, and, inſtead of raiſing a ſubject, in fact, diminiſhes its dignity, which ſhould ariſe from ſentiment and thought, not from ornament. This obſervation, as we have already ſuggeſted, demands the particular notice of young writers. A ſecond rule reſpects the choice of objects, from which metaphors, and alſo other figures, are to be drawn. Accordingly, we ſhould ſtudiouſly beware of even uſing ſuch alluſions as raiſe in the mind diſagreeable, mean, vulgar, or dirty ideas. Some approved authors have been incautiouſly betrayed into this error. Again, care ſhould be taken that the reſemblance, which is the foundation of the metaphor, be clear and perſpicuous, not far-fetched, nor difficult of diſcovery. The tranſgreſſion of this rule produces harſh or forced metaphors, which are always diſpleaſing, becauſe they puzzle the reader, and, inſtead of illuſtrating the thought, render it perplexed and intricate. Cowley is often chargeable with this fault. Farther, it muſt be carefully attended to, in the conduct of metaphors, never to jumble metaphorical and plain language together; never to conſtruct a period ſo that part of it muſt be underſtood metaphorically, part literally, which always produces a moſt diſagreeable confuſion. Moreover, two different metaphors ſhould never be made to meet on one object. This is what is called mixed metaphor, and is one of the groſſeſt abuſes of this figure; ſuch is Shakſpeare's expreſſion, "to take arms againſt a ſea of troubles." This makes a moſt unnatural medley, and confounds the imagination entirely. If we have occaſion to doubt whether metaphors be or be not of the mixed kind, we ſhould try to form a picture upon them, and conſider how the parts would agree, and what ſort of figure the whole would preſent, when delineated with a pencil. As metaphors ought never to be mixed, we ſhould alſo avoid crowding them together on the ſame object. Finally, metaphors ſhould not be too far purſued. This is called ſtraining a metaphor, and drawing it out into an allegory; by which we ſhall tire the reader, and render our own diſcourſe obſcure. Cowley, lord Shaftſbury, and Dr. Young, tranſgreſs in this way. Blair's Lectures, vol. i.

METAPHRAST, Metaphrastes, a tranſlator, or perſon who renders an author in another form, or another language, word for word.

A metaphraſe, μέταφρασις, uſually ſignifies ſomething more than either a paraphraſe, or a tranſlation: according to Baillet, a metaphraſt implies a tranſlator, gloſſator, and interpolator, all at once.

METAPHYSICS, Metaphysica, *Tranſnaturalis*, a branch of ſcience, about the nature and idea of which there is ſome difference among authors.

The word is formed from the prepoſition μετα, *trans*, *beyond* or *above*; and φυσις, *nature*, or φυσικη, *natural*.

Some define metaphyſics, that part of ſcience which conſiders ſpirits and immaterial beings; which others chooſe to diſtinguiſh by the name of *pneumatics*, or *pneumatology*.

Others, keeping cloſe to the etymology of the word, explain metaphyſics by *trans-natural*, or *præter-natural*, or even *poſt-natural philoſophy*: becauſe it is ſubſequent in contemplation to the phyſical, though prior to it in the real order of beings.

Others, with more propriety, conceive metaphyſics to be what ſome others call *ontology*, or *ontoſophy*, *i. e.* the doctrine *de ente*, or of being, *quatenus* being.

In the ſame view, ſome philoſophers call this ſcience by the name *philoſophia*, or *ſcientia generalis*, as being the foundation, or, as it were, the ſtamen or root from whence all the other parts of philoſophy ariſe, and wherein they all meet; its object being *being* in the abſtract, or general, not reſtrained to this or that ſpecies of beings; not to ſpirit any more than body; ſo that the doctrines of metaphyſics are applicable to all beings whatever.

Philoſophers, again, are divided as to the notion of a ſcience *de ente* in general. Some hold it real, preciſe, and ſolid enough to be demonſtrated; but others judge it too obſcure, faint, and confuſed, to be admitted into philoſophy.

Being, abſtracted from every ſort of ſpecies of being, is certainly a very vague term, and does not ſeem to give ſcope enough for a ſcience: we do not ſee how it can affect the mind as an object. Add, that the common metaphyſics cannot demonſtrate any part of its ſubject, but aſſume the whole: there are no principles or axioms, whereon to demonſtrate metaphyſics which contain the principles of all other ſciences.

The firſt who wrote profeſſedly on the ſubject of metaphyſics is Ariſtotle. Indeed, he is the firſt who uſes the word: Μεταφυσικα is the title of one of his books; but this ſome of his commentators will have to ſignify no more than *after the book of phyſics*. M. du Hamel, taking the prepoſition μετα in the ſenſe of *poſt*, is even of opinion, that the word was coined by Ariſtotle's followers: and that it was unknown to Ariſtotle himſelf.

Ariſtotle's metaphyſics ſeem to have been intended for a kind of natural theology. The metaphyſics of Ariſtotle have been lately illuſtrated by the ingenious Mr. Harris, in his treatiſe, intitled "Philoſophical Arrangements," 8vo. 1775.

Metaphyſics, ſays this ingenious author, are properly converſant about primary and internal cauſes; and the ſtudy of them is metaphyſical, becauſe, though prior in itſelf, it is ſubſequent in man's contemplation, whoſe road of ſcience is naturally upward, that is, from effect to cauſe, from ſenſible to intelligible.

Accordingly metaphyſics have been, not improperly, defined "the ſcience of the principles and cauſes of all things exiſting." Ariſtotle calls this ſcience "the firſt philoſophy," as it is not only ſuperior, but prior in the order of nature, to the whole circle of the other arts and ſciences. What is firſt in nature, however, is not firſt to man. Nature begins with cauſes which produce effects; whereas man aſcends from effects to causes. Hence, as "Physics" was the name given by Aristotle to the philosophy of body, some of his interpreters called that of mind "Metaphysics," thus intimating not only that its subject is more sublime and difficult, but that the study of it would be more properly and successfully undertaken "after that of physics." The followers of Aristotle were led to adopt this appellation by their master himself, who to the books in which he pretends to elevate the mind above things corporeal to the contemplation of God and things spiritual, prefixed the Greek words μετα τα φυσικα. However significant the name, in reference to the subjects which this science recommends, it has, from misapplication and abuse, as well as from the decline and extinction of the Peripatetic philosophy, sunk into disrepute: and although Malebranche and Mr. Locke have written much more clearly and consistently of metaphysics than any of the ancients; yet more modern writers have comprehended these subjects, which were formerly referred to metaphysics, under the appellation of PHILOSOPHY *of the Human Mind.* Under this article we propose to give a general account of it, and to mention the particular subjects which it includes.

METAPHYSICAL, something belonging to metaphysics.

The word is also used to denote something subtile, abstract, and refined. In which sense we say, such a reasoning, such a proof is too metaphysical, &c.

A metaphysical case is an imaginary or chimerical case, which can scarcely ever happen, or not without much difficulty; and which ought not to be laid down as a rule for common occasions.

METAPHYSICAL *Certitude, Distinction, Evidence, Form, Perfection, Universality.* See the respective substantives.

METAPHYSICAL *Sect*, in the *History of Learning*, is one of the two great sects into which the philosophical world was divided about the beginning of the 17th century. This sect followed the system of Des Cartes, and considered truth as attainable by abstract reasoning; and from a small number of abstract truths, deduced a long series of propositions, in order to arrive at a precise and accurate knowledge of God and nature, of body and spirit. The metaphysical philosophers, supposing that many things are known by man with the utmost certainty, discovered an undue propensity to form their opinions and doctrines into a regular system. The other sect was the *Mathematical.* (See CARTESIANS.) A branch of the Eleatic sect was denominated *Metaphysical*, by way of contradistinction to the *Physical.* See ELEATIC *Sect.*

METAPLASM, METAPLASMUS, compounded of μετα, and πλασσω, *fingo*, in *Grammar*, a transmutation, or change, made in the word, by adding, retrenching, or altering a letter or syllable of it.

METAPLEXIS, in *Botany*, so called by Mr. R. Brown, from μετα, *together*, or *between*, and πλεκω, *to plait*, or *connect*, alluding to the alternation of small leaves with the membranous-tipped anthers, composing a sort of wreath in the centre of the flower. Brown in Wern. Trans. v. 1. 48.—Class and order, *Pentandria Digynia.* Nat. Ord. *Contortæ*, Linn. *Apocineæ*, Juss. *Asclepiadeæ*, Brown.

Ess. Ch. Corolla somewhat wheel-shaped. Crown of the stamens of five dwarf-hooded leaves, alternate with the membranous-tipped anthers. Masses of pollen tumid, pendulous, attached laterally. Stigma with an elongated undivided beak. Follicles . . .

A twining smooth *shrub*, found by sir George Staunton, bart., in the province of Peckeley, in China. The *leaves* are heart-shaped. *Clusters* on stalks, inserted between the footstalks. *Limb* of the corolla bearded. No specific name is mentioned.

METAPTOSIS, a word used by many physical writers to express a change of one distemper into another, whether it be by *diadoche*, or *diadexis*, as it is called; when the change is for the better, and the morbid matter removes from a more noble to an ignoble part: or by *metastasis*, when the change is for the worse, and the morbid matter removes from an ignoble to a more noble part.

METASTASIO, L'ABATE PIETRO, in *Biography*, the best lyric poet and writer of operas, or dramas, for music in Italy, during the last century, or perhaps during any age, or in any country. This exquisite poet, second son of Felice Trapassi of Assisi, and Francesca Galasti of Bologna, was born at Rome, January 6th, 1698, in the parish of Santi Lorenzo and Damaso, where he was baptized the 19th of the same month, by cardinal Ottoboni. His father, though descended from a family in Assisi, which had long enjoyed the privileges of free citizens, but which, by a gradual decline, was reduced to poverty, not being able to subsist in the place of his birth, listed for a soldier in the regiment of Corsi, and soon after married Francesca Galasti, by whom he had many children besides the poet.

While he was in garrison, to the small pay of a soldier he added something towards the maintenance of his family, by becoming an amanuensis. And at length, having served the usual time, and by extreme industry and economy saved a little money, he entered into partnership with a shop-keeper at Rome, for the sale of goods which belong to what the Romans call *l'arte bianca*, consisting of oil, flour, pastry, and other culinary materials.

And having been somewhat prosperous in this kind of merchandise, he placed his two eldest sons, Leopoldo and Pietro, at a grammar-school. The latter discovered an extraordinary quickness and disposition for literature, and a violent passion for poetry, with a power of making verses, extempore, on any given subject, before he was ten years old.

This faculty he was habituated to exercise, after school hours, at his father's shop, where great crowds used to assemble in the street of an evening to hear the young Trapassi sing *all' improvista;* who, besides the harmony of his numbers, was gifted with the melody of a fine voice. During one of these tuneful fits, the learned civilian Gravina, having accidentally passed that way, was struck with the sweetness of the child's voice, and still more with his verses, which he soon found were extempore, and either upon persons who stood near him, or on playful subjects of their suggesting.

Gravina was so astonished and pleased at the precocity of the little bard's talents, that he stopt to caress and converse with him, offering him money for his performance, which, however, the child modestly declined to accept. This so much increased the civilian's admiration, that he instantly conceived a wish to adopt him, for the pleasure of cultivating a soil which nature had rendered so fertile, that even the spontaneous flowers and fruits it produced were of a superior kind. Without hesitation he therefore applied to his parents, soliciting them to transfer to him the care of their son's education, promising to become not only his preceptor, but father.

As the child was still to remain at Rome, and no cruel preliminary was mentioned, by which his natural parents were prohibited from seeing him, and cherishing reciprocal affection, Felix was too wise, and zealous for the welfare of his son, to refuse the proffered patronage; and the next morning, Pietro was conducted by his father and mother to the

the houſe of Gravina, and wholly conſigned to his care and protection.

Our young bard was now, from the legitimate child of a ſhop-keeper, become the adopted ſon of a man of letters. And as his learned patron was partial to Greek literature, and wiſhed to implant in the mind of the young Roman a reſpect and reverence for ancient lore, he tranſlated his name into Greek; calling him Metaſtaſio, inſtead of Trapaſſi; as Μεταςασις, Mutatio, ſeemed at once to expreſs his former name of Trapaſſi, and his new ſituation as an adopted child.

And having changed his name, he undertook the more difficult taſk of changing, or at leaſt enlarging, his mental faculties; and at the ſame time that he was ſtudying the learned languages, and imbuing his mind with the ſciences, he wiſhed to make him an orator rather than a poet, and determined that he ſhould ſtudy the law as a profeſſion; that and divinity being the only two roads by which a man of learning could arrive at honours and dignity in Rome. Poets, indeed, were rewarded with barren praiſe and acclamation, but wealth and affluence were ſtrangers to their doors.

Yet while he was obliged to read the dry books of the law, and was ſeemingly occupied by other ſtudies, he found time, by ſtealth, to read the great models of the art of poetry, for which his inſtinctive paſſion increaſed from the difficulty of gratifying it. At the name of Homer and Arioſto, his favourite poets, he was unable to contain himſelf; and Gravina diſcovering, in ſpite of his pupil's determination to conform implicitly to his will, that this excluſive paſſion for poetry was inſuperable, at length permitted him to read thoſe poets which he himſelf thought not only the beſt, but the only models of perfection. At the age of fourteen, during the early period of this indulgence, Metaſtaſio produced his tragedy of "Giuſtino," conformable to the rigour of all the rules of the ancient Greek dramatic writers, with which his learned preceptor had ſupplied him.

We have his own opinion of this production, in a letter written to ſignor Calſabigi, in which he ſays: "I ſhould have wiſhed that none of my early productions, which favour too much of adoleſcence, might have appeared in the Paris edition, particularly the tragedy of Giuſtino, written at fourteen years of age: when the authority of my illuſtrious maſter did not ſuffer me to move a ſtep from the moſt religious imitation of the Greeks; and when my inexperience and want of diſcernment were unable to diſtinguiſh gold from lead, even in thoſe mines themſelves, of which he then began to diſplay to me the treaſures."

After producing this tragedy on the favourite model of his patron and preceptor, the learned civilian ſeems not only to have tolerated, but encouraged his pupil's adoration of the muſes; and at eighteen carried him to Naples, expreſsly to afford him an opportunity of ſinging extempore with the moſt celebrated improviſatori of Italy at that time. Metaſtaſio, in a letter to Algarotti, written in 1757, gives the following account of this poetical contention: "It is your wiſh to have ſpecimens of the verſes which I made extempore, during my childhood; but how can I poſſibly gratify this wiſh? I do not deny but that a natural talent for harmony and the muſes was diſcovered in me, that was thought ſomewhat uncommon, and more early than uſual, that is, at ten or eleven years old; that this phenomenon ſo dazzled my great maſter Gravina, that he was partial to it, and cheriſhed me as a ſoil worthy of his cultivation: and that, ſo late as the year 1716, he exhibited me to ſpeak verſes, God knows how, for the benefit of Georgio Lorentino, upon all kinds of ſubjects; at which time I had for competitors the illuſtrious Rolli, Vagnini, and the cavalier Perfetti, men who were then arrived at full maturity, and veterans in Pindaric battles."

At twenty years of age he had the misfortune to loſe his learned preceptor and patron, Gravina, who died in 1718, aged fifty-four. It has been doubted whether this event, which his heart inclined him to regard as the greateſt calamity, was not a fortunate circumſtance for his fame. Metaſtaſio, whoſe writings evince him to have been all tenderneſs, gratitude, and diſintereſted ſenſibility, bewailed this misfortune with the deepeſt affliction; and in the elegy, called "La Strada della Gloria," written on this occaſion, and read at a full aſſembly of the members of the arcadian academy founded by Gravina, he gave a public teſtimony of his ſorrow and gratitude, expreſſive of thoſe noble ſentiments, which he cheriſhed and practiſed to the end of his life. Nor did the beneficent will of his maſter diminiſh his grief or dry his tears, though, when opened, it was found to have been made in 1717, and that he had appointed him his heir.

By this liberal act, he verified his promiſe to the parents of Metaſtaſio, of treating him as his own child. The advantage to his talents and to the lovers of poetry, which is ſuppoſed to have been derived from this early loſs of his learned tutor, was the opportunity it afforded his genius to free itſelf from the trammels of Grecian rules and ſervile imitation. But though in his dramas he has more pathos, poetry, nature, and facility, than we are now able to find in the ancient Greek tragedians, yet his early ſtudy of them certainly elevated his ideas and ſtyle, and taught him how to ſhun the vulgarity and abſurdities with which the early popular dramatiſts of moſt countries abound. He may be ſaid to write with claſſic elegance, though he had liberated himſelf from claſſic chains.

Gravina's bequeſt to Metaſtaſio conſiſted of 15,000 Roman crowns, between 3 and 4000 pounds ſterling in money, an excellent library, and a great quantity of rich furniture, with three ſmall places of which he had put him in poſſeſſion before his deceaſe, and a little eſtate in the kingdom of Naples.

But our young poet, now become a free agent, and a deſpotic prince over no contemptible fortune, among all his acquirements had not the leaſt idea of prudence and economy. His converſation and verſes had too much excellence to want admirers; and his table was too well ſerved to want gueſts. He now wholly quitted the dry ſtudy of the law, and entirely devoted himſelf and his fortune to the muſes and his friends. There was no poetical aſſembly in which he did not read ſome new production: as our Garrick, in the early part of his life, was found wherever lovers of theatrical amuſements were aſſembled. Stimulated by the applauſe which every piece univerſally received, Metaſtaſio thought of nothing but how to have it renewed by another compoſition. The love of praiſe is an infirmity to which the beſt minds are perhaps the moſt ſubject. During this intoxication, not a thought ſeems to have been beſtowed on his preſent finances or future fortune. If he reflected at all during theſe times of diſſipation, it was on the number of his friends and admirers, and the certainty of patronage whenever he ſhould want it. What his predeceſſor Petrarca has ſaid of the temple of love, was ſtill more applicable to that of fortune by Metaſtaſio.

"Errori, ſogni, ed immagini ſmorte
Eran d'intorno all' arco trionfale,

E falfe opinioni in fu le porte,
E lubrico fperar fu per le fcale."

" Errors and dreams and thoughts half form'd abound,
And crowd the bafelefs fabric all around;
While at the threfhold falfe opinions ftand,
And on the fteps, vain hope, with magic wand."

His patron's legacy was foon diffipated, not in the fupport of vice, but munificence and good cheer; fo that at the end of two years, finding himfelf wholly reduced to his two fmall Roman places, his Neapolitan poffeffions, and his library, he went to Naples with the firm refolution of ferioufly refuming the ftudy of the law. Being arrived in that city, 1720, he placed himfelf under the guidance of an advocate of the name of Paglietti, earneftly entreating his affiftance in the ftudy of jurifprudence, and promifing, on his own part, to fecond the inftructions which he fhould receive with all poffible diligence and docility. Paglietti was one of the moft eminent lawyers, at that time, in the city of Naples; but fo rigorous a difciplinarian, and fo totally devoted to his profeffion, that he not only defpifed but abfolutely hated every fpecies of ornamental knowledge or literature. Poetry was therefore ranked by him among the moft deadly fins of which an advocate could poffibly be guilty.

It is natural, therefore, to fuppofe that Paglietti, devoid of all tafte for the arts of elegance, which help to humanize and polifh our favage nature, was rough, four, and forbidding in his addrefs and manners: he was all law, and of that fevere and mercilefs fort, which knows not how to pardon the fmalleft imprudence or deviation from worldly wifdom.

Metaftafio was not ignorant of his feverity and invincible hatred for poetry; but inftead of looking upon it as an evil, he was the more eager to place himfelf under his moft rigid difcipline, in order to prevent a relapfe into poetry, which had hitherto been to him fo unprofitable a ftudy. The reception of Metaftafio by this Lycurgus, and his firft lecture, were perhaps rendered more auftere and acrid by the fame of his poetical talents, with which not only Naples but all Italy was already filled; but Metaftafio, hearing it with heroic patience, renewed his promife of unwearied application, and kept it fo well during his firft refidence under the advocate's roof, that he began to entertain great hopes of his becoming an excellent lawyer, and treated him with as much fweetnefs as his bitter nature would allow. He knew that the ftudies of his young difciple were frequently impeded by the vifits of perfons of learning and diftinction, to whom his poetical abilities were well known, and who remembered him when he was brought to Naples, as an *improvifatore*, by Gravina. But now their expectations were transferred to his legal abilities, upon which, from his learning and application, they had formed the higheft hopes. It is certain that Metaftafio, at this time, exercifing the greateft tyranny over his natural inclination, refrained entirely, not only from writing verfes, but from fpeaking them extempore, in fpite of all folicitation. The firft breach of contract with the rugged advocate, and firft feduction of the mufe during his refidence at Naples, was in the beginning of 1721, at the inftigation of the countefs of Althan, who prevailed on him to write an Epithalamium for the nuptials of her relation, the marquis Pignatelli, with a lady of the Pinelli family: it confifts of near one hundred octave ftanzas, is full of elegance, and in the higheft clafs of poetry. The drama of " Endymion," the firft that he produced exprefsly for mufic, is faid to have been written on the fame occafion.

Metaftafio's next infringement of the laws laid down by the advocate Paglietti againft the wicked practice of poetry, was occafioned by an application from the viceroy of Naples himfelf, that he would write a drama for mufic, to be performed on the birth-day of the emprefs Elizabeth, confort of the emperor Charles VI., who was then in poffeffion of that kingdom. It is faid that he was with difficulty prevailed upon to enter on this tafk, and only complied upon a promife that it fhould be kept a profound fecret. Our bard, in perpetual fear of the inexorable lawyer, was obliged to facrifice his hours of fleep to this contraband commerce with the mufes. The piece was entitled " The Gardens of the Hefperides," and is one of the moft beautiful of his early productions.

The next drama that was written at the expence of his legal ftudies, or his moments of reft and recreation, was " Angelica." This was printed at Naples in 1722, and fet to mufic by Porpora for the emprefs's birth-day. It has been faid in fome accounts of Metaftafio's early productions, that Farinelli's firft public performance was in this ferenata.

The poems which he produced at Naples were the admiration of all perfons poffeffed of a love and tafte for poetry, particularly " The Gardens of the Hefperides;" but none felt its beauties fo forcibly as the Bulgarella detta Romanina, the greateft female finger and actrefs of her time; who, having performed the part of Venus in that occafional drama, was fo enchanted with the uncommon beauty of the poetry, that fhe could not reft till fhe had been introduced to the acquaintance of the author. Indeed, tradition fays, that this drama had an effect upon the audience in general, which Naples had never before experienced. The recitative was hardly begun, when the fpectators formed a more curious fpectacle than the actors themfelves: fo great was the change in their behaviour and mode of liftening that was inftantly produced. Violent noife and unbridled clamour ufed to reign in every part of that theatre, and could never be fubdued but with great difficulty, even when fome capital finger had a favourite air to perform; and it was no fooner over than the din was renewed with fuch vehemence, that even the orcheftra could not be heard. But now, every one delighted by the new and decorous arrangement of the fcenes, original beauty and fweetnefs of the verfe, the force of the fentiments, the texture of the parts, and all the wonders of Metaftafio's dramatic poetry, was forced, almoft infenfibly, into profound filence and attention.

Univerfal curiofity was excited, and inquiries made, after the author, who, though a poet and fond of praife, is faid to have wifhed to lie concealed. But the Bulgarini, who was not only pleafed in common with the lovers of poetry, but impreffed with the moft lively gratitude to the author of the " Hefperides," for the flattering reception and unbounded applaufe which this piece had procured her, both as an actrefs and finger, was impatient to be perfonally acquainted with him. And having difcovered that fhe knew one of his intimate friends, fhe prevailed upon him to try to bring the poet to her houfe. He at firft refifted the folicitation; but at length, ceafing to be inexorable, he was induced to make her a vifit. The Romanina (as fhe was generally called from being a native of that city) had no fooner feen him, than fhe felt an uncommon regard for him. His poetical abilities, elegance of manners, and fine countenance, together with the circumftance of his being her countryman, or rather townfman, all joined to increafe her regard; while Metaftafio on his part felt equally unable, with all the ftoicifm he could mufter, to refift the defire of improving the acquaintance; and frequently returned to enjoy the pleafure of her converfation.

He had foon reafon to believe, from the countenance and

 behaviour

behaviour of Paglietti, that neither his theatrical production, nor the new ſtage acquaintance which he had made, was unknown to him. The praiſes he received from the Romanina, and all thoſe to whom the ſecret had been divulged, and their preſſing inſtances that he would continue to write, awakened his paſſion for poetry, which he had flattered himſelf was wholly ſubdued. He now began to feel, that by the narrow and contracted ſtudy of the law, his genius could never expand in his own original ideas, but would be conſtantly tied down to thoſe of others. His reflections upon the ſordidneſs of ſacrificing his whole life to a diſtaſteful buſineſs, for the mere hope of acquiring wealth, (as he afterwards confeſſed to his confidential friends,) joined to the harſh treatment of the old advocate, which became more intolerable in proportion as the aſſiduity of Metaſtaſio diminiſhed, entirely determined him to quit both him and his profeſſion.

His female friend perceived the conflict and internal war; and in order to ſtimulate his courage and reſolution, ſhe and her huſband invited him in the moſt preſſing manner to reſide under the ſame roof, and aſſured him that they would contribute every thing in their power to render his life as eaſy and comfortable as poſſible. He remained ſeveral months in a ſtate of uncertainty; but at length determined to accept their offer, to return to poetry, and to enjoy the pleaſures of ſociety in full liberty. Yet he did not ſeem inſenſible of the apparent indecorum and want of fortitude which he manifeſted in quitting, with ſuch ſeeming levity, the purſuit of ſtudies which had been recommended to him by his deceaſed patron. Nor was he quite at his eaſe on the ſide of delicacy, as to appearances; the obligations to the Bulgarini, under which he was loading himſelf, frequently oppreſſed his mind. And yet ſo limited is our power of penetrating into future events, that the meaſures which he now purſued, far from impeding either his fame or fortune, were the foundations of all his ſubſequent celebrity. An Italian poet has well deſcribed the ſhortneſs of mental viſion.

> " Sebben ſembra talor che torvo e iniquo
> Il volto verſo noi volga la ſorte;
> Ella ſeguendo ſuo coſtume antiquo
> A inaſpettata gioja apre le porte:
> E aſconde ſpeſſo ſotto calle obbliquo
> Della felicità le vie più corte:
> Onde non ſappia in mezzo ai torti, e ai guai
> L'uom che temer, nè che ſperar giammai."

> " Blind to the future, while he ſojourns here,
> Man knows not what to hope or what to fear;
> Amidſt misfortune, ſorrow, and diſmay,
> Fate oft, in frowns, points out the ſhorteſt way
> To fortune, fame, and unexpected joy,
> By means which prudence trembles to employ."

The Bulgarini was engaged to ſing in the theatre of Naples, during the carnival of 1724; and being very ambitious of appearing to as much advantage in the next opera as ſhe had done in that for the birth-day of the empreſs, ſhe preſſed the poet to write a drama, in which, as firſt woman, ſuch a character might fall to her ſhare, as would give her an opportunity of diſplaying all her powers, both as an actreſs and ſinger. It is eaſy to imagine with what zeal the Abate went to work, in order to gratify her wiſh. After many heroines had paſſed in review, Dido was at length choſen, and the drama, entitled " Didone Abbandonata," produced; in which he choſe the period of the hero, Æneas, quitting the Carthaginian queen: as it furniſhed ſcenes of the greateſt force and paſſion, as well as more expreſſion for his pen, and more abundant opportunities for the diſplay of the Romanina's abilities, than any other. This was the firſt perfect muſical drama, perhaps, that ever graced the Italian ſtage. The applauſe it obtained was equal to that of the " Orti Eſperidi;" and though the ſtory was ſo well known, that no effects could be produced by ſurpriſe, yet the pleaſure of the audience was exceſſive. It was ſet by Sarro, and the part of Æneas was performed by Nicolini.

From the great and ſudden celebrity of " Didone," which, immediately after its firſt appearance at Naples, was ſet by the beſt compoſers of the time for the other principal theatres of Italy; the Venetian miniſter at Rome, where it had been performed to Sarro's muſic, was inſtigated to apply to Metaſtaſio to write the opera of " Siroe," which he ſent to Venice, where it met with a ſucceſs equal to that of Dido, to the great emolument of the author, who was magnificently rewarded for the ſuperior excellence of his poetry. This drama was ſet by Vinci at Venice, and performed and printed in 1726.

It appears from the original *libretti*, or printed books of the words, that the Romanina not only performed the principal female part in Metaſtaſio's four firſt dramas at Naples, but in " Didone" and " Siroe," with Nicolini, at Venice, in which city they were firſt repreſented in 1725 and 1726; and, according to Quadrio, (Storia d'ogni Poeſia,) Metaſtaſio himſelf was at Venice during theſe performances. It was during this period that he altered the old opera of " Siface," for the ſame performers, at the requeſt of Porpora.

In the carnival of 1726, while the dramas of Metaſtaſio received ſuch unbounded applauſe at Venice, " Didone," as ſet by Vinci, was received at Rome with acclamation. The famous ex-jeſuit Cordara, who was there at that time, in his eloge of Metaſtaſio, recited at Alexandria in 1782, deſcribes its reception in the following manner:

" Every ſcene produced one continued applauſe. But who can deſcribe the rapture of the pit, when the queen of Carthage, diſdainfully riſing from the throne, repreſſes the inſolent pretenſions of the king of Mauritania, with the dignity of an independent princeſs, by the ſpirited air, " Son Regina," &c.? The noiſe ſeemed to ſhake the theatre to its foundation. I was not there myſelf, as my habit did not allow me to be preſent at ſuch ſpectacles; but I almoſt heard the rumour in my cell, ſo full was all Rome with the fame of this production."

In 1727, the Romanina having fulfilled all her theatrical engagements at Naples and elſewhere, prepared to return to Rome, yet declared at the ſame time, that ſhe would never ſee her native city again, unleſs in the company of her dear friend. He remained for a while irreſolute; but, at length, the warm affection he retained for the place of his nativity, in ſpite of the neglect and diſappointment which had driven him thence, heightened perhaps by his regard for the Bulgarini, and fortified by the deſire of ſeeing his father, and the reſt of his family, determined him to quit Naples, in company with his benefactreſs; but not before he had obtained a promiſe from her, that, in return for the hoſpitality which he had received under her roof at Naples, ſhe and her family ſhould become his gueſts at Rome. To this propoſition all parties having acceded, he wrote to his agents, to provide a houſe ſufficient for the two families of Trapaſſi and Bulgarini. And from the time of his arrival in that city, till his departure for Germany, they all lived under the ſame roof, and conſtituted one family. The Romanina, as more rich and accuſtomed to the management of a family, was inveſted with the ſuperintendance of all houſhold concerns: the reſt had nothing to do, but to attend their own purſuits; while

while Metastasio received visits, wrote verses, improved his circumstances, and increased his celebrity.

The first drama which he produced, expressly for Rome, was "Catone in Utica," which was set by Vinci, and performed in that city, 1728; and in 1729, at Venice, to the music of Leo. He chose the subject purposely to please the Romans, supposing that he should gain both applause and gratitude, by displaying the virtue of one of their own heroes. But as it seldom happens that a prophet or a poet (which in ancient times were united in the same person) receives due honour in his own country, particularly at Rome, which is proverbially called the residence of strangers; in spite of the excellence of this drama, which abounds with sublime, as well as tender sentiments and delineations, of the passions of glory, ambition, anger, and love; and in which the conduct was natural, and catastrophe historical; it was instantly attacked by the satirical genius of the Romans, and the performance suspended. The frivolous scenes, and feeble poetry to which they had been long accustomed, had corrupted the taste of the Roman public in general; and, except a few learned men, less invidious than the rest, who, if they knew of no modern Cato, had read, at least, something about the ancient, this piece was at first very coldly received; though afterwards, when their minds and tastes were enlightened and refined by other original and beautiful works of our author, this drama was treated with more justice.

The next opera which our author produced was "Ezio," set by Porpora, in 1728, and "Semiramide Riconosciuta," set by the same composer, 1729; but though both these dramas were received in the most favourable manner, and the praises bestowed upon the poet were unbounded, his fortune was not greatly improved by their success. Poetry has more frequently enriched the bookseller than the author, in every country; but at Rome, it is a drug of less value, even to the bookseller, than elsewhere; and Metastasio's muse, however chaste, was but little better treated for not being meretricious. If Metastasio had been a mere psalmodist, or hymnologist, his monkish rhymes might have obtained him some ecclesiastical preferment; but the poetry which he produced on pagan and secular subjects precluded him from every avenue to the church. He was, however, far from necessitous; and with the assistance of the Romanina, whose purse was always at his service, his fortune and situation were tolerably easy. But the being sometimes obliged to avail himself of the liberality of his generous friend, was a circumstance which humbled and mortified him beyond any other. He could not bear to reflect on being a burthen to her, for whom chiefly he wished to be rich, not only to exempt her from the expences which she incurred on his account, but to manifest his gratitude for the benefits she had already conferred on him.

His amiable friend tried every means in her power to set his mind at ease, concerning his obligations to her: assuring him that he had contributed much more to her professional fame than it had been in her power to do to his fortune; that she was in such circumstances as rendered the small friendly offices, which she had been able to perform, more a pleasure than an inconvenience; and pressed him, in the most urgent manner, to tranquillize his mind on that account, and to believe (which she assured him was the truth) that he was doing her the greatest favour, when he afforded her an opportunity of dividing with him her possessions.

The afflicted poet drew some comfort from these declarations, but it was of short duration. He was perpetually convinced of the ingratitude of his pretended Roman friends, and the duplicity of his protectors; and having nourished in his soul an ardent passion for general esteem, respect, and admiration, his narrow circumstances threw him into so profound a fit of melancholy, that he became incapable of receiving consolation.

Such was his state of despondency in 1729, when, to his great astonishment, he received a letter from prince Pio of Savoy, inspector of the imperial theatre at Vienna, inviting him to engage in the service of the emperor Charles VI., as the successor of Apostolo Zeno, who, from the year 1718, had filled the place of imperial laureate, whose chief employment had been to furnish dramas for music; and these had been justly thought the best which the Italian language could boast.

Metastasio was infinitely more surprised and flattered by this unsolicited and splendid offer, from finding that he had been recommended to the emperor's notice by the learned Zeno himself, who, growing in years, wished to retire to Venice, the place of his nativity, and had been applied to by his imperial majesty to recommend a successor.

And yet the offer of this employment to Metastasio, however dazzling, was not long productive of joy without deduction. The quitting Rome, for which he had always a filial fondness, as well as leaving his family, friends, and, perhaps more than all, the Romanina, impressed his mind with a sorrowful allay to his happiness.

Upon consulting with his family, they instantly conceived such magnificent hopes of his future aggrandizement, as contributed much to their consolation at losing him; and the Romanina was so generous and disinterested, in spite of secret affliction, as to use her utmost eloquence in removing his doubts, and diminishing the causes of his repugnance, at quitting Rome and his friends.

After many consultations and discussions of the several arguments for and against the acceptance of the proposition from Vienna, the answer which he sent, and which has been printed among his letters, contains so many characteristic traits of modesty, propriety, and delicacy, that it deserves to be preserved as a model of conduct under similar circumstances.

The result of meditation, and the advice of his family and friends, was to accept the appointment, and to throw himself at the feet of his imperial master as soon as he could arrange his affairs, and fulfil his engagements to furnish the Roman theatre with two new operas for the ensuing carnival.

His appointment at Vienna was settled at three thousand florins *per annum*, and fifty pounds sterling for the expences of his journey. After completing his two new dramas for Rome, which were "Artaserse" and "Alessandro nell' Indie," and which were both set by Leonardo Vinci, and performed before the poet's departure, he left his native city with a heavy heart, and a most sovereign contempt for the friendship and flattering promises of the great, by whose delusions he had so long entertained hopes of preferment in his native city; whence, at last, he was driven into a kind of splendid banishment, for the rest of his life. These early disappointments, from being extremely credulous, rendered him incurably sceptical, as to all future presages of good fortune; and the effects of hoping too much in early life, and too little after, produced, perhaps, the principal defects in his character.

Upon quitting Rome, Metastasio consigned into the hands of his zealous and affectionate friend, the Romanina, all his effects, interests, and concerns; together with the management of his family affairs: she most willingly submitting to

 these

these several tasks, as well as to the care of the produce of the little places, and sums of money, which he left behind him.

Of his reception at Vienna, where he arrived in July, 1730, by prince Pio and his imperial patron, there is among his letters an account written by himself to a friend at Rome, the day after he had been presented. It was to the highest degree flattering. And the emperor, who was of a grave, religious, and moral character, seems to have honoured him not only with his favour but affection, on finding in him principles congenial with his own.

In his correspondence with the Romanina, we have an account of his occupations at Vienna, during the first three years of his residence there; and the reception of his operas of "Adriano in Siria," "Demetrio," "Issipile," and his oratorio of "Sant' Elena al Calvario."

In 1734 he lost the friend of his head and heart, the Romanina, who died at Rome, and manifested the sincerity of her attachment to the poet, by bequeathing to him all her possessions, after the decease of her husband, to the amount of twenty-five thousand crowns. But Metastasio, always consistent with his usual rectitude and propriety, totally declined accepting of her intended kindness, and transferred the whole bequest to her husband, whose real property, according to our English ideas of jurisprudence, it seems legally to have been. The testamentary laws of Italy may be different from those of our country. Some Italian writers say, that the Romanina left Metastasio *erede di tutto il suo patrimonio*: "heir to all her patrimony." If by patrimony was meant an estate possessed by inheritance, and independently settled upon her at the time of her marriage, her testamentary dispositions are reconcileable to English ideas of law in such cases; though preferring the friend to the husband deviates somewhat from the general custom of our country. That the bequest was legal has never been doubted by Metastasio's biographers, who all speak of his renunciation in the highest terms of panegyric, as uncommonly disinterested, generous, and heroic. And the poet himself, as well as all Italy, regarded it as a noble sacrifice.

Whether Metastasio's connection with the Romanina was purely platonic, or of a less seraphic nature, we shall not attempt to determine. But the husband residing with them both at Naples and Rome, and the friendly manner in which the poet always mentioned him in his letters to the wife, and the openness with which he expressed his affliction in writing to him after her death, would, in England, be thought indications favourable to conjugal felicity. But a chaste actress or opera singer is still a more rare phenomenon in Italy than in Great Britain.

Yet though it is not thought absolutely necessary for the female singers of Italy to be vestals while single, or Lucretias when married, they find it convenient to have a nominal husband, who will fight their battles, contend with the first man, and impresario of an opera; and, occasionally, stand in the gap, as circumstances may require.

But whether the poet's friendship for Bulgarini, the husband, was pure and undissembled or not, his affliction for the death of his wife seems to have been unfeignedly deep and sincere. The following pathetic letter, written immediately after he had received the news of her decease, and of her testament in his favour, seems a faithful delineation of the state of his mind at this time, and to correspond with that goodness of heart, as well as those tender feelings and lofty ideas of rectitude, which appear in all his other writings, and which have ennobled the general tenor of his life.

"To signor Domenico Bulgarini.

"Oppressed by the afflicting news of the death of our poor Marianna, I know not how to begin this letter. The tidings are intolerable to me on so many accounts, that I can devise no means to diminish the acuteness of my sufferings; and, therefore, I trust you will not accuse me of want of feeling, if I am unable to suggest to you any consolation for your loss, as I have hitherto been utterly unequal to finding any for myself.

"The last disposition of the poor deceased in my favour aggravates the cause of my sorrow, and obliges me to give a public and incontestable proof of the disinterestedness of that friendship, which I professed to her while living, and which I shall preserve for her honoured memory to the last moment of my existence. Knowing, therefore, how much affection, kindness, and zeal, for the welfare of the poor Marianna, you have always manifested, I shall best shew my gratitude to her, by entirely renouncing, in your favour, all claim to her effects; not through pride, God preserve me from such ingratitude! but because it appears to be my duty, as an honest man and a Christian. The advantage which I shall still derive from this inheritance, even after renouncing it, will not be inconsiderable: as the knowing what was intended for me by the generous testatrix will be a lasting proof of her friendship; and the relinquishing it in your favour will be a proof of my disinterestedness with respect to her, and of my equity towards yourself. I am at present, thank God, in no need of such assistance, as I am rewarded beyond my merit; so that I shall not suffer by the sacrifice I make to you. Though I entangle you with no conditions in the renunciation which I enclose, yet I have some requests to make, and counsels to suggest to you.

"My first request is, that the relinquishing this claim may in no wise dissolve our friendship; but that, according to the wish of the poor Marianna, our correspondence may continue as entire as if she were still living; substituting you at all times, and in all places, for her representative.

"My second request is, that you will undertake the trouble of receiving the salaries of my three offices in Rome, and the transacting of my Neapolitan concerns, exactly in the same manner as was done by our incomparable Marianna; for which purpose, I send you proper powers. I write likewise to signor Tenerelli, at Naples, who will treat you in the same manner as signora Marianna herself; remitting to you, from time to time, whatever sums may be due to me from that quarter, continuing to my poor family the usual assignments and provision, if you shall chuse it, jointly with my brother.

"The advice which seems necessary for me to give you is, that you would assist the poor family of signor Francesco Lombardi, by every means in your power; and try by acts of charity to do every thing for them, which, in a similar situation, you would expect from them to you. I have specified in my renunciation some particulars in which you should assist them; but besides my unwillingness to involve you in trouble and difficulty, I am so certain of the goodness of your heart, that I have left all the merit of your benevolence towards them to the liberality of your own determination.

"In all things else, you are at full liberty to act as occasion, and your own prudence, shall suggest.

"At present, my mind is in too great perturbation for me to attempt giving you a plan for the regulation of your conduct. I shall only say, that it appears to me, as if you should dispose of all the effects you can spare, in order to raise a capital, and that you should live in a smaller house.

"I can

"I can think of no other testimony to offer you, at present, of my friendship and confidence. Be equally open in your correspondence, and consider my interests as your own, and me as your brother. I am unable now to write a longer letter: when my mind is more tranquil, I shall communicate to you such thoughts as may occur.

"In the mean time, love me, and endeavour to be comforted yourself. Be assured, if it were in my power, that I would try to contribute that to your consolation, which I am unable to receive myself."

In a letter to his brother Leopold, apologizing to him for the renunciation of the Romanina's intended kindness, he says, "I ought not to abuse the partiality of my poor deceased friend, at her husband's expence; and God, I trust, will permit me to prosper by some other means, for my integrity."

To a friend at Rome, on the subject of his affliction, he says, "I am now placed in the world as in a populous desert, and in that kind of desolation in which a man, if he were transported in his sleep to China or Tartary, would find himself in waking, among people of whose language, inclinations, and manners, he was quite ignorant."

If platonic affection can subsist in human nature, we may suppose it possible, perhaps, to have been realized between the poet and such a female friend as the Romanina; who, by what we can gather from Metastasio's letters, seems to have possessed a strong mind and great rectitude of heart.

The solemn manner in which so pious and moral a man as Metastasio says in his letter to a Roman friend, "In the midst of my gloomy imaginations, reason enough is left to tell me who, and what I am; but that is not sufficient to free me from affliction. May God, in whose hands are all events, turn this affliction to my benefit, and teach me by such a manifestation, what a vain hope it is to form systems of happiness, without his assistance." The late Mr. Mason, on reading this passage, regarded it as a proof that there had been nothing criminal between them.—"Such a man as Metastasio, writing to a friend, would have expressed in this place some compunction, at least he would not have invoked the Deity in such a solemn manner."

We have dwelt the longer on this incident in the poet's life, which places him, like Alcides, between virtue and vice, in hopes that a character, so exemplary during every other period of his existence, may, for the honour of humanity, descend spotless to posterity. In all other respects, his private virtues merit equal praise with his poetry, which has so long delighted the most polished and refined inhabitants of Europe.

Among the anecdotes, indeed, that were published after his decease, concerning the private life of our admirable bard, some peculiarities have been related, which seem too serious for ridicule, and from which we should be sorry, for his honour, and for the honour of human nature, not to be able to defend him. What a disgrace to practical virtue and benevolence would it be, to find a writer, whose works breathe the purest principles of virtue and morality, and whose life, during his long residence at Vienna, was unimpeachably innocent, and constant in the exercise of religious duties, to want, not only filial and fraternal affection, but even those common and laudable partialities for his kindred and countrymen, to which the most vulgar minds are naturally prone! It has been said with a degree of levity, perhaps more to enliven a period than from conviction, or a wish to degrade the poet's moral character, that "he refused to hear, and took pains not to know, whether he had, in his latter days, any relation left in the world." But in his correspondence, published by his executor signor Giuseppe Martinetz, aulic counsellor, and first keeper of the imperial library, there are letters to his father and brother, so full of filial and fraternal affection, as completely confute such hasty and unjust charges.

The year 1733 seems to have been extremely fertile in the Parnassian domains of our bard. Not only the operas of "l'Olympiade" and "Demofoonte," with the oratorio of "Giuseppe Riconosciuto, but his charming canzonet, "La Libertà," were all productions of this year. This celebrated canzonet, "Grazie agl' inganni tuoi," was first set by the poet himself, but soon after by all the great composers of Italy, as a Venetian ballad, a canzonet, a duo, and a cantata, to much more elaborate and fanciful music than that of the poet: yet his own melody, which has been composed more than seventy years, has still its merit; and, compared with airs of the same period and kind, is superior to most of them in elegant simplicity.

In 1734, besides his usual occupations, we find, by his letters, that he was obliged, in the greatest haste, to write an entertainment for music, to be performed by the archduchesses, and to instruct, direct, and assist them. "But in truth," he says, "it is a pleasure which no other can equal, to have such an opportunity of seeing and admiring the excellent qualities of these august princesses. I should not else have believed it possible to meet with such attention, docility, patience, and gratitude. Oh, how many people, of the sixteenth rank, have I known, who were not possessed of the thousandth part of the courtesy of these incomparable personages! They have acted and sung like angels, and it was truly sacrilege, that the whole world was not permitted to admire them; for the festival was extremely private, as none but the Vienna ladies of the highest rank were able to obtain admission, and even these were in masks. As a return for instructing their serene highnesses, I was presented with a gold snuff-box, of about fourscore hungheri (near 40*l.*) in weight; but the workmanship is of much more value."

This little dramatic poem was called "Le Grazie Vendicate," set by Caldara, and performed by the two archduchesses, Maria Teresa, afterwards empress-queen, and her sister Marianne, with another lady of the court.

In the year 1734 he produced, for the emperor's birthday, "La Clemenza di Tito."

It seems as if the character and court of Charles VI. had directed the muse of Metastasio to chuse a virtuous prince for the principal hero of most of the musical dramas that were represented in the imperial theatre. The emperor was a religious prince, and a rigid observer of decorum himself, which consequently kept licentiousness at a distance from his court. And the poet, naturally a friend to virtue and morality, seems to have gratified his own feelings, by conforming to the serious sentiments of his imperial patron.

In 1735 he produced, by command of the empress Elizabeth, a little opera, with three characters only, entitled "Le Cinesi," for the same two archduchesses and a lady of the court to perform, as an introduction to a Chinese ballet.

The same year he furnished "Il Palladio conservato," and "Il Sogno di Scipione," pieces written for the celebration of the emperor and empress's name-day. These were a kind of birth-day odes, but in a dramatic form, in which the praise was delicately disguised in a fable or allegory.

In 1736, his "Themistocles," set by Caldara, first appeared; but while this was performing, Metastasio had another task assigned him, the difficulties of which he frequently related to his friends, many years after.

To Betinelli, the printer, he writes: "I send you a copy of of the opera of 'Achille in Sciro,' which I have been obliged to write in eighteen days and a half, for the nuptials of the archducheſs Tereſa with the duke of Lorrain. Three months, which I uſed to allow myſelf for writing an opera, were never ſufficient to finiſh it to my mind: imagine whether it was poſſible to ſatisfy myſelf with this."

The admirable drama of "Ciro Riconoſciuto" was a production of this period.

It ſeems as if 1737 had been a ſabbatical year for our author and his muſe; for none of his poetical works bear that date, nor do any of his letters of that period appear in the collection.

In 1738 and 1739 he produced ſeveral ſmall occaſional pieces, chiefly for the archducheſſes to perform; which, though elegantly written, have not been of that general uſe to the reſt of Europe, which fell to the lot of moſt of his operas on a larger ſcale, for want of length and more characters.

In 1740, however, his dramatic muſe was better employed, and more propitious: for, beſides the opera of "Zenobia," and the oratorio of "Iſacco," he wrote "Il Natale di Giove," and the opera of "Attilio Regolo," for the birth-day of the emperor Charles VI.; but that prince dying before it had been repreſented, it was laid aſide, and not performed till 1750, when it was ſet by Haſſe, for the court of Dreſden.

The poet laments the death of his patron with great ſenſibility, in a letter to a friend. Indeed it was a calamity to all Europe, by the general war which immediately enſued.

This prince found in Metaſtaſio a man who encouraged and confirmed his love of virtue, decorum, and propriety; and Metaſtaſio found in his patron a prince ſuſceptible of receiving his recommendations of the moral and ſocial, as well as the heroic virtues. Indeed the poet and the patron ſeem to have been formed for each other.

Between the death of this emperor, in 1740, and 1745, when prince Charles of Lorrain, conſort to the empreſs-queen, was elected emperor, by the title of Francis I., the court of Vienna had little leiſure for being amuſed by the peaceful arts of poetry and muſic. We find, among the poet's works, but two complete dramas written during all that time: "Antigono," and "Ipermeſtra." One of theſe, "Antigono," was written expreſsly for the court of Dreſden. Both were ſet by Haſſe, who ranked high in the favour of Metaſtaſio, as a great compoſer and intelligent man.

Our author's poetical productions in 1746 conſiſt only of his two beautiful canzonette, "La Partenza," and "La Palinodia a Nice," thirteen years after he had ſo piouſly and elegantly thanked the gods for diſcovering to him her infidelities, in his "Grazie agl' inganni tuoi."

His correſpondence with the celebrated Farinelli began in 1747, to whom 38 of his letters are addreſſed, in the ſixth volume of his correſpondence, which ſeem the moſt affectionate and confidential in the collection. The poet and muſician were nearly of the ſame age. And having begun their career of fame and fortune together at Naples, in 1723, they, from that circumſtance, ever after called each other *Gemello*, or Twin, in their correſpondence, which laſted to the end of their lives. Many of the poet's letters were addreſſed to the great ſinger at Madrid, where, during two ſucceſſive reigns, he enjoyed the higheſt favour. See Farinelli.

The bleſſings of peace, after the ſeven years' war, revived at Vienna the innocent pleaſures of the lyric theatre; and in 1751 produced Metaſtaſio's beautiful opera of "Il Re Paſtore," which was followed, in 1752, by "l'Eroe Cineſe." Theſe were performed in the imperial theatre by perſons of the higheſt diſtinction, ſome of whom are ſaid greatly to have ſurpaſſed, in many particulars, profeſſed opera ſingers of the firſt rank.

In 1756, at the requeſt of his friend Farinelli, and with the permiſſion of his imperial patrons, he furniſhed the court of Spain with a new opera, entitled "Nitteti," which was brought on the ſtage there, with the utmoſt ſplendour and magnificence, under Farinelli's direction.

The laſt three operas written by Metaſtaſio, were "Il Trionto di Clelia," in 1762; "Remolo ed Erſilia," 1765; and "Il Ruggiero," in 1771; which were performed at three ſeveral places: the firſt at Vienna, on the delivery of Iſabella of Bourbon, firſt conſort of the emperor Joſeph II.; the next at Innebruck, on the marriage of the grand duke of Tuſcany with Maria, Infanta of Spain; and the laſt at Milan, on the nuptials of the archduke Ferdinand with Beatrice, princeſs of Modena, which terminated the dramatic labours of our admirable lyric bard.

His other poetical compoſitions, which are very numerous, conſiſt of oratorios, occaſional ſhort lyric pieces, hymns, and ſacred ſongs, cantatas, epithalamia, ſonnets, canzoni, complimentary verſes, &c., all replete with elegance, refined ideas, and every beauty of numbers which the Italian language ſo copiouſly can furniſh, and melody requires.

Among his proſe writings, the extracts from Ariſtotle's Poetics, and the Ars Poetica of Horace, are the principal; and theſe will long remain indiſputable proofs of his learning, good taſte, and perfect comprehenſion of the laws preſcribed by theſe great maſters, which he explains with the utmoſt clearneſs and practical utility; giving ſenſe to many paſſages that were thought obſcure and unintelligible.

In all his productions, religion, government, ſound policy, morals, manners, and even innocent prejudices, are ſo highly reſpected, that the moſt extreme delicacy never finds the leaſt ſentiment that can offend or alarm. His doctrines and practice in theſe particulars ſo perfectly agreed, that he conſtantly diſcountenanced in converſation all tendency to licence, diſreſpect, and diſputation on moral and ſacred ſubjects, though naturally cheerful, and pleaſantly metaphorical, in his converſation. This being his invariable practice during his long reſidence at Vienna, excited as much eagerneſs in travellers of all ranks to ſee and converſe with him, as the renown which he had juſtly acquired by his writings.

He was honoured with teſtimonies of reſpect and admiration from almoſt all the ſovereigns in Europe, where the Italian language and muſic were known, which he received with the utmoſt humility and gratitude.

Such were the delicacy and conſtancy of his friendly attachments and intercourſe, that death could only diſſolve them. The princeſs di Belmonte Pignatelli, the counteſs d'Althan of the ſame illuſtrious family, who knew and patroniſed him in his early youth; count Canale, baron Hagen, and count Perlas, who ſpent all their evenings with him at Vienna during their ſeveral lives; Farinelli, his correſpondent of 50 years duration, count Algarotti, and his brother, the advocate, Leopoldo, to whom 48 of his letters are extant; all theſe affections were habitual and deeply rooted in his heart.

His whole life appears to have been of that even tenour, which nothing but great accidents or public calamities could diſturb. His veneration and gratitude for his patroneſs, the empreſs queen, ſeem, during the laſt years of his life, to have been the ſtrongeſt paſſions to which he gave admiſſion in in his breast. When unfortunate in war, or on account of the sickness or death of any of her family, he was as much agitated as any of her most faithful and best subjects. But when her own life was endangered by disease, his equanimity and philosophy totally left him. Then yielding to the natural sensibility and tenderness of a heart, neither chilled by apathy, nor petrified by stoicism, he became a common man; not too stubborn for affliction, or too proud and obdurate for the impressions of calamity. The sickness of his brother, and death of the countess d'Althan, are likewise illustrations of this occasional sensibility.

His conversation was usually scientific, turning on new discoveries, new books, pleasing events, but rarely on calamity or unpleasant topics. By this means he kept his passions and affections in equilibrio, obtained prosperity in youth, and veneration in old age.

Though his longevity had extended to 84, yet his faculties were so entire, his person so free from any appearance of decrepitude, still possessing a florid countenance, and his accustomed eloquence, and playful language in conversation, that he was expected to have many years in store; but on the 1st of April, 1782, returning from his constant evening visit to count Perlas, he complained of a chilliness, eat very little at supper, and went to bed at his usual hour of 12 o'clock. "The next morning, (says mademoiselle Martinetz in her letter to Farinelli, giving him an account of his friend's decease,) he called for my elder brother, Giuseppe, and consulted him whether he had best rise and go to church, as he had intended, it being Easter Sunday; but was advised by him to remain in bed, as his pulse was very quick: an hour after the fever increased to such a degree, that it deprived him of speech, and he remained oppressed by a heavy lethargic sleep, which continued during two days, with short intervals, in which he was only able to take the medicines prescribed by Dr. Molinari, his physician. The fever diminished so much on the morning of the fifth day, that he became tranquil, spoke freely, conversed with some of his friends, who visited him, and was able, after dinner, to have the sacrament administered to him. You may imagine, sir, what great consolation this afforded us; but our hopes were of short duration, for at night the fever returned with such violence, that every day he became more lethargic, and baffled all the skill of the most able physicians, who met in consultation; so that on the 12th of April, between 11 and 12 o'clock at night, he finally, without much agony, expired."

Metastasio, lamented by all who knew or had heard of him at Vienna, was interred at the parish church of St. Michael, the 14th of April. The funeral rites were performed with splendour, by his grateful heir, signor Joseph Martinetz, in despite of the poet's injunctions, who had forbidden all kind of pomp. The inheritance of signor Martinetz consisted in a well-furnished habitation, a coach, horses, a great quantity of princely presents, a very ample and select collection of books, with a capital of 130,000 florins; from which, however, were to be deducted, 20,000 for each of the executor's sisters, and 3000 for each of his younger brothers.

The poet's attachment to the Martinetz family was of long standing. In the year 1730, on his arrival at Vienna, the first house in which he took up his residence, was that of signor Nicolò Martinetz, master of the ceremonies to the apostolic nuncio in that city. The eldest son of this gentleman he appointed his heir, jointly with his eldest sister, signora Marianna Martinetz, educated under his eye, and universally admired for her talents and accomplishments, particularly in music, not only as an excellent performer on the harpsichord, and an exquisite singer, but for her genius and abilities in composition, she was an elève of the great Dr. Haydn, who resided three years under the same roof with Metastasio during her musical studies; and had lessons in singing from the celebrated Porpora, who had many years before been the poet's own music master. The productions of mademoiselle Martinetz were communicated to, and approved by the greatest masters of Italy, and her name is inscribed as a member of the Philharmonic academy in Bologna and Mantua.

Signor Saverio Mattei, the most useful of Metastasio's biographers, though he rather gives advice to others, with loose and indigested materials, than a regular life of the poet, says, that "whoever wishes to acquire an exact knowledge of his customs, manners, way of life, opinions of himself and others; of his precision in fulfilling his duties, of the changes in his fortune, his application, and the different degrees of favour with which his several productions were at first received, their chronology, the influence they had on the taste of Italy, and on that of all Europe, with respect to the melodrama, or lyric stage, can only acquire such information by the perusal of his Letters."

"His Letters (says the abate Cristini, the most accurate and ample of all his biographers, and editor of the Nice edition of his works) will do honour to all Italy, while they discover his most intimate attachments, his most secret thoughts, his favourite opinions, and the history of a man who was all heart and all virtue."

"His genius (says signor Arteaga, Revol. del Theatro Mus. Ital.) may be compared to the goddess Chloris of the Greeks, who, in flying through the air, scattered roses wherever she went." The same grace, facility, and elegance of style appear in his prose, as have rendered his poetry so justly celebrated. Till we saw these Letters, we used to think that there was no Italian prose so easy to comprehend and construe, by young students in the language, as the dramas of Metastasio; but we are now convinced, that, in point of facility, the prose of our author is to his own poetry, what the prose of others is to their verse.

What renders these Letters infinitely more natural and satisfactory is, that, like the Epistolæ Familiares of Cicero, they were not written with the least view to publication; as is manifest by the lively complaints which he makes to his correspondents, who, for the gratification of their own vanity, had betrayed his confidence.

Few writers have been fortunate enough to enjoy the favour of the public so completely during their lives as Metastasio. But this felicity is not to be more ascribed, perhaps, to the excellence of his writings, than to his modesty, candour, and determination neither to give nor take offence by censuring the productions of others, or resenting the censures of his own. He seems to have seen, with due horror, the effects of literary war on the combatants.

That celebrity which he enjoyed so indisputably during life, was not diminished by his decease; his works are still in every hand: the philosopher, the courtier, the bigot, the man of the world, austere and gallant females, all equally read them, and all find them equally beautiful. His moral maxims are daily cited, and his productions are become the code of lovers. The setting and singing his verses, have rendered Pergolesi, Vinci, Jomelli, Sacchini, and Farinelli, Caffarelli, Pacchierotti, and Marchesi, as celebrated in all parts of Europe, as Corneille, Racine and Voltaire. Had his dramas been regular tragedies, written for declamation, without music, perhaps we should never have heard of them in England: but music being an universal language throughout Europe, they are certainly obliged to the composer and

singer

finger for a great part of their fame, at least out of Italy, notwithstanding the complaints of Metastasio himself, and the admirers of tragedy, who are inimical to music, that they have been injured by composers and performers. Particular operas, and perhaps, at some time or other, all his dramas, may have fallen into the hands of composers without genius, and singers without talents; but upon the whole, excellently written as are Metastasio's dramas, and exquisite as is the Italian language, it must be owned, that music has been the vehicle in which the operas of Metastasio have travelled into foreign countries. Cato, Regulus, Themistocles, Artaxerxes, Olimpiade, and Demofoonte, are allowed to breathe a true tragic spirit, even through the effeminate languor of lengthened tones and long divisions; but it is in the perusal, perhaps, not the vocal performance, that the force and beauty of Metastasio's dramatic scenes have been discovered out of Italy. When an air has been encored, it has not been for the beauty of the poetry, but the composition or performance of that air. It must be allowed, however, without the least deduction, that Metastasio's genius, good taste, and sound judgment, first achieved the difficult task of rendering so wild and incongruous a compound of seemingly heterogeneous ingredients and absurdities, as an *opera*, a rational entertainment.

Even the church has defended the morality of Metastasio's dramas. The ci-devant Jesuit, father Cordaro, in his eulogy of our poet, says, "I well know that he has been accused by some of having brought the passion of love too forward in his dramas, at the risk of seducing and enervating the heart and virtue of the hearers. How shall we defend him from this charge? He would certainly have done better, if he could have confined himself to the love of glory, and of our country, in displaying the virtues of valour, fidelity, and constancy, without meddling with the follies of lovers. But there are certain noble affections, concerning which, the vulgar have but little knowledge, and less taste. On the contrary, every one understands love; and without that seasoning every representation, at present, seems insipid. It is the predominant passion of the times. He was perhaps necessitated to comply with it; but with what precaution and reserve! Has an unchaste word ever escaped him? Or an idea that is not strictly within the limits of the most perfect delicacy? This may be said of his secular dramas taken from profane story; but his sacred dramas are not only exempt from blame with respect to the passion of love, but sufficiently pure in morals and doctrine, to serve as correctives to whatever the most morose critics may object to his productions for the stage."

The chronology and *moral object* of each drama is indicated in the English Memoirs of his Life and Writings, vol. iii. p. 316. &c.

We dare extend this article no farther. Our biographical articles should doubtless, in general, be confined to the battles of heroes, and books of the learned; but Metastasio's private character, meriting as much display as his public productions, we could not in our sketch of his life help stopping on the road to look about us, and admire the beautiful views which a life well spent affords.

METASTASIS, in *Medicine*, μεταστασις, signifies a translation or transition of disease from one part of the body to another, the part first affected recovering its natural functions at the time when the other begins to be diseased.

These transitions of disease have been noticed from the earliest history of the practice of medicine; and the writings of Hippocrates abound with instances of the fact, and with practical precepts, deduced from a careful observation of the consequences that ensue under the various circumstances of their occurrence. The older writers, who ascribed all diseases to the existence of a morbid matter, which, in whatever part it prevailed, gave rise to peculiar local symptoms, readily explained these instances of metastasis, upon the supposition that the morbid matter was substantially translated from the part first diseased to the seat of the new affection: indeed, this translation of the disease was deemed by them one of the proofs of the existence of a *materies morbi*. But we have already shewn, at some length, that the existence of such a morbid matter, as the efficient cause of diseases, is purely a gratuitous supposition, which more accurate investigation has exploded; and that the fact of the transition of disease by what has been called *metastasis*, although not easily explained upon any hypothesis, is as satisfactorily accounted for on the principle of sympathy, through the medium of the nervous system, which experiment has demonstrated, as upon the notion of an actual transference of morbid matter, which is hypothetically assumed. See HUMORAL *Pathology*.

It is scarcely necessary here to point out examples of the metastasis of diseases, which are universally recognised: such are the severe attacks of disorders in the stomach, when the inflammatory gout suddenly disappears from the extremities; the occurrence of diarrhœa or dysentery, upon the sudden retrocession of the measles, or other extensive eruption on the skin; the appearance of epileptic convulsions upon the cessation of the hæmorrhoidal, or other habitual discharge; the inflammation of the testes in men, or of the mammæ in women, which ensues, when that of the parotid glands in the disease called *mumps*, suddenly disappears; and other cases of a similar nature.

The transition by metastasis, however, is only one of several modes in which diseases are converted into each other. Of these we have already described the varieties in a former article, to which we refer the reader. See CONVERSION *of Diseases*.

METASTASIS, Μεταστασις, *Remotio*, in *Rhetoric*, is used for the removing the blame from the person accused to another person, or laying it upon something as a cause. Thus, Adam's excusing himself by blaming Eve, is an example of the former; and the laying the crime of drunkenness upon the wine, is an instance of the latter.

METASTELMA, in *Botany*, from μεῖα, signifying *a change*, and στελμα, *a crown*, because the usual crown of the stamens being wanting, its place is supplied by a five-toothed appendage to the mouth of the corolla. Brown in Wern. Trans. v. 1. 52.—Class and order, *Pentandria Digynia*. Nat. Ord. *Contortæ*, Linn. *Apocineæ*, Juss. *Asclepiadeæ*, Brown.

Ess. Ch. Corolla bell-shaped; its mouth crowned with five prominent teeth, opposite to the sinuses, running down the tube. Crown of the stamens none. Anthers tipped with a membrane. Masses of pollen compressed, attached by their taper points, pendulous. Stigma pointless. Follicles. . . .

M. *parviflorum*. (Cynanchum parviflorum; Swartz Ind. Occ. 537. Willd. Sp. Pl. v. 1. 1258. Periploca scandens, nummulariæ foliis, flore albo; Plum. Ic. 209. t. 215. f. 1.)—Native of wild mountainous thickets in the West Indies, in various islands of which it was gathered by Plumier, Swartz, Masson, and Von Rohr. The *stem* is somewhat shrubby, twining to a great extent, subdivided, slender, bluntly quadrangular, smooth like every other part of the herbage; its branches thread-shaped, opposite, spreading, and twining. *Leaves* about an inch long, opposite, distant, stalked, ovate, entire, thin, smooth on both sides, with one rib, and several transverse veins, tipped with a minute, rigid, awl-shaped point. *Umbels* nearly sessile between the footstalks, of about six or eight small, stalked, greenish-white *flowers*, whose segments are acute, finely downy, thickened at the edges, and reflexed. Mr. Brown complains of the inaccuracy of Dr. Swartz's description of the crown of the flower, and we have also to remark that the umbels are, as the former truly says, between the footstalks, not axillary; and the leaves have a very conspicuous rib, as well as numerous veins. The name was given by Dr. Solander, from whom, as well as Dr. Swartz, we have specimens.

METATARSIUS, in *Anatomy*, the abductor minimi digiti pedis. See Abductor.

METATARSUM, in *Natural History*, a name given by authors to a sort of stone supposed to represent a human foot. See Metapedium.

METATARSUS, in *Anatomy*, one of the divisions of the foot. See Extremities.

METATEPEC, in *Geography*, a town of Mexico, in the province of Guasteca; 50 miles S. of Panuco.

METATHESIS, Μεταθεσις, formed of μετα, *trans*, and θεσις, *position*, *transposition*, a grammatical figure, whereby letters or syllables of a word are transposed, or shifted out of their natural situation; as *Evandre* for *Evander*; *I pre* for *prei*.

Metathesis, a word used by medical writers for a change of place in such humours, or other diseased parts, as cannot be absolutely removed or sent off. Thus a metathesis of a cataract is a depression thereof, so that it no longer shuts out the light.

METATOR, among the Romans, a quarter-master. Out of every legion a tribune, and some centurions, were appointed to go before the army, in order to choose a place for a camp, and assign and mark out quarters to each legion.

METAWAUMKEAG, in *Geography*, a large northerly branch of the river Penobscot, in America.

METCHICOT, a lake of Canada. N. lat. 50° 22'. W. long. 88° 30'.

METCHIGAMIAS, a long narrow lake, or rather dilatation of the northern branch of the river St. Francis, in Louisiana, which falls into the Missisippi from the N.W. about four miles above Kappas Old Fort.

METE, a small island in the Arabian sea, near the coast of Adel. N. lat. 11° 10'. See Babelmandeb.

METEARA, a town of Hindoostan, in Bahar; 23 miles S.E. of Saseram.

METECAL, or Metical, in *Commerce*, a weight for gold, silver, and diamonds, in the Levant. At Aleppo it is used for weighing pearls and ambergris, and is $1\frac{1}{2}$ drachm, or 73 English grains. At Damascus, silver is sold by the ounce of 10 pesi, or $6\frac{2}{3}$ metecalli, weighing 19 dwt. 4 gr. English troy. At Smyrna, gold and silver lace is sold by the metical of $1\frac{1}{2}$ drachm avoirdupois, or 72 grains troy weight, very nearly. See Weights.

METEGAVEL, in our *Old Writers*, a tribute or rent paid in victuals, which was a thing used in this kingdom, as well with the king's tenants as others, till the reign of king Henry I.

The word is Saxon, *metagavel*; *i. e. cibi gablum, seu vectigal.*

METELAR, in *Geography*, one of the Laccadive islands. N. lat. 12° 18'. E. long. 72° 25'.

METELE, a town of Lithuania, in the palatinate of Troki; 36 miles N. of Grodno.

METELEN, a town of Germany, in the bishopric of Munster; 19 miles N.W. of Munster. N. lat. 52° 14'. E. long. 7° 10'.

METELIN. See Mitylene.

METELINOS, a town of the island of Samos; 2 miles N.E. of Cora.

METELLUS, Quintus Cæcilius, in *Biography*, the son of L. Cæcilius Metellus Calvus, was raised to the consulate, during the Jugurthine war, with M. Junius Silanus, in the year B.C. 109. On casting lots for the consular provinces, that of Numidia fell to Metellus, who made immediate preparations for retrieving the honour of the Roman arms, which had lately fallen into disgrace through the successes of Jugurtha. He was extremely careful in the selection of the officers to serve under him, and chose, among others, of known military talents, the famous Marius, who, for want of interest, had for some time remained unemployed at Rome. Having restored order and discipline in his army, he marched into the centre of Numidia, where he defeated and dispersed the whole force commanded by Jugurtha in person. When the consular year was ended, the command was continued to Metellus as pro-consul, and he pursued the plan of ruining the country of Jugurtha, and cutting off his resources. At length the circumstances of the Numidian obliged him to enter into a treaty with Metellus, by which he delivered up all his elephants, a number of horses and arms, and all the deserters from the Roman army. The latter, to the disgrace of the conqueror, were put to death, with great cruelty. Jugurtha took the first opportunity of appearing again in arms, and the people rose upon a Roman garrison, and massacred the whole, excepting the commander Turpilius. Metellus soon recovered the place, brought Turpilius to a court martial, and caused him to be put to death, on account of which he underwent the keenest remorse: having been influenced in his decision rather by popular clamour than by the strict rules of justice. Marius had been a leading actor in the condemnation of Turpilius, and triumphed in the consequences which it had upon the mind of Metellus, whose character with the people he endeavoured to injure. The third year of his command was going on, and nothing decisive had been effected. Of this his rival, Marius, made a handle, and by his representations to the people was able, not only to procure his own election to the consulate, but to obtain a decree for his superseding Metellus in the conduct of the Numidian war. Metellus deplored his hard fate with tears. He refused to see his rival; delivered up his army by a lieutenant, and immediately embarked for Rome. He was received with great honour by his friends and partizans, who obtained for him the honour of a triumph. Being charged with peculation by a tribune, he would have produced his books in his own justification; but the Roman knights who sat as his judges refused to examine his accounts, declaring that they considered the whole tenor of his life as a sufficient testimonial of his innocence. Having passed with honour through his military career, there remained a trial of his civic virtue and firmness, in which he obtained equal credit. In the year B.C. 100, the most violent measures were carried on by the popular leaders; and the tribune Apuleius Saturninus having prepared an Agrarian law, procured a clause to be previously passed, that the senate would swear to confirm whatever the people should enact. Metellus opposed the proposition; the senate, to a man, joined in a similar opposition. Marius, who had led them to this determination, by pretending to entertain the same sentiments, soon retracted, and took the oath; all the senators, excepting Metellus, followed his example. Metellus persisting in his resolution was condemned to banishment. His friends offered to oppose this act of injustice, but he declared that not a drop of blood should be spilt on his account. He said, "either the state of public affairs will change, and I shall be recalled; or, if they remain as as they are, I ſhall be better off any where than at Rome." He then paſſed over to Rhodes, or Smyrna, where he paſſed his time in the ſtudy of philoſophy. In the following year, a decree was paſſed by a great majority for his return: the news was brought to him while he was aſſiſting at ſome public games, and though he was informed that the packet contained pleaſing intelligence, he would not open it till the ſpectacle, perhaps a religious ceremony, was over. On his return to Rome he was met at the gates by all the perſons of diſtinction in the city, and was accompanied to his houſe by great crowds of people, and at the next conſular election the public eſteem for him was ſhewn by accepting his recommendation of one of his own name and family. After this, we hear no more of this worthy man.

METEMPSYCHI, in *Church Hiſtory*, heretics, who, in imitation of the Pythagoreans, maintained the tranſmigration of ſouls. See METEMPSYCHOSIS.

METEMPSYCHOSIS, Μετεμψυχωσις, formed of μετα, *beyond*, and εμψυχω, *I animate*, or *enliven*, in the *Ancient Philoſophy*, the paſſage or tranſmigration of the ſoul of a man, after death, into the body of ſome other animal.

Pythagoras and his followers held, that, after death, men's ſouls paſſed into other bodies, of this or that kind, according to the manner of life they had led. If they had been vicious, they were impriſoned in the bodies of miſerable beaſts, there to do penance for ſeveral ages; at the expiration whereof, they returned afreſh to animate man. But if they had lived virtuouſly, ſome happier brute, or even a human creature, was to be their lot.

What led Pythagoras to this opinion was, the perſuaſion he had, that the ſoul was not of a periſhable nature: whence he concluded, that it muſt remove into ſome other body upon its abandoning this. According to Empedocles, human ſouls, in the courſe of the tranſmigration to which they are liable, may inhabit not only different human bodies, but the body of any animal or plant. Lucan treats this doctrine as a kind of officious lie, contrived to mitigate the apprehenſion of death, by perſuading men, that they only changed their lodging; and only ceaſed to live to begin a new life.

Reuchlin denies this doctrine; and maintains, that the metempſychoſis of Pythagoras implied nothing more than a ſimilitude of manners, deſires, and ſtudies, formerly exiſting in ſome perſon deceaſed, and now revived in another alive. Thus, when it was ſaid, that Euphorbus was revived in Pythagoras, no more was meant than that the martial virtue, which had ſhone in Euphorbus at the time of the Trojan war, was now, in ſome meaſure, revived in Pythagoras, by reaſon of the great reſpect he bore for the athletæ. For thoſe people wondering how a philoſopher ſhould be ſo much taken with men of the ſword, he palliated the matter, by ſaying, that the ſoul of Euphorbus, *i. e.* his genius, diſpoſition, and inclinations, were revived in him. And this gave occaſion to the report, that Euphorbus's ſoul, who periſhed in the Trojan war, had tranſmigrated into Pythagoras.

Ficinus aſſerts, that what Plato ſpeaks of the migration of a human ſoul into a brute, is intended allegorically, and is to be underſtood only of the manners, affections, and habits, degenerated into a beaſtly nature by vice. Serranus, though he allows ſome force to this interpretation, yet inclines rather to underſtand the metempſychoſis of a reſurrection.

Pythagoras is ſaid to have borrowed the notion of a metempſychoſis from the Egyptians (ſee EGYPT); others ſay, from the ancient Brachmans. It is ſtill retained among the Banians, and other idolaters, of India and China; and makes the principal foundation of their religion. (See BRACHMANS, BANIANS, and GENTOOS). So extremely are they bigotted to it, that they not only forbear eating any thing that has life, but many of them even refuſe to defend themſelves from wild beaſts. They burn no wood, leſt ſome little animalcule ſhould be in it; and are ſo very charitable, that they will redeem from the hands of ſtrangers any animals that they find ready to be killed. See PYTHAGOREANS.

METEMPTOSIS, from μετα, *poſt*, and πιπτω, *cado*, *I fall*, a term in *Chronology*, expreſſing the ſolar equation, neceſſary to prevent the new moon from happening a day too late.

By which it ſtands contradiſtinguiſhed from *proemptoſis*, which ſignifies the lunar equation, neceſſary to prevent the new moon from happening a day too ſoon.

The new moons running a little backwards, that is, coming a day too ſoon at the end of three hundred and twelve years and a half; by the proemptoſis, a day is added every three hundred years, and another every two thouſand four hundred years; on the other hand, by the metemptoſis, a biſſextile is ſuppreſſed each one hundred and thirty-four years; that is, three times in four hundred years. Theſe alterations are never made but at the end of each century; that period being very remarkable, and rendering the practice of the calendar eaſy.

There are three rules for making this addition, or ſuppreſſion, of the biſſextile day, and, by conſequence, for changing the index of the epacts. 1. When there is a metemptoſis without a proemptoſis, the next following, or lower index, muſt be taken. 2. When there is a proemptoſis without a metemptoſis, the next preceding or ſuperior index is to be taken. 3. When there are both a metemptoſis and a proemptoſis, or when there is neither the one nor the other, the ſame index is preſerved. Thus, in 1600, we had D; in 1700, by reaſon of the metemptoſis, C was taken; in 1800, there were both a proemptoſis and a metemptoſis; ſo the ſame index was retained. In 1900, there will be a metemptoſis again, when B will be taken, which will be preſerved in 2000, becauſe there will then be neither the one nor the other. This is as far as we need compute for it: but Clavius has calculated a cycle of 301,800 years; at the end of which period, the ſame indices return in the ſame order. See EPACT.

METEOR, from μετεωρος, *high*, *ſublime*, is a general term uſed to ſignify the tranſient, fiery appearances in the heavens; ſuch as are denoted by the more particular names of *ſhooting ſtars*, *globes of fire*, *ignes fatui*, *aurora borealis*, &c. The word is uſed by ſome writers to ſignify all the various phenomena of the atmoſphere, as *clouds*, *rain*, *hail*, &c. in which caſe meteors are divided into *fiery* and *watery*; but this laſt diſtinction is adopted by few. We ſhall under this head make a few obſervations upon the fiery meteors, or thoſe more generally deſignated by the name meteor, and leave the other to be conſidered under the article METEOROLOGY.

The phenomena called *ſhooting* or *falling ſtars* have been ſeen by every one, as theſe meteors are viſible in greater or leſs numbers every clear night; they need not therefore be particularly deſcribed. Theſe meteors are ſo very tranſient, not often exceeding one or two ſeconds in duration, that they afford no opportunity for obſervations by which their altitude can be determined with accuracy, and conſequently we are in a great meaſure ignorant of their height. If a few intelligent perſons were to agree to make the beſt obſervations they could on the altitudes of theſe meteors ſome ſuitable evening, ſuppoſing the obſervers to be ſtationed at the diſtance of ten, twenty, or more miles from each other, and to have their watches, &c. duly adjuſted, it is very probable that data might be obtained to ascertain the height of these meteors, within certain limits at least.

Though the general appearance of these meteors is that of stars shooting or falling, yet they occasionally are observed of great magnitude and comparatively of long duration, sometimes almost as large as the moon, and move through a celestial arc of 100°, more or less. As an instance of this kind we may take the great meteor of August 18th, 1783, an account of which was given in the Philos. Transact. 1784, by the late Mr. Cavallo, from his own observations, and those of some intelligent friends who happened to be with him, at Windsor. "On the evening of the 18th of August 1783, we were standing upon the N.E. corner of the above-mentioned (Windsor) terrace. The weather was calm, and agreeably warm; the sky was serene, excepting very near the horizon, where a haziness just prevented the appearance of the stars. A narrow, rugged, and oblong cloud stood on the N.W. side of the heavens, reaching from the extremity of the haziness, which rose as high as 18 or 20 degrees, and stretching itself for several degrees towards the east, in a direction nearly parallel to the horizon. It was a little below this cloud, and consequently in the hazy part of the atmosphere, about the N. by W. half W. point of the compass, that this luminous meteor was first perceived. Some flashes of lambent light, much like the aurora borealis, were first observed on the northern part of the heavens, which were soon perceived to proceed from a roundish luminous body, nearly as big in diameter as the semidiameter of the moon, and almost stationary in the above-mentioned point of the heavens. It was then about 25 minutes after nine o'clock in the evening. The ball at first appeared of a faint bluеish light, perhaps from being just kindled, or from its appearing through the haziness; but it gradually increased its light, and soon began to move, at first ascending above the horizon in an oblique direction towards the east. Its course in this direction was very short, perhaps of five or six degrees; after which it directed its course towards the east, and, moving in a direction nearly parallel to the horizon, reached as far as the S.E. by E. point, where it finally disappeared. The whole duration of the meteor was half a minute, or rather less; and the altitude of its track seemed to be about 25 degrees above the horizon. A short time after the beginning of its motion, the luminous body passed behind the above-mentioned small cloud, so that during this passage we observed only the light which was cast in the heavens from behind the cloud, without actually seeing the body from which it proceeded for about the sixth or at most the fifth part of its track; but as soon as the meteor emerged from behind the cloud, its light was prodigious. Every object appeared very distinct; the whole face of the country, in that beautiful prospect before the terrace, being instantly illuminated. At this moment the body of the meteor appeared of an oblong form; but it presently acquired a tail, and soon after it parted into several small bodies, each having a tail, or elongation; and all moving in the same direction, at a small distance from each other, and very little behind the principal body, the size of which was gradually reduced after this division. In this form the meteor moved as far as the S.E. by E. point, where the light decreasing rather abruptly, the whole disappeared.

"During the phenomenon no noise was heard by any of our company, excepting one person, who imagined to have heard a crackling noise, something like that which is produced by small wood when burning. But about ten minutes after the disappearance of the meteor, and when we were just going to retire from the terrace, we heard a rumbling noise, as if it were of thunder at a great distance, which in all probability was the report of the meteor's explosion; and it may be naturally imagined that this explosion happened when the meteor parted into small bodies, *viz.* at about the middle of its track.

"Now if that noise was really the report of the explosion which happened at the above-mentioned place; the distance, altitude, course, and other particulars relating to this meteor, must be very nearly such as are expressed in the following list; they being calculated with mathematical accuracy upon the preceding particulars, and upon the supposition that sound travels at the rate of 1150 feet *per* second. But if the noise we heard was not that of the meteor's explosion, then the following results must be considered as quite useless and erroneous.

Distance of the meteor from Windsor castle - - -	130 miles
Length of the path it described in the heavens - - -	550 miles.
Diameter of the luminous body, when it came out of the clouds -	1070 yards.
Its height above the surface of the earth - - -	56½ miles.

The explosion must have happened perpendicularly over Lincolnshire."

The above account was written the day after the appearance of the meteor; and in his Natural Philosophy this author farther observes, "Those accounts which were sent from various parts of this island, as also from the continent, confirmed, as nearly as can be expected, the above-mentioned results respecting its size, velocity, elevation, and explosion over Lincolnshire; but this meteor must have certainly had its origin much farther north than we imagined; and indeed, on account of the intervening cloud, it was impossible for us to perceive it at an earlier part of its course. It is also probable that it must have gone or terminated at a much greater distance than it appeared to us; for as its light diminished until it vanished, we must naturally have lost sight of it sooner than those who stood farther south on the continent. The various accounts seem to establish, that its course commenced beyond the northern extremity of this island, probably somewhere over the northern ocean. It passed a little westward of Perth, and perhaps a little eastward of Edinburgh; it proceeded over the south of Scotland, Northumberland, the bishopric of Durham, Yorkshire, Lincolnshire, over which it seemed to have deviated gradually to the westward, and in the course of that deviation to have suffered the bursting or partition. It then passed over Cambridgeshire, Essex, and the straits of Dover, entering the continent probably not far from Dunkirk, where, as well as at Calais and Ostend, it was thought to be vertical. It was seen at Brussels, Paris, Nuits in Burgundy, and, it is said, even at Rome. Upon the whole, it must have described a track upwards of 1000 miles in about half a minute; an astonishing rate of going, vastly swifter than the motion of sound." Vol. iv. p. 363.

In corroboration of the general accuracy of the above account, the author of this article may add his testimony, having been a witness of the meteor nearly during the whole of its apparition from Kendal in Westmoreland, a place, as it should seem from the above account, situated near to the middle of the meteor's track. The meteor, as seen from thence, rose near the N.W., moved nearly in the direction of the magnetic meridian, and disappeared in the S.E. The apparent velocity was least at first and at last, and greatest during the middle or highest part of the track; but the variation was not more than what would arise from a really uniform velocity,

velocity, owing to the optical illusion in such case. The greatest altitude of the meteor seemed to be very nearly 50°, and its duration was about half a minute, more or less; its altitude, when first seen, might be about 15° or 20°, and nearly the same at its disappearance. The sky was quite clear, except a haziness in the S.E. horizon; the twilight was considerable; yet the first attention to the meteor arose from observing the moving shadow of a window frame. No subsequent report was heard; but this might be from the attention being at that time otherwise engaged. From a comparison of observations at different places, its height was estimated to be about 60 miles.

Upon the whole it may be pretty safely concluded, that the height of this meteor was not less than 50, nor more than 60 miles above the earth's surface; and that its motion was nearly in a horizontal direction during the whole of its course.

From the general resemblance of the small meteors or shooting stars to the large globes of fire, except in size and duration, it can scarcely be doubted that they are of the same nature. Whatever hypothesis may be laid down to explain the one, must be expected to apply to the other; and if the results of the recent observations and investigations respecting the stones fallen from the atmosphere are to be credited, these last phenomena are intimately connected with the former.

Dr. Halley conjectured, that a stratum or train of inflammable vapour, gradually raised from the earth, and accumulated in an elevated region, suddenly took fire at one end, and burning like a train of gunpowder, exhibited the meteoric phenomena. (Philos. Trans. vol. 30. N° 360.) But this notion appears to have been entirely laid aside, as altogether untenable.

In later times, since the discoveries in electricity, meteors have been very generally ascribed to that agent. There seem, however, insuperable difficulties in explaining their phenomena upon electrical principles. The air, at the height of fifty miles, is probably 30,000 times more rarified than at the earth's surface; in such circumstances, we are almost certain that the electric fluid would either not pass at all, or pass in a very thin, attenuated state, so as to be far from exhibiting that densely luminous appearance which accompanies all the meteors in the form of balls. But admitting that large dense balls of electric fluid could be formed and conveyed through these high regions of the atmosphere, we should still be at a loss for materials to form those ponderable metallic masses which seem occasionally to be precipitated upon the surface of the earth, after the appearance of the meteor.

Professor Clap, late president of Yale college, in New England, in his theory of meteors, supposes them to be "terrestrial comets, revolving about the earth in the same manner as the solar comets revolve about the sun. That moving in very excentric orbits, when in perigee, they pass through the atmosphere, are highly electrified, and consequently become luminous. As they approach their lower apside, their electricity is discharged, the body disappears, and a report is heard. This being admitted, it is not strange that, by the violence of the shock, portions of the meteor should be thrown to the earth, while the main body, not sensibly affected by so small a loss, continues to move on in its orbit, and of course ceases to be luminous." Silliman on Meteoric Stones, American Philos. Trans. vol. 6. p 335.

In the Philos. Transact. 1784, Dr. Blagden has given "An account of some late fiery meteors; with observations." He considers the meteors under the following heads, in all of which he makes various appropriate observations. 1. Their general appearance. 2. Their path. 3. Their shape or figure. 4. Their light and colours. 5. Their height. 6. Their noise. 7. Their size. 8. Their duration: and, 9. Their velocity. In discussing the opinions of philosophers on the subject, he refers to professor Clap's, as follows: "A strong objection to this hypothesis of permanent revolving bodies, is derived from the great number of them there must be to answer all the appearances. Such a regular gradation is observed from these large meteors, which strike all beholders with astonishment, and occur but rarely, down to the minute fires, called shooting stars, which are seen without being regarded in great numbers every clear night, that it seems impossible to draw any line of distinction between them, or deny that they are all of the same nature. But such a crowd of revolving bodies could scarcely fail to announce their existence by some other means than merely a luminous train in the night, as for instance, by meeting or jostling sometimes near the earth, or by falling to the earth in consequence of various accidents; at least one might expect they would be seen in the day-time, either with the naked eye, or telescopes, by some of the numerous observers who are constantly examining the heavens. Another argument of great weight against the hypothesis that fire-balls are terrestrial comets, is taken from the great velocity. A body falling from infinite space towards the earth, would have acquired a velocity of no more than seven miles a second, when it came within 50 miles of the earth's surface; whereas these meteors seem to move at least three times faster. And this objection, if there be no mistake in regard to the velocity of the meteors, as I think there is not, absolutely oversets the whole hypothesis." Page 223.

Dr. Blagden proceeds to explain these meteors on the hypothesis that they are electrical phenomena. His arguments are; 1st. From the great rapidity of their motion, which seems to exceed any other we are acquainted with besides that of electricity. 2dly. From certain electrical phenomena, which sometimes accompany these meteors; and 3dly. From the connection which they have with the aurora borealis, or northern lights. These last are well known to regard the magnetic meridian; and most of the great meteors have been observed to move in a direction nearly coincident with the same meridian. Upon this head he observes; "the tendency towards the magnetic meridian, however, seems to hold good only with regard to the largest sort of fire-balls; the smaller ones move more irregularly, perhaps because they come further within the verge of our atmosphere, and are thereby more exposed to the action of extraneous causes. That the smaller sort of meteors, such as shooting stars, are really lower down in the atmosphere, is rendered very probable by their swifter apparent motion; perhaps it is this very circumstance which occasions them to be smaller, the electric fluid being more divided in more resisting air. But as these masses of electricity, which move where there is scarcely any resistance, so generally affect the direction of the magnetic meridian, the ideas which have been entertained of some analogy between these two obscure powers of nature, seem not altogether without foundation." P. 230.

Dr. Blagden concludes, that there are *three* regions of the atmosphere, distinguished by electrical phenomena peculiar to each. 1st. The lowest region, in which the phenomena of thunder and lightning occur. 2dly. The middle region, where the fire-balls and shooting stars are observed; and, 3dly. The highest region, where the aurora borealis displays a peculiar kind of electric agency.

Though many of the arguments which Dr. Blagden has advanced in favour of the hypothesis of electricity being the origin of meteors, are of considerable weight, yet the circumstances which have since occurred respecting the falling of of ſtones from the ſky, effectually remove one of his objections to the reception of profeſſor Clap's hypotheſis; namely, that of the meteors not "falling to the earth in conſequence of various accidents," and at the ſame time they riſe up againſt the electrical hypotheſis; unleſs indeed another be attached to it, that electricity condenſes and fuſes the earthy and metallic exhalations in the atmoſphere, which are thus precipitated to the earth's ſurface in greater or leſs portions. The other great objection to Clap's hypotheſis, that of the velocity of fire-balls being greater than is conſiſtent with a body revolving round the earth, however, remains in full force, except it can be ſhewn that the velocity of meteors has been much overrated. From the law of gravitation it is demonſtrable, that the velocity of a body revolving round the earth cannot, even when in perigee, and near the ſurface of the earth, be leſs than five, nor more than ſeven miles *per* ſecond. Hence, then, if the velocity of a meteor exceeds ſeven miles *per* ſecond, it cannot be a body revolving in an orbit round the earth. It does not appear, however, to be ſatisfactorily aſcertained that the velocity of fire-balls exceeds ſeven miles *per* ſecond. It is not perhaps going beyond probability to ſay, that no obſerver ſaw the great meteor of Aug. 18th, 1783, for more than an extent of 200 miles; as a proof, it may be remarked that the burſting of the meteor, ſaid to have taken place over Lincolnſhire, was not obſerved at Kendal, though the diſtance from the neareſt point, or that of greateſt apparent altitude, was not more than 100 miles. Now if the meteor took 30 ſeconds to move 200 miles, it gives $6\frac{2}{3}$ miles *per* ſecond; which is within the required limits. And, farther, let thoſe who ſaw the meteor paſs nearly through the zenith, endeavour to eſtimate the time it ſeemed to take in paſſing through an arc of 10°, or let the like obſervation be made upon a ſhooting ſtar. Perhaps few, if any, will be found to inſiſt upon the time being ſo little as one ſecond; at leaſt the writer of this article is not inclined to adopt the affirmative from his own obſervation. But 10° in one ſecond would correſpond only to eight miles of velocity, at the height of 50 miles above the earth's ſurface. It may therefore perhaps be ſtill deemed problematical, whether the velocity of either the larger or ſmaller meteors ever exceeds ſeven miles *per* ſecond; as alſo whether it ever falls ſhort of five miles *per* ſecond.

Upon the whole, the hypotheſis of fire-balls being ſomething of the nature of comets, that is, bodies revolving around the earth in excentric orbits, appears in the preſent ſtate of the ſcience to be as probable as any other. The light and heat acquired in paſſing through the perigee might be variouſly accounted for; but it would be premature to enter into a diſquiſition on this head, as long as ſuch doubts remain reſpecting the real velocity of this ſort of meteors. See Balls *of Fire* and Falling *Stones*.

Ignis fatuus is the name of a luminous meteor, ſaid to be ſeen occaſionally in the night, hovering over moiſt ground, and about church-yards. Though it is ſtated by writers to be a common meteor, we find few authentic accounts of its nature and appearance; and ſome accounts are evidently mixed with ſuperſtitious notions reſpecting the origin of the meteor, and particularly with regard to its effects in miſleading travellers. See Ignis *fatuus* for more on this head.

One of the moſt ſplendid and moſt ſurpriſing of the luminous meteors is the *aurora borealis*, or *northern lights*. An account of this meteor may be ſeen under the article Aurora *Borealis*; but as ſome of the lateſt, and perhaps the moſt accurate obſervations on theſe ſtriking phenomena, have been omitted in that account, it will be proper to introduce them here. The obſervations are thoſe of Mr. Dalton, publiſhed in his Meteorological Eſſays, 1793. This diligent obſerver reſided in the north of England (at Kendal), during a period when theſe phenomena were very frequent; namely from 1786 to 1793. The aurora borealis has ſeldom appeared ſince that period; and it ſhould ſeem, from the hiſtory of this meteor, that it is one in ſome way ſubject to periodical apparition.

Mr. Dalton has given the times and appearances of the aurora borealis, ſome of them deſcribed minutely, with accompanying obſervations on the variation of the magnetic needle. It ſeems the number of the phenomena ſeen at Kendal and Keſwick, was as under:

		Number of Auroræ Boreales.
1786	———	16
1787	———	27
1788	———	53
1789	———	45
1790	———	36
1791	———	37
1792	———	23

From ſuch a number of obſervations, and from thoſe previouſly made by others, to be found in various philoſophical works, the author was enabled to generalize the phenomena of the aurora borealis. He obſerves, "the appearances of the *aurora* come under four different deſcriptions. Firſt, a *horizontal light*, like the morning *aurora*, or break of day. Secondly, fine, ſlender luminous beams, well defined, and of denſe light; theſe continue $\frac{1}{4}$, $\frac{1}{2}$, or 1 whole minute, ſometimes at reſt apparently, but oftener with a quick lateral motion. Thirdly, *flaſhes* pointing upward, or in the ſame direction as the beams, which they always ſucceed; theſe are only momentary, and have no lateral motion, but they are generally repeated many times in a minute; they appear much broader, more diffuſe, and of a weaker light than the beams; they grow gradually fainter, till they diſappear. Theſe ſometimes continue for hours, flaſhing at intervals. Fourthly, *arches*, nearly in the form of rainbows; theſe, when complete, go quite acroſs the heavens, from one point of the horizon to the oppoſite point.

When an *aurora* takes place, thoſe appearances ſeem to ſucceed each other in the following order: Firſt, the faint rainbow-like arches; ſecondly, the beams; and, thirdly, the flaſhes; as for the northern horizontal light, it will appear in the ſequel to conſiſt of an abundance of *flaſhes* or *beams* blended together, owing to the ſituation of the obſerver relative to them. Theſe diſtinctions, and the terms appropriated for them, muſt be kept in view, in attending to the following phenomena.

Phenom. 1.—The beams of the *aurora borealis* appear, at all places alike, to be arches of great circles of the ſphere, with the eye in the centre, and theſe arches, if prolonged upwards, would all meet in one point.

Phenom. 2.—The rainbow-like arches all croſs the magnetic meridian at right angles: when two or more appear at once, they are concentric, and tend to the magnetic eaſt and weſt: alſo, the broad arch of the *horizontal light* tends to the magnetic eaſt and weſt, and is biſected by the magnetic meridian; and when the aurora extends over any part of the hemiſphere, whether great or ſmall, the line ſeparating the illuminated part of the hemiſphere from the clear part, is half the circumference of a great circle, croſſing the magnetic meridian at right angles, and terminating in the magnetic eaſt and weſt; moreover, the beams apparently perpendicular to the horizon, are only thoſe on the magnetic meridian.

Phenom. 3.—That point in the heavens to which the beams of the aurora appear to converge at any place, is the ſame as that to which the ſouth pole of the *dipping-needle* points at that place.

Phenom. 4.—The beams appear to riſe above each other in ſucceſſion, ſo that of any two beams, that which has the higher baſe has the higher ſummit alſo, or its ſummit nearer the point of concourſe; the angle ſubtended by the length of each beam is not the ſame, it being greateſt about half way from the horizon to the zenith, and leſs above and below; alſo the beams to the ſouth ſubtend leſs angles than thoſe to the north, having the ſame altitude. The greateſt angle to the north ſeems to be about 25° or 30°; and that to the ſouth 15° or 20°.

Phenom. 5.—Every beam appears broadeſt at, or near, the baſe or bottom, and to grow narrower as it aſcends, in ſuch ſort that the continuation of its bounding lines would meet in the common centre to which the beams tend; yet the ſummit of the beam is not flat, but pointed; the higheſt beams ſeem about 3° broad, and the loweſt 1°.

In order to derive the true ſituation and poſition of the ſeveral objects preſented in theſe phenomena, it was neceſſary to have recourſe to the principles of geometry or perſpective. Mr. Dalton premiſes five propoſitions. The firſt is to ſhew that any line in a plane paſſing through the eye, appears in the heavens to be an arch of a great circle. The other four propoſitions relate to the perſpective appearance of one or more cylinders, ſuppoſed to be arranged upon a horizontal plane at any given elevation above the earth's ſurface, the cylinders being parallel to each other, and making a given angle with the horizontal plane. The propoſitions are illuſtrated by ſuitable diagrams, and demonſtrated in the uſual way. By a compariſon of the data of theſe propoſitions with the above phenomena, the author makes certain inferences reſpecting the aurora borealis, and draws ſuch concluſions as ſeem to be warranted by the eſtabliſhed methods of reaſoning in natural philoſophy. Theſe are,

1. The luminous beams of the aurora borealis are cylindrical, and parallel to each other, at leaſt over a moderate extent of country.

2. The cylindrical beams of the aurora borealis are all *magnetic*, and parallel to the dipping-needle at the places over which they appear.

3. The height of the rainbow-like arches of the aurora, above the earth's ſurface, is about 150 Engliſh miles.

4. The beams of the aurora are ſimilar, and equal in their real dimenſions to one another.

5. The diſtance of the beams of the aurora from the earth's ſurface is equal to the length of the beams nearly. This diſtance is ſubſequently eſtimated at 75 miles.

6. That appearance which we have called the *horizontal light*, and which is always ſituate near the horizon, is nothing but the blended lights of a group of beams, or flaſhes, which makes the appearance of a large luminous zone.

The author next proceeds to develope, at ſome length, an hypotheſis, by which he propoſes to explain theſe wonderful phenomena. It is ingenious, but cannot be conſidered as ſatisfactory. Future inveſtigation may derive from it ſome uſeful hints. The following is a brief ſketch of it.

Mr. Dalton conceives an extremely ſubtile elaſtic fluid of a *ferruginous* nature, or at leaſt ſuch as is capable of being acted upon magnetically, to exiſt in the higher regions of the atmoſphere; perhaps without the verge of the common atmoſphere. That this elaſtic fluid is collected into parallel cylindrical beams, and horizontal rings, over the regions of the earth near the magnetic pole, by virtue of the earth's magnetiſm; and that the beams, &c. are preſerved in their due form and poſition, and diſtinct from each other by their mutual magnetic action. This fluid is ſuppoſed to be an imperfect conductor of electricity. When the electricity of the upper regions of the atmoſphere is diſturbed, it is ſuppoſed the electric fluid runs along theſe beams and rings from one part of the atmoſphere to another, to reſtore the equilibrium. The reaſon why the diffuſe flaſhes ſucceed the more intenſe light of the beams, is becauſe the electricity diſperſes the elementary particles of the beams in ſome degree, which collect again after the electric circulation ceaſes. Hence too, he conceives, is the reaſon of the fluctuations of the magnetical needle below, while the magnetiſm of the upper regions of the atmoſphere is thus affected. The general obſervations on the diſturbance of the needle are ſtated as under.

1. When the aurora appears to riſe only about 5°, 10°, or 15° above the horizon, the diſturbance of the needle is very little, and often inſenſible.

2. When it riſes up to the zenith, and paſſes it there, it never fails to be a conſiderable diſturbance.

3. This diſturbance conſiſts in an irregular oſcillation of the horizontal needle, ſometimes to the eaſtward, and then to the weſtward of the mean daily poſition, in ſuch ſort that the greateſt excurſions on each ſide are nearly equal, and amount to about half a degree each in this place.

4. When the aurora ceaſes, or ſoon after, the needle returns to its former ſtation.

One ſection on the aurora borealis is deſtined to the enquiry, How far the moon has an effect in producing this meteor, or whether the phenomenon is influenced by the aerial tides? It appeared that the average number of auroræ obſerved during the period of ſpring tides, was to the number obſerved during the period of neap tides, as 4 to 3. Alſo, it appeared that ſpring and autumn (ſeaſons in which the tides are uſually higheſt) are moſt favourable for the production of this meteor, as may be ſeen by the following table.

	Number of Auroræ.		Number of Auroræ.
January	18	July	2
February	18	Auguſt	21
March	26	September	23
April	32	October	36
May	21	November	38
June	5	December	9

Some of the moſt ſplendid appearances of the aurora borealis were obſerved in a troubled and rather tempeſtuous ſtate of the atmoſphere; but it did not appear in general that this meteor affords any deciſive prognoſtic of the weather. See Aurora Borealis, Falling *Stones*, &c. Alſo, for other luminous meteors, ſee Rainbow, Halo, Parhelia, Zodiacal Light, &c.

METEORIC Stones. See Falling *Stones*.

METEORISMUS, in *Medicine*, from μετέωρος, *ſublimis*, has been applied by medical writers to that tumid ſtate of the belly, ariſing from flatulence, which diſtends only the upper parts, as the pit of the ſtomach and the hypochondriac regions. See Sauvages Noſol. Method, claſs x. gen. 16, who has made four ſpecies of Meteoriſmus: alſo Caſtelli Lexic. Med. Art. *Meteoros*.

METEOROLOGICAL Journal, is a table recording the daily ſtate of the air, exhibited by the barometer, thermometer, hygrometer, anemometer, and other meteorological inſtruments. We have many journals of this kind kept at the houſe of the Royal Society, and by different obſervers in other places, in the Philoſophical Tranſactions, the Memoirs of the Academy of Sciences, and ſimilar publications.

METEOROLOGY is a ſcience which treats of the weather, or of the various affections and phenomena of the atmoſphere, as *winds*, *clouds*, *rain*, *hail*, *ſnow*, *dew*, *thunder* and *lightning*, and the fiery meteors. The univerſal importance of this ſcience is acknowledged; and it may be ſaid that for 150 years paſt, or ſince the invention of the barometer and the air-pump, almoſt every diſtinguiſhed natural philoſopher has contributed to its advancement, either by the diſcuſſion of hypotheſes or by the obſervation of facts. The difficulty, however, of forming a correct theory of the phenomena of the atmoſphere may eaſily be conceived, when we conſider that it is requiſite for a perſon to have a large collection of facts, and an extenſive acquaintance with ſeveral collateral ſciences; for inſtance, with mechanics, pneumatics, electricity, and chemiſtry.

The principal inſtruments of uſe in meteorology are, the barometer, by which the weight or preſſure of the atmoſphere over any place is known; the thermometer, which aſcertains the temperature of the air; the hydrometer, to denote the moiſture or dryneſs of the air; the pluviameter, or rain-gauge, to meaſure the depth of rain that falls; the evaporation-gauge, to ſhew the depth of water evaporated; the wind-dial, to point out the direction of the wind; the anemometer, to meaſure its force; and the electrometer, to aſcertain the kind and intenſity of electricity in the air. See theſe different inſtruments deſcribed under their appropriate heads.

In order to form a proper notion of the phenomena of the atmoſphere, as exhibited at any one place, it will be neceſſary to obtain a correct notion of the atmoſphere itſelf at large. It appears to be a collection or mixture of various elaſtic fluids in very different proportions, retained on the ſurface of the earth by their gravitation. The principal part of the weight of the atmoſphere ariſes from the permanently elaſtic fluids, azotic gas, and oxygenous gas, the quantities of which are as 4 to 1 nearly: about one part in a thouſand of the atmoſphere is conſtituted of another permanently elaſtic fluid, carbonic acid. The reſt of the atmoſphere conſiſts of aqueous vapour or ſteam, an elaſtic fluid ſubject to partial condenſation by a diminution of temperature. The quantity of this elaſtic fluid is variable at different places and in different ſeaſons; it may perhaps conſtitute $\frac{1}{70}$th of the weight of the whole atmoſphere, conſidered as a general average for the earth; but in ſome places within the torrid zone it may amount to $\frac{1}{30}$th of the weight of the incumbent atmoſphere; and in the polar regions may ſometimes be leſs than $\frac{1}{10,000}$dth part of the atmoſphere. It is this portion of the atmoſphere which more immediately occaſions ſome of the principal phenomena in meteorology, particularly clouds, rain, hail, ſnow, dew, and thunder and lightning: it has conſiderable influence on the temperature of the atmoſphere; but it has little effect in the production of winds, or on the variation of the barometer.

The atmoſphere decreaſes in denſity as we aſcend in a geometrical progreſſion to equal aſcents. As far as experience warrants the concluſion, the ſeveral kinds of gas decreaſe in denſity in the ſame ratio: thus, if at three miles in height, the weight of the atmoſphere is one-half what it is at the earth's ſurface; then will the proportions of the ſeveral elaſtic fluids found in a given volume of air, at that place, be the ſame as what they are in a like volume of air taken at the ſurface of the earth; all the kinds being diminiſhed one-half nearly in weight and denſity. This concluſion is not, perhaps, ſtrictly true for every height, nor for any two heights; but experiments have not been made with ſufficient accuracy to aſcertain the deviation from this law. At ſix miles elevation the barometer would ſtand at $\frac{1}{4}$ the height at the ſurface, or at $7\frac{1}{2}$ inches; at 9 miles of elevation, $3\frac{3}{4}$ inches; at 12 miles, $1\frac{7}{8}$ inch; and at 15 miles, nearly 1 inch. Hence it ſeems that the greateſt part of the atmoſphere is at all times within 15 or 20 miles of the ſurface of the earth; and it is probable that the ordinary phenomena of winds, clouds, rain, &c. are chiefly confined within much narrower limits.

Origin of Winds.—If the atmoſphere ſhould be perfectly calm at any one time all over the ſurface of the earth, it is evident that there muſt be an equilibrium of preſſure, or the weight of air incumbent over every place muſt be the ſame, and the real velocity of the air over any place ariſing from the earth's rotation around its axis, would be the very ſame as that of the place itſelf; namely, at the equator the velocity would be about 1000 miles *per* hour, from W. to E.; and in the lat. of London the velocity would be 620 miles from W. to E.; and at the poles of the earth, the air would have no velocity. If an equilibrium of this kind were once obtained, there appears to be no mechanical reaſon why it ſhould be diſturbed, ariſing out of the circumſtance of the earth's rotation. But if any cauſe ſhould ariſe which diſpoſes the air to move from any part of the earth in a northerly or ſoutherly direction, it is alſo evident that the rotation of the earth would conſpire with this cauſe to modify the direction, and to accelerate the velocity of the current of air ſo produced. For inſtance, ſuppoſe a body of air in the lat. of London was to receive an impulſe or ſeries of impulſes, ſuch as to compel it to move 10° ſouthward in a day, with an uniform velocity; this current of air gradually paſſing through other air of greater velocity eaſtward, will in part be carried along with the current, and when it arrives at the 10th parallel it will find air diſpoſed to move from W. to E. with a velocity of 750 miles *per* hour, being the velocity of the place; whereas its own velocity in that direction was only 620 miles. Now if the moving current of air have not acquired the additional velocity of 130 miles *per* hour from W. to E., it muſt appear at the place to have a motion from E. to W. with a velocity equal to the difference or deficiency; ſuppoſe it has only acquired 105 miles additional velocity eaſtward, then it will appear to move at the rate of 25 miles *per* hour weſtward; and as it moves alſo 25 miles ſouthward each hour, it is manifeſt its direction will be truly that of a N.E. wind, and its velocity 35 miles *per* hour. If the air is impelled northward, inſtead of ſouthward, then *vice verſâ*, a S.W. wind is produced. It appears, then, that as ſoon as any cauſe operates to impel a portion of the atmoſphere either north or ſouth, that inſtant the rotation of the earth on its axis begins to manifeſt an effect, which is to accelerate the apparent velocity of the current, and to divert its direction. We are then directed to look for ſome natural cauſe or ſtimulus which may, either occaſionally or conſtantly, operate in impelling the atmoſphere in a meridional direction. This cauſe is found in the unequal temperature of the atmoſphere in the different zones of the earth. The torrid zone is always the warmeſt region of the earth. The temperate zones are colder; but alternately approximate to the temperature of the torrid zone. The frigid zones are colder ſtill, but they alſo alternately make ſome approximation to the temperature of the torrid zone. Now it is well known that air is expanded by heat, and hence becomes ſpecifically lighter; the air over the torrid zone being then ſpecifically lighter than the air in the temperate zones, it will have a tendency to aſcend, whilſt the air in the two temperate zones will preſs forward to ſupply the vacancy, and the air in the frigid zones will follow after upon the ſame principle. Hence it appears that there muſt always be a draught of air from the polar towards the equatorial regions, greater

greater or lefs according to the exifting difference of temperature. As, however, an accumulation of air in the torrid zone would thus enfue, and a deficiency in the other zones, means muft be found to return the excefs of air over the torrid zone into the northern and fouthern regions. This is effected, without doubt, by the upper regions of the atmofphere in the torrid zone meeting with a lefs lateral preffure than is adequate to fupport them. The air rifes up, and overflows in fome degree, fo that currents northward and fouthward are eftablifhed, in oppofite directions to the two former currents, and fuperior to them. The two under currents, as has been fhewn, will be N.E. and S.E. winds; the two upper currents, by a like method of reafoning, will be S.W. and N.W. winds. The two under currents, or the N.E. and S.E., meeting each other in the torrid zone, their velocities N. and S. are deftroyed by their oppofition, but their velocity from E. to W. continues, and occafions the regular or trade-winds. But it is not our defign in this place to do more than point out the great active principles, which are conftantly at work to produce a motion and circulation of the atmofphere; a more particular defcription and detail will be given under the article WINDS. The principle, however, cannot but be allowed by thofe who duly confider the effect of the earth's rotation, and the currents of air we ordinarily obferve in any room containing a fire.

Origin and Nature of Clouds.—Clouds are conftituted of an infinite number of very minute drops of water; they are formed by the condenfation of fteam or vapour by cold. In order to underftand their origin, we muft take a view of the atmofphere of fteam already mentioned, and confider its rife and properties. Steam, as every one knows, is an elaftic fluid arifing from the union of water and heat; and it is again condenfible into water by cold, fo as to lofe its elafticity. Steam is formed almoft inftantaneoufly from water inclofed in a vacuum; the maximum effect is at once produced, and there is an end of the evaporation, unlefs the temperature is increafed. The fame effect is produced when the water is inclofed in the fame volume of perfectly dried common air, or any other kind of air perfectly dried, not acting chemically on water. The fame quantity of water, in this cafe as in the former, is converted into vapour, and the fame elaftic force of fteam is produced for the maximum effect; but there is this difference in the two cafes, the latter requires a fenfible *time*, in order that the maximum effect may be produced. This demonftrates that the prefence of air retards evaporation, and that in all probability is, by reafon of its preffure on the furface of the water. From all thefe obfervations it might be expected that evaporation would go on, and the quantity of fteam in the air increafe till the maximum effect was produced over all the earth, and then there would be a total ceffation. But we find that evaporation is unceafingly going on in almoft every place, and even at the very place where rain is defcending. This curious fact would appear at firft view to be of difficult explanation; but the difficulty is not infurmountable, as will prefently be fhewn.

It appears that the quantity of fteam that can be contained in a veffel, either with or without air, increafes nearly in geometrical progreffion to equal intervals of temperature. Mr. Dalton contends that the increafe is *accurately* in geometrical progreffion, and that the intervals of temperature are not duly meafured by the common thermometer; however this may be, there can be no doubt that the former increafes more rapidly than the latter. It has been found, that if the maximum of fteam in air of 32° be denoted by 2, that of air of 52° will be denoted by 4, and that of air of 72° by 8. (See Dalton's Chemiftry, p. 14.) Hence it is obvious, that if equal portions of air of 32° and 72°, both faturated with vapour, were mixed together, the mean temperature would be 52°, and the quantity of vapour prefent in the mixture would be 10; whereas, the greateft quantity of vapour that the air of that temperature could contain, is only 8, according to the above ftatement; whence two parts muft be condenfed, and would firft appear in the fhape of a cloud, and be ultimately depofited. Here, then, we perceive the origin of clouds and rain. It has been fhewn that an unceafing circulation of air between the equatorial and polar regions takes place; and as both currents of air muft be fuppofed to be near the point of faturation with vapour, there muft frequently be a cloud formed by their mixture. The current from the equator is warm and full of vapour, compared with the air of like altitude in the northern and fouthern regions; and *vice versâ* with regard to the air from the north and fouth towards the equator. This laft air is cold, but nearly faturated with vapour for its temperature; and hence will precipitate vapour from warm air. Were the currents of air to and from the equator quite faturated with vapour at their departure, there muft be perpetual cloudinefs to accompany their progrefs; but the circulation of air is fo quick, and the faturation with vapour is flowly effected by reafon of the preffure of the atmofphere, that it rarely happens for the currents to be faturated at their commencement. It is eafy to fee, then, that this circumftance, with others equally obvious, may modify the effects fo far, as that the atmofphere may be either clear or cloudy over any place whilft the general currents are making their ordinary progrefs. It is owing to the fame circumftance (the flownefs with which fteam circulates itfelf through the air) that two currents of air may meet in the higher regions of the atmofphere, and a precipitation of vapour may enfue, when the inferior ftrata of air are not faturated with vapour. This, indeed, is generally the cafe in fhowery weather, but never in long continued rain. The more particular details of this theory of rain will be better deferred till the article *Rain* is compofed. See RAIN, alfo CLOUDS, EVAPORATION, &c.

If any doubt fhould remain as to the correctnefs of the above views in regard to the formation of clouds and rain, it may be completely removed, if we will take the trouble to examine the phenomena of a drying ftove. We may there fee the procefs above defcribed completely copied in miniature. The moment we open the door to enter the ftove, the cold air rufhes in, and a prodigious cloud is inftantly formed, fo as to render furrounding objects invifible: foon after the door is fhut, the cloud difappears, and the internal air refumes its ufual tranfparency. Here, then, is an inftance of a current of cold air rufhing into warm, both of them being below the point of faturation with vapour, and yet a great precipitation takes place. Again, if we notice the air which has afcended the air-flues of the ftove and is mixing with the atmofphere, we find a copious ftream or cloud of condenfed vapour fpreading itfelf all around. This is formed by the current of warm air rufhing into the cold atmofphere, though both of them are ufually below the point of faturation with vapour.

Height of the Clouds.—We fhall fubjoin the refults of a feries of obfervations on the height of the clouds: thefe are the more valuable, as very few meteorologifts have an opportunity of making fimilar obfervations. They were made by Mr. Crofthwaite, of Kefwick, in Cumberland. In mountainous countries the clouds frequently furround the hills, like a girdle, and exhibit a fmooth horizontal furface; if the

the height of the hill at the point of interfection be known by previous obfervation, then the mountain may be made into a fcale to meafure the altitude of the clouds. The mountain Skiddaw was fixed upon for that purpofe, and Mr Crofthwaite determined its height above Derwent lake to be 1050 yards. This altitude is probably too great, but the error will have no material effect in the prefent confideration.

"The refult of five years' obfervations is contained in the following table. In order to determine what effect the feafons of the year have upon the clouds in this refpect, we have kept the obfervations in the feveral months diftinct. It is to be noted, that the column containing the number of obfervations when the clouds were above Skiddaw, includes thofe obfervations when there were no clouds vifible; but Mr. Crofthwaite has noted this laft circumftance alfo in the journal, and it appears that about one obfervation in thirty, of thofe in that column, fhould be deducted on that account.

	Clouds from 0 to 100 Yards high.	From 100 to 200 Yards high.	From 200 to 300 Yards high.	From 300 to 400 Yards high.	From 400 to 500 Yards high.	From 500 to 600 Yards high.	From 600 to 700 Yards high.	From 700 to 800 Yards high.	From 800 to 900 Yards high.	From 900 to 1000 Yards high.	From 1000 to 1050 Yards high.	Above 1050 Yards high.	Number of Obfervations.
January -	0	9	12	28	53	39	37	32	30	39	36	116	431
February -	5	10	5	15	41	45	45	27	43	38	29	94	397
March -	2	1	6	11	22	40	32	36	24	32	44	184	434
April -	0	4	5	18	24	34	37	26	23	38	35	206	450
May -	0	1	4	8	13	31	22	25	30	34	27	270	465
June -	0	2	2	6	24	24	29	21	34	41	34	233	450
July -	0	2	2	18	35	36	35	25	35	48	38	191	465
Auguft -	0	4	5	13	27	39	35	26	25	45	30	215	464
September	0	1	7	13	38	38	32	30	27	51	27	186	450
October -	2	0	5	13	26	49	31	31	46	61	37	164	465
November	0	0	3	13	30	58	42	38	46	45	47	128	450
December	1	8	6	23	41	53	39	50	47	46	35	111	460
Total -	10	42	62	179	374	486	416	367	410	518	419	2098	5381

"It may be proper to obferve, that the fuppofition of the clouds rifing or falling with the barometer, or as the denfity of the air increafes or diminifhes, is not at all countenanced by thefe obfervations. Alfo, that in very heavy and continued rains the clouds are moftly below the fummit of the mountain; but it frequently rains when they are entirely above it." Dalton's Meteorology, p. 40.

By comparing the parts of the above table, it is manifeft that clouds are at an average higher in fummer than in winter; and by analogy, we may conclude that clouds are higher in the torrid zone than in the temperate zones, and higher in thefe laft than in the frigid zones. From the above obfervations it would feem, that the large, denfe, opaque clouds feldom are found more than one mile elevated in this country; but the thicknefs of the cloudy ftratum is unknown, and may perhaps be feveral hundred yards. Different ftrata of clouds are fometimes obferved one above another, in fummer efpecially. Small white ftreaks of cloud are fometimes feen at the elevation of three, four, five miles, or more. In thefe high regions, any condenfation that can take place is probably infufficient to produce a cloud of great denfity or opacity.

Sufpenfion of Clouds.—It appears to many people wonderful how large and denfe clouds, confifting of drops of water, fhould be fo long fufpended in the air, as fome of them feem to be, without materially defcending; efpecially as water is 800 times the weight of air. This is to be explained on two principles: the one is, that bodies in a ftate of extreme divifion are much more refifted in their motion through the air, or any other fluid, than when in large portions. Gravity, or the force of defcent, remains the fame whether the body is divided or not; but the furface increafes with the divifion of the body, and the refiftance increafes with the furface. Hence it is that the extremely fmall drops, conftituting clouds, fall very flowly, till they begin to coalefce or increafe in fize. The other principle is, that fmall drops falling into a ftratum of air not faturated with vapour, are frequently refolved again into fteam; thus, that part of the cloud which actually defcends difappears; and it not unfrequently happens that the whole cloud vanifhes in this way, being again converted into vapour, and blended with the general mafs of the atmofphere.

Rain, Snow, Hail, and Dew.—Whenever two currents of air of different temperatures meet and intermix, each of which is previoufly near the point of faturation with vapour, or whenever a body of atmofpheric air is fuddenly cooled (as by the rarefaction occafioned by the ftroke of an air-pump, or by opening the cock of a condenfing engine), a cloud is formed, and a precipitation often enfues. The precipitation is in the form of rain if the temperature be above 32° Fahr., but in the form of fnow if the temperature be below the faid degree. Rain or fnow is ordinarily obferved in all latitudes; but in the torrid zone the latter is confined to the fummits of the higheft mountains. Hail is an extraordinary form in which the vapour is precipitated; it feems to arife from an inverfion of the ftrata of the atmofphere, by which a cold ftratum is placed beneath a warmer one, contrary to the general difpofition of the atmofphere. Rain is formed in the upper ftratum, and this falling through the under ftratum is cooled and frozen, receiving at the fame time a confiderable acceffion from the condenfation on the furfaces of the frozen drops. Hail-fhowers occur in all

feafons

feaſons of the year, but more rarely in the ſummer months; they, however, ſometimes accompany thunder in thoſe months, and are peculiarly deſtructive and formidable. Hail ſeems to be confined principally to the temperate zones: it is probable that in this quarter of the globe hail is ſeldom obſerved, except between the parallels of 40° and 60° of latitude. It is more frequent in mountainous places than on plains; in the former hail-ſhowers uſually occur on five or ſix days of the year at an average.

Dew is formed when, inſtead of cold air mixing with warm, a cold ſolid or liquid body is preſented to (comparatively) warm air. There exiſts a determinable temperature at all times, which is juſt capable of ſupporting the vapour of the atmoſphere in an elaſtic ſtate. (See HYGROMETRY, *on the Dew-point.*) If the temperature of the cold body be below this, then the vapour of the atmoſphere is gradually condenſed into water on its ſurface: this is a well-known phenomenon, and preſented on various occaſions. The dew on the graſs and the hoar on walls after the breaking of a froſt, are two of the more ſtriking appearances of this kind.

Temperature of the Atmoſphere.—This important ſubject has already been treated upon at large under the heads, ATMOSPHERE, *Temperature of the;* and HEAT, in *Geography*, to which we muſt therefore refer. There is, however, one remarkable character of the atmoſphere, namely, that of the uniform decreaſe of temperature in aſcending, which has never been ſatisfactorily explained. An ingenious eſſay on this ſubject has lately been publiſhed, from which we ſhall here give an extract.

"It is a remarkable fact, and has never, I believe, been ſatisfactorily accounted for, that the atmoſphere in all places and ſeaſons is found to decreaſe in temperature in proportion as we aſcend, and nearly in an arithmetical progreſſion. Sometimes the fact may have been otherwiſe, namely, that the air was colder at the ſurface of the earth than above, particularly at the breaking of a froſt I have obſerved it ſo; but this is evidently the effect of great and extraordinary commotion in the atmoſphere, and is at moſt of a very ſhort duration. What then is the occaſion of this diminution of temperature in aſcending? Before this queſtion can be ſolved, it may be proper to conſider the defects of the common ſolution. Air, it is ſaid, is not heated by the direct rays of the ſun, which paſs through it as a tranſparent medium, without producing any calorific effect, till they arrive at the ſurface of the earth. The earth being heated, communicates a portion to the contiguous atmoſphere, whilſt the ſuperior ſtrata, in proportion as they are more remote, receive leſs heat, forming a gradation of temperature, ſimilar to what takes place along a bar of iron when one of its ends is heated.

"The firſt part of the above ſolution is probably correct: air, it ſhould ſeem, is ſingular in regard to heat; it neither receives nor diſcharges it in a radiant ſtate; if ſo, the propagation of heat through air muſt be effected by its conducting power, the ſame as in water. Now we know that heat applied to the under ſurface of a column of water is propagated upwards with great celerity, by the actual aſcent of the heated particles: it is equally certain, too, that heated air aſcends. From theſe obſervations it ſhould follow, that the cauſes aſſigned above for the gradual change of temperature in a perpendicular column of the atmoſphere, would apply directly to a ſtate of temperature the very reverſe of the fact; namely, to one in which the higher the aſcent, or the more remote from the earth, the higher ſhould be the temperature.

"Whether this reaſoning be correct or not, it muſt, I think, be univerſally allowed, that the fact has not hitherto received a ſatisfactory explanation. I conceive it to be one involving a new principle of heat; by which I mean a principle that no other phenomenon of nature preſents us with, and which is not at preſent recogniſed as ſuch. I ſhall endeavour in what follows to make out this poſition.

"The principle is this:—*The natural equilibrium of heat in an atmoſphere, is when each atom of air in the ſame perpendicular column is poſſeſſed of the ſame quantity of heat;* and, conſequently, *the natural equilibrium of heat in an atmoſphere is when the temperature gradually diminiſhes in aſcending.*

"That this is a juſt conſequence cannot be denied, when we conſider that air increaſes in its capacity for heat by rarefaction; when the quantity of heat is given or limited, therefore, the temperature muſt be regulated by the denſity.

"It is an eſtabliſhed principle, that any body on the ſurface of the earth unequally heated is obſerved to tend conſtantly towards an equality of temperature: the new principle announced above, ſeems to ſuggeſt an exception to this law. But if it be examined, it can ſcarcely appear in that light. *Equality of heat and equality of temperature*, when applied to the ſame body in the ſame ſtate, are found ſo uniformly to be aſſociated together, that we ſcarcely think of making any diſtinction between the two expreſſions. No one would object to the commonly obſerved law being expreſſed in theſe terms: *When any body is unequally heated, the equilibrium is found to be reſtored when each particle of the body becomes in poſſeſſion of the ſame quantity of heat.* Now the law thus expreſſed is what I apprehend to be the true general law, which applies to the atmoſphere as well as to other bodies. It is an *equality of heat*, and not an *equality of temperature*, that nature tends to reſtore.

"The atmoſphere, indeed, preſents a ſtriking peculiarity to us in regard to heat: we ſee in a perpendicular column of air, a body without any change of form, ſlowly and gradually changing its capacity for heat from a leſs to a greater; but all other bodies retain a uniform capacity throughout their ſubſtance.

"If it be aſked why an equilibrium of heat ſhould turn upon the equality in *quantity* rather than in *temperature?* I anſwer, that I do not know; but I reſt the proof of it upon the fact of the inequality of temperature obſerved in aſcending into the atmoſphere. If the natural tendency of the atmoſphere was to an equality of temperature, there does not appear to me any reaſon why the ſuperior regions of the air ſhould not be at leaſt as warm as the inferior.

"The arguments already advanced on behalf of the principle we are endeavouring to eſtabliſh, are powerfully corroborated by the following facts:—By the obſervations of Bouguer, Sauſſure, and Gay Luſſac, we find that the temperature of the air at an elevation where its weight is $\frac{1}{2}$, that at the ſurface is about 50° Fahrenheit leſs than that at the ſurface; and from my experiments (Manch. Memoirs, vol. v. p. 525.) it appears that air being ſuddenly rarified from 2 to 1, produces 50° of cold. Whence we may infer, that a meaſure of air at the earth's ſurface being taken up to the height above-mentioned, preſerving its original temperature, and ſuffered to expand, would become two meaſures, and be reduced to the ſame temperature as the ſurrounding air; or *vice verſâ*, if two meaſures of air at the propoſed height were condenſed into one meaſure, their temperature would be raiſed 50°, and they would become the ſame in denſity and temperature, as the like volume of air at the earth's ſurface. In like manner we may infer, that if a column of air from the earth's ſurface to the ſummit of the atmoſphere were condenſed, and brought into a horizontal poſition on the earth's ſurface, it would become

of

of the fame denfity and temperature as the air around it, without receiving or parting with any heat whatever.

" Another important argument in favour of the theory here propofed, may be derived from the contemplation of an atmofphere of vapour. Suppofe the prefent aerial atmofphere were to be annihilated, and one of fteam or aqueous vapour were fubftituted in the place; and fuppofe, further, that the temperature of this atmofphere at the earth's furface were every where 212°, and its weight equal to thirty inches of mercury. Now at the elevation of about fix miles the weight would be fifteen inches or one-half of that below, at twelves miles it would be 7.5 inches, or one quarter that at the furface, &c. and the temperature would probably diminifh 25° degrees at each of thefe intervals. It could not diminifh more; for we have feen (p. 14.) that a diminution of temperature of 25° reduces the force of vapour one-half; if, therefore, a greater reduction of temperature were to take place, the weight of the incumbent atmofphere would condenfe a portion of the vapour into water, and the general equilibrium would thus be difturbed perpetually from condenfations in the upper regions. But if we fuppofe, on the other hand, that the diminution of temperature in each of thefe intervals is lefs than 25°, then the upper regions would admit of more vapour without condenfation; but it muft take place at the furface, becaufe vapour at 212° cannot fuftain more than the weight of thirty inches of mercury." Dalton's New Syftem of Chemical Philofophy, p. 123.

Thunder and Lightning.—Of all the atmofpherical phenomena there are none more awfully fublime than thofe of thunder and lightning. Refpecting the nature and caufe of thefe it would be ufelefs to cite the opinions of ancient philofophers, as all our real knowledge on thefe fubjects is derived from modern difcoveries, and particularly thofe in electricity. Dr. Franklin afcertained the identity of lightning and electricity; fince then the attention of philofophers has been directed to the inquiries, how the electric fluid or energy circulates from the earth to the air and back again to the earth; by what means it is raifed into the atmofphere, how it becomes redundant, and how it is returned to the earth again. The aqueous vapour, or fteam of the atmofphere, appears to be the vehicle. The dry and permanent elaftic fluids have probably no more to do than as non-conductors of electricity to obftruct its paffage through the atmofphere. When water is evaporated it takes along with it a greater quantity of electricity, as well as heat, than it had before; that is, the capacity of vapour for electricity is greater than that of water. This fact has been obferved by moft of thofe who have, of late years, carefully attended to electrical phenomena. (See *Electricity of the* ATMOSPHERE.) Of courfe when the fteam is condenfed into water, there muft be a redundance of electricity as well as of heat; and if the air be a non-conductor (as it undoubtedly is when dry), the drops of water, or the cloud formed, muft be electrified pofitively. This is afcertained to be the fact; indeed it may be feen in the article above referred to, that the electricity of the atmofphere is almoft univerfally pofitive. If, during a thunder-ftorm, and on fome few other occafions, the atmofphere exhibit figns of negative electricity, it can fcarcely be doubted that this is occafioned by the action of fome fuperior cloud, which being pofitively electrified, makes the other, or the circumambient air, negative by induction, agreeably to the well-known law of electricity. The reafon why the atmofphere cannot be negatively electrified is, that in the ordinary courfe of nature *no evaporation of water infulated by the atmofphere can ever take place;* the evaporation being always originally from the earth's furface. We have obferved, indeed, that clouds are fometimes re-diffolved in the air; but then thefe clouds being infulated muft have their excefs of electricity about them, and confequently will not rob the atmofphere at large of any electricity that naturally belongs to it.

Conformably to thefe obfervations then, we may lay it down as an eftablifhed maxim, that *the electricity of every cloud at its formation is pofitive.* It will remain then to be explained how the phenomena of thunder and lightning are to be accounted for on this pofition. One moft obvious queftion occurs; if the electricity of one cloud find it expedient to force its way to the earth by a violent difcharge, why is it not univerfally the cafe, and why are not thunder and lightning as frequent as clouds and rain?

Before this queftion can be fatisfactorily anfwered, we muft make ourfelves acquainted with the circumftances that ufually accompany thunder and lightning. It will be generally allowed, that the frequency of thunder and lightning, in this part of the world at leaft, is in proportion to the quantity of aqueous vapour in the atmofphere, or, which nearly amounts to the fame thing, to the temperature of the air. The following extract from Dalton's Meteorology, being the refult of five years' obfervations, will fupport this affertion. See pages 29 and 46.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Mean temperature each month	37°	39°	39°	45°	51°	56°	57°	58°	53°	46°	41°	35°
Number of days when thunder was heard	1	0	0	3	7	5	12	7	4	2	0	1

In fact, thunder is very rare in winter, perhaps never known in froft, more frequent in fpring and autumn; but it is in the months of May, June, July, Auguft, and September, which are the warmeft months in the year, that we ufually expect, and have to record thunder-ftorms of any confequence or duration. Of thefe months, July, which is the middle of the feries, is generally the warmeft, and from the above ftatement appears pre-eminent for thunder-ftorms. It is further remarkable, that when thunder is obferved in winter, *it is always during a low barometer, and an unufually warm vapoury ftate of the atmofphere;* alfo in fummer, whenever the dew-point temperature arrives at a maximum for the feafon (that is, from 55° to 62°, or upwards), it is reduced for the moft part by a thunder-ftorm and confiderable rain. With regard to other climates, it is known that thunder is frequent and violent in low latitudes, and in all places where the extremes of heat and moifture are found; but we do not often hear of its effects in high latitudes where neither heat nor moifture can be long prevalent. Whenever vapour is precipitated from the atmofphere by the caufes we have already affigned, the quantity will be greater in proportion as the abfolute quantity of aqueous vapour in the atmofphere is greater: this arifes from the increafe of vapour being in a geometrical progreffion to that of temperature in arithmetical progreffion. Rain, with the dew-point at 60°, will be twice as heavy, all other circumftances the fame, as rain with the dew-point at 40°; becaufe there is twice as much fteam in the air in the former cafe. It has already been obferved, that the clouds are higher or more elevated above the furface of the earth in fummer than in winter. From combining thefe obfervations we may, perhaps, obtain a fatisfactory reafon for thunder not accompanying every cloud and fhower of rain. In winter the clouds are low, lefs denfe, and confequently lefs electric,

electric, than in ſummer; their electricity ſilently and ſlowly ſteals away to the earth's ſurface. In ſummer the intenſity of the electricity is double, in conſequence of its quantity being as the vapour condenſed, and it is more removed from the earth, or inſulated by its ſuperior altitude; hence its energy may be ſo far increaſed as to overcome the reſiſtance of the air. Thus, if an imperfectly rounded ball be preſented at a proper diſtance from the conductor of an electrical machine, it will ſlowly and ſilently draw off the electricity; but if the intenſity of the electricity be increaſed ſufficiently, nearly the whole will come away in an inſtant in the ſhape of a denſe ſpark, with a ſnapping noiſe.

There is another circumſtance which probably has conſiderable influence in giving a highly vapourized air its character for favouring thunder. It admits of ſeveral ſtrata of clouds arranged one beneath another, which will operate like the ſeries of plates in the Voltaic pile in increaſing the intenſity of their electric charge. This diſpoſition cannot well occur in winter, as the higher air is too deficient in vapour to ſpare an adequate quantity for the purpoſe.

One very remarkable character of thunder has not been duly noticed by philoſophers; that is, the long continuance of each ſingle peal. It may, perhaps, be ſafely aſſerted, that the duration of a peal of thunder is at an average about twenty ſeconds; it is certainly longer in many inſtances. Now, as the flaſh of lightning is inſtantaneous, we have no rational method of explaining the continuance of the ſound, but by ſuppoſing the diſcharge to extend for a great many miles; if the ſound continue half a minute, the diſcharge cannot be leſs than through the ſpace of ſeven miles, but may be twice as much, or more. How, then, is this great length of the diſcharge to be explained? In order to meet this queſtion, we may remark, that clear air is a bad conductor of electricity, but that clouded air poſſeſſes a kind of middle quality, of being neither a good conductor, nor a good non-conductor. We may ſuppoſe that the ſame electric energy which forces a way through 100 yards of clear air, may be capable of forcing a way through 10,000 yards of denſely-clouded air. Hence we may account for the long continuance of thunder, by ſuppoſing that the electricity of a ſuperior cloudy ſtratum ſtrikes an inferior ſtratum at the neareſt point, and runs along it for a number of miles. The ſound arrives at the ear from the neareſt point of the courſe firſt, and afterwards ſucceſſively from the more remote points, and thus occaſions the continuance of the ſound. This view of the ſubject is corroborated by the obſervation, that whenever a clap of thunder is noticed to be remarkably near, or to ſucceed the flaſh immediately, by one inhabitant of any large town, it is noticed in like manner by moſt of the other inhabitants, though ſituate ſome miles diſtant from each other.

Thunder may be heard to the diſtance of ten or fifteen miles, but ſeldom further; this is aſcertained from a calculation of the velocity of ſound during the interval between the flaſh and the report in a dark night. It is uncertain to what diſtance lightning may be ſeen; we ſometimes ſee it in the night when no clouds are viſible; in this caſe it muſt be at a great diſtance, perhaps one or two hundred miles, or more. In ſuch caſes the flaſhes are obſerved to be much more frequent than when the thunder is near; this ſeems to indicate that in the latter inſtance we do not perceive all the lightning of the ſtorm.

Cauſes of the Variation of the Barometer.—One of the moſt difficult problems in meteorology is to aſſign the cauſes for the daily changes in the weight of the atmoſphere. Various opinions have been held with regard to theſe cauſes, many of which are too futile to merit animadverſion. This ſubject has already received an ample diſcuſſion under the head Barometer, *Cauſe of the Phenomena of*, ſo that we ſhall be brief on the preſent occaſion. It may be proper, in the firſt place, to ſtate the leading facts: namely, that the variation of the barometer is leaſt in the torrid zone, and is greater, as we proceed thence northward or ſouthward; that in the temperate and frigid zones, the variation is always greater in winter than in ſummer. We ſhall take for granted that the whole atmoſphere of the earth continues the ſame in quantity, and that the variations of the barometer ariſe from unequal diſtribution of the atmoſphere, and not from any generation or deſtruction of elaſtic fluids. We ſhall alſo take for granted that any changes in the aqueous vapour of the atmoſphere are inſufficient to explain the phenomena, becauſe if the whole quantity of aqueous vapour in the atmoſphere were withdrawn from any place on any occaſion, it would not depreſs the barometer one quarter of what is frequently obſerved in high northern latitudes in winter.

Mr. Kirwan's idea that the atmoſphere is higher over the equator than over the poles, owing to the difference of temperature in thoſe two regions, and that the currents occaſioned thereby are inſtrumental in producing the changes of the barometer, is certainly entitled to our conſideration. On this principle Mr. Dalton has conſtructed a table to ſhew the relative heights of the barometer at given elevations over the equator, the north of England, and the north pole. (Meteorology, page 83.) "The mean heat at the earth's ſurface under the equator is ſuppoſed 84°; the mean heat in theſe parts for the hotteſt month of ſummer at 60°, and for the coldeſt month of winter at 35°. The mean annual temperature at the north pole being ſuppoſed 31°, the mean temperature for the coldeſt month of winter at that place may perhaps be ſtated at 2°."

Elevation of the Barometer above the Level of the Sea in English Miles.	Height of the mercurial Column of the Barometer in Inches.			
	Above the Equator.	Above the North of England.		Above the North Pole.
		In Summer.	In Winter.	In Winter.
0	30.00	30.00	30.00	30.00
2	20.55	20.10	19.58	18.81
4	13.61	12.96	12.24	11.19
6	8.66	7.98	7.26	6.24
8	5.25	4.65	4.03	3.19
10	3.00	2.52	2.05	1.45
12	1.58	1.24	.93	.56

From this table it ſhould ſeem, that the weight of air in a vertical column of ſix miles over the equator is nearly equal to that of a column of five miles over the pole in winter: that is, the heights of the atmoſphere at the equator and pole are as 6 to 5 nearly. But the relation between the equator and the north of England in this reſpect, in ſummer is as 16 to 15, and in winter as 8 to 7 nearly. Now when the variations in the altitudes are greateſt (in winter), the energy or velocity of the great northern and ſouthern currents of air is greateſt, as has been ſhewn above on winds, and therefore the irregularities occaſioned by the interference, &c. of theſe currents muſt then be alſo at their greateſt. Theſe irregularities are ſhewn by the barometer. If we were to ſuppoſe that, from ſome extraordinary incidents, the atmoſphere over the north of England

land in winter were raised to the same elevation as that over the equator, all other circumstances being the same, the barometer must rise nearly four inches; and it would sink four inches if the atmosphere were depressed as much below the mean. But this supposition is much too extravagant to be admitted, and indeed the facts do not call for any thing near it. The barometer rarely rises or falls more than one and a half inch from the mean in this country; and consequently a slight variation of the mean altitude of the atmosphere is all that is required, and such may well be admitted.

Besides this variation of the mean altitude of the atmosphere, Mr. Dalton thinks there is another cause that acts in combination with it to produce the extraordinary falls of the barometer in winter, (which are observed to go below the mean more than the rises go above it.) He supposes, that during a violent S.W. wind on the occasion of a thaw (at which time the minimum usually takes place), a temporary change in the law of temperature in ascending exists. That the temperature in ascending is then more nearly uniform than at other times; by which means the elasticity in the lateral directions will be equal to any force that may be opposed, whilst the weight of a vertical column will be less than otherwise. See Meteorology, page 109.

For further information on meteorology, see ANEMOMETER, ATMOSPHERE, BAROMETER, CLOUD, DEW, EVAPORATION, FOG, HAIL, HYGROMETRY, LIGHTNING, METEOR, RAIN, SNOW, THERMOMETER, THUNDER, WIND, &c.

METEOROMANCY, a species of divination by meteors, principally by lightning and thunder: this method of divination passed from the Tuscans to the Romans, with whom, as Seneca informs us, it was held in high esteem.

METEOROS, μετεωρος, from μετα, and αιρω, *to elevate*, in *Medicine*, elevated, suspended, sublime, erect, tumid. Thus μετεωρα αλγηματα, are expounded by Galen, Com. ad. Aph. 7. lib. vi. sublime pains: those which are above the peritonæum, or affect the superficial and external parts of the body. These pains are opposed to such as are deeply seated, and called τα μη μετεωρα, not sublime, but deep, and seated within the peritonæum.

METEOROSCOPE, from μετεωρος, *high*, and σκοπος, of σκεπτομαι, *I view, observe*, a name which the ancient mathematicians gave to such instruments as they used for observing and determining the distances, magnitudes, and places of the heavenly bodies; many of which they regarded as meteors.

The name, however, may much more properly be applied to meteorological instruments.

METEPEC, in *Geography*, a town in the province of Mexico.

METERISCH, a town of Moravia, in the circle of Iglau; 17 miles E. of Iglau.

METESSIB, an officer of the eastern nation, who has the care and oversight of all the public weights and measures, and sees that things are made justly according to them.

METEYARD, in *Rural Economy*, a term applied to a staff or beam of a certain length for taking measures.

METEZAU, CLEMENT, in *Biography*, a celebrated French architect, who flourished in the former part of the 17th century, was a native of Dreux, but settled at Paris, became architect to Lewis XIII., and acquired much fame by carrying into execution, with Tiriot, a Parisian mason, the plan suggested by cardinal Richelieu for reducing Rochelle, by means of an immense dyke, in imitation of what Cæsar had done at Durazzo, and Alexander the Great at Tyre. This scheme was to run a solid wall across a gulf upwards of 740 fathoms, or more than three quarters of a mile broad, into which the sea rolled with great force, and when the wind was high, with an impetuosity which seemed to set at defiance the art of man. Those who had undertaken the business were not to be turned aside by any obstacles: they began, by throwing in huge rocks, to lay a kind of foundation; upon these were placed vast stones, cemented by the mud thrown up by the sea. These were supported by immense beams, driven into the bottom with incredible labour. It was raised so high, that the soldiers were not incommoded by the water, even at spring tides. The platform was nearly 30 feet wide, and 90 feet at the foundation. At each extremity there was a strong fort, in the middle there was an open passage of 150 paces, several vessels being sunk immediately before it, together with high stakes in a double row, and before these 35 vessels linked together, so as to form a kind of floating pallisade. This amazing dyke was completed in somewhat less than six months, and proved the principal means of occasioning the surrender of the city. So honourable were the exertions of M. Metezau in this business, that his portrait was circulated widely through France, to which were attached the following lines,

> "Dicitur Archimedes Terram potuisse movere:
> Æquora qui potuit sistere, non minor est."

METH, METI, or *Mott*, in *Geography*, a small island near the coast of Africa, at the entrance of Babelmandeb, with a town upon it. N. lat. 11° 15′. E. long. 48° 45′.

METHANA, a town of the Morea, near the coast of the gulf of Engia; 56 miles E.S.E. of Napoli di Romania.

METHEGLIN, a drink prepared of honey; one of the most pleasant and general drinks the northern parts of Europe afford; and much used among the ancient inhabitants.

The word is Welsh, *meddyglin*, in which it signifies the same. There are divers ways of making it; one of the best of which follows: put as much new honey, naturally running from the comb, into spring water, as that, when the honey is thoroughly dissolved, an egg will not sink to the bottom, but be just suspended in it; boil this liquor for an hour, or more, till such time as the egg swim above the liquor about the breadth of a groat; when very cool, next morning, it may be barrelled up; adding to each fifteen gallons an ounce of ginger, as much of mace and cloves, and half as much cinnamon, all grossly pounded: a spoonful of yeast may be also added at the bung-hole, to promote the fermentation. When it has done working, it may be closely stopped up; and, after it has stood a month, it should be drawn off into bottles. See MEAD.

METHO, in *Geography*, a small independent country of Africa, S.E. of Fittré.—Also, a town of the Morea; 34 miles E.S.E. of Napoli di Romania.

METHOD, METHODUS, from μεθοδος, in *Logic* and *Rhetoric*, the art or rule of disposing things in such a manner, as that they may be easily comprehended; either in order to discover the truth, of which we ourselves are ignorant; or to shew or demonstrate it to others when known, or to fix it in the memory. See DISPOSITION.

Gassendus distributes method, with regard to its object, into three kinds, or branches, *viz.* inventionis, *the method of invention*, or discovering a truth unknown.

Methodus judicii, the method of judging or determining of a truth, or position, proposed.

And

And *methodus demonſtrationis,* or method of demonſtration; that is, of exhibiting it to another.

Method is diſtributed by others into two general kinds, *viz. natural* and *arbitrary. Natural* method is that which obſerves the order of nature, and proceeds in ſuch a manner, as that the knowledge of things which follow depends in a great meaſure on the things which go before. *Arbitrary* method leaves the order of nature, and accommodates itſelf to many purpoſes: as to treaſure up things, and retain them in the memory; to harangue and perſuade mankind to any practice in the religious or civil life; or to delight, amuſe, or entertain the mind. This kind of method is chiefly purſued in poetry and oratory.

Natural method is again ſubdivided into two kinds; the one of *reſolution,* which is that we generally uſe in our enquiry after truth. The other of *compoſition,* by which the truth, once found, is taught or imparted to others.

In the method of *reſolution,* called alſo by geometers the *analytic* method, we proceed from ſome general known truths to others, which belong to ſome particular or ſingular thing.

In the *method of compoſition,* called alſo the *ſynthetic* method, we propoſe ſome certain general truths, from which we produce particular truths.

If, in the method of reſolution, we lay down any axioms, it is not immediately in the beginning, and all together, but as they are found neceſſary in the diſquiſition: on the contrary, in the method of compoſition, they are propoſed all together in the beginning, before there is any abſolute need of them.

The two methods differ from each other, as the methods of ſearching out a genealogy, either by deſcending from the anceſtors to their poſterity, or by aſcending from the poſterity to the anceſtors: both of them have this in common, that their progreſſion is from a thing known to another unknown. Thoſe things that are known in each are ſet in the front, or firſt place, that by them we may be able to arrive at thoſe which are not known.

Dr. Watts, in his excellent Treatiſe on Logic, has compriſed the general requiſites of true method in the purſuit or communication of knowledge, under the following heads. It muſt be, 1. Safe or ſecure from error: in order to which great care ſhould be uſed in laying the foundations of a diſcourſe, or the ſcheme of our thoughts, on any ſubject; the primary and fundamental propoſitions ſhould not only be evident and true, but made familiar to the mind by dwelling on them before we proceed farther; our ground ſhould be made firm in every ſtep; and we ſhould draw up all our propoſitions and arguments with ſo much caution, and expreſs our ideas with ſuch a juſt limitation, as may preclude or anticipate any objections. 2. Plain and eaſy: for which purpoſe, we ſhould begin always with thoſe things that are beſt known and moſt obvious, and proceed by regular and eaſy ſteps to things that are more difficult; nor ſhould we affect exceſſive haſte in learning or teaching any ſcience, nor hurry at once into the midſt of it; nor again crowd too many thoughts and reaſonings into one ſentence or paragraph, beyond the apprehenſion or capacity of our readers or hearers; we ſhould alſo avoid too many ſubdiviſions; and acquire in early life a clear and eaſy way of expreſſing our conceptions. 3. Diſtinct: in order to which no needleſs heterogeneous matter ſhould be introduced; every complicated theme or idea ſhould be divided into its diſtinct ſingle parts, as far as the nature of the ſubject, and our preſent deſign, require; we ſhould call every idea, propoſition, and argument, to its proper claſs, and keep each part of the ſubject in its own place; and in the partition of our diſcourſe into diſtinct heads, take heed that particulars do not interfere with the general, nor with each other. 4. Full, or without defect: and this is neceſſary in explaining a ſubject; in enumerating its parts or properties; in aſſerting or proving any truth; in illuſtrating or arguing a point of difficulty; in drawing up a narrative; and in ſolving any difficulty. 5. Short, or without ſuperfluity: for this purpoſe, all needleſs repetitions, tedious prolixity, long parentheſes, uſeleſs explications, proofs, and refutations, and all ſcholaſtic forms, ſhould be carefully avoided. 6. Proper to the ſubject, the deſign, and the age and place in which we dwell. 7. Connected: in order to this, we ſhould keep our main deſign always in view, and preſerve an apparent tendency in all the parts of our diſcourſe towards it; the mutual relation and dependence of the ſeveral branches of our diſcourſe ſhould be ſo juſt and evident, that every part may lead onward to the next; and we ſhould acquaint ourſelves with all the proper and decent forms of tranſition from one part of the diſcourſe to another, and practiſe them as occaſion offers.

The *ſynthetic* method is only practicable in things whoſe principles we perfectly know; as in geometry, which is wholly employed in the conſideration of abſtract modes, of which our mind has clear and adequate ideas. When the inquiry is into ſubſtances, as in phyſics, we cannot make uſe of the method of *compoſition,* becauſe their kinds and intimate eſſences are unknown to us.

This method has not been by any ſo juſtly and accurately obſerved as by the mathematicians, whoſe principles are perfectly known: its laws, therefore, will be beſt drawn from their practice; for which, ſee COMPOSITION.

The ſupreme law of the philoſophical method is, to premiſe that which is neceſſary towards the underſtanding or eſtabliſhing what follows.

The mathematical and philoſophical methods are the ſame, as may be ſeen by the practice of the geometers of antiquity, who conſtantly obſerve the law here mentioned.

Several authors, as Ramus, Meſſrs. de Port-Royal, &c. have accuſed Euclid of want of method. Had theſe gentlemen attended to the ſupreme law of all true method, they would have been more cautious in their cenſures.

METHOD, *Methodus,* is more particularly uſed, in *Mathematics,* for divers particular proceſſes for ſolving problems. In this ſenſe we ſay,

METHOD *of Exhauſtions.* See EXHAUSTIONS.

METHOD *of Fluxions.* See FLUXIONS.

METHOD *de Maximis & Minimis,* &c. See MAXIMA, &c.

METHOD *of Tangents.* See TANGENTS.

METHOD *Differential,* &c. See DIFFERENTIAL.

METHOD *Exponential.* See EXPONENTIAL.

METHOD *Poriſtic.* See PORISTIC.

METHODIC SECT. See METHODISTS, and MEDICINE, *Hiſtory of.*

METHODISTS, in *Eccleſiaſtical Hiſtory,* is a denomination applied to different ſects, both Papiſts and Proteſtants.

The *Popiſh* Methodiſts were thoſe polemical doctors, of whom the moſt eminent aroſe in France towards the middle of the ſeventeenth century, in oppoſition to the Huguenots or Proteſtants. The Methodiſts, from their different manner of treating the controverſy with their opponents, may be divided into two claſſes. The one may comprehend thoſe doctors, whoſe method of diſputing with the Proteſtants was diſingenuous and unreaſonable, and who followed the examples of thoſe military chiefs, who ſhut up their troops in intrenchments and ſtrong holds, in order to cover them from the attacks of the enemy. Of this number were the Jeſuit Veron, who required the Proteſtants to prove the tenets

tenets of their church by plain passages of scripture, without being allowed the liberty of illustrating those passages, reasoning upon them, or drawing any conclusions from them; Nihusius, an apostate from the Protestant religion; the two Walenburgs, and others, who confined themselves to the business of answering objections and repelling attacks; and cardinal Richelieu, who restricted the whole controversy to the single article of the divine institution and authority of the church. The Methodists of the second class were of opinion, that the most expedient manner of reducing the Protestants to silence, was not to attack them partially, but to overwhelm them at once, by the weight of some general principle or presumption, some universal argument, which comprehended, or might be applied to all the points contested between the two churches: thus imitating the conduct of those military leaders, who, instead of spending their time and strength in sieges and skirmishes, endeavour to put an end to the war by a general and decisive action. These polemics rested the defence of popery upon prescription; the wicked lives of Protestant princes who had left the church of Rome; the crime of religious schism; the variety of opinions among Protestants, with regard to doctrine and discipline; and the uniformity of the tenets and worship of the church of Rome. To this class belong Nicole, the Jansenist doctor, the famous Bossuet, &c. Mosh. Eccl. Hist. vol. v. 8vo.

The *Protestant* Methodists form a very considerable class, principally of the lower people in this country. They sprung up about the year 1729, at Oxford, and were soon divided into two parties, the one under the direction of the two brothers, John and Charles Wesley, and the other under that of Mr. George Whitefield, who joined them in the year 1735. These leaders, and, if we except Mr. William Law, the celebrated mystic, founders of Methodism, were educated at Oxford, and received episcopal ordination; and always professed themselves advocates for the articles and liturgy of the established church: though they commonly practised the dissenting mode of worship. The appellation of Methodists is said to have been derived from the regular distribution of their time, their orderly and composed demeanour, and the supposed purity of their religious principles. Conceiving a design of forming separate communities, superior in sanctity and perfection to all other Christian churches, and impelled to a very considerable degree by a zeal of an enthusiastic and extravagant kind, they became itinerant preachers, and, being excluded from most of our churches, exercised their ministry in private houses, fields, &c. not only in Great Britain and Ireland, but also in America: thus collecting a very considerable number of hearers and proselytes, both amongst the members of the established church and the dissenters. The theological system of Mr. Whitefield and his followers is Calvinistic: that of Mr. Wesley and his disciples, Arminian; and the latter maintain the possibility of attaining sinless perfection in the present state. The subordinate teachers of both these classes of Methodists are generally men of no liberal education, and they pretend to derive their ministerial abilities from special communications of the spirit. The Methodists of both parties, like other enthusiasts, make true religion to consist principally in certain affections and inward feelings, which it is impossible to explain, but which, when analysed, seem to be mechanical in their spring and operation, and they generally maintain, that Christians will be most likely to succeed in the pursuit of truth, not by the dictates of reason, or by the aids of learning, but by laying their minds open to the direction and influence of divine illuminations and their conduct has been directed by impulses.

Such is the account given of the followers of Whitefield in Mosheim's Eccl. Hist. translated by Dr. Maclaine (vol. vi. p. 36. ed. 1811, 8vo.); but though it may be true in general, as comprehending Methodists of both descriptions, at their first rise and in their early progress, it admits, in the present state of this sect, of many exceptions; and it would be unjust and uncandid to charge upon a whole body of Christians, respectable both as to number and character, the errors in sentiment and irregularities in practice, into which the excesses of enthusiasm may have betrayed some of their number. Much as we may disapprove these errors and irregularities, truth requires us to declare from our own knowledge, that those who have passed under the denomination of Methodists have been eminently useful in awakening into consideration the unthinking, and in restraining the profligate, among the lower classes of mankind. We perceive with satisfaction a change of conduct: the idle and dissolute have become diligent and virtuous; religion finds votaries among those who were accustomed to treat it with neglect and contempt; the state of families has been amended, and the community in general, composed of individuals and of domestic associations, has derived benefit from the assiduity and zeal of the Methodists. We look forward with pleasure to a period, when, by the diffusion of knowledge among persons in the inferior stations of life, many of those who are now deemed erroneous enthusiasts will become enlightened, rational, and exemplary Christians. Having rendered this tribute of justice to the Methodists in general, we shall now proceed to give a more particular and detailed account of the two leading classes into which they have been divided.

The opinions of Mr. Whitefield, which we have already stated to have been Calvinistic, as well as his piety, recommended him to the notice of a devout peeress, the countess dowager of Huntingdon, who became his patron, and liberally promoted the erection of meeting-houses for the Calvinistic Methodists; and when her preachers could not obtain episcopal ordination, established a college at Trevecca, in Breconshire, not far from Brecknock, for the education of ministers in the Whitefieldian connection. This seminary, not being endowed, expired with the countess; but a new one was soon after established at Cheshunt, which has furnished the Methodists of this description with useful preachers.

We may here observe, that the proselytes of Whitefield were less numerous than those of Wesley; and that their association was less compact. Their ministers and places of worship were respectively supported by the different congregations, aided for a time by the liberality of the countess above-mentioned and her friends in the higher ranks of life; not, like those of the Wesleyan sect, by a general fund. The former had no annual assembly for the government of the whole body; but the latter had a regular session, under the name of a "Conference," in which the affairs and the circumstances of the confederacy were investigated, funds provided, abuses corrected, and grievances redressed. This meeting was composed of preachers chosen by the assemblies of different "districts" as representatives of the Methodist connection, and of the superintendants of the "circuits," or inferior divisions. It was at first limited to 100 of the senior itinerant preachers; but, in process of time, all the preachers were permitted to assist, if they were so inclined, or had an opportunity of attending. At first, laymen were allowed to preach; but ministers were afterwards ordained for that purpose by the clerical heads of the society. Our readers hardly need to be informed, that Wesley and some of his associates had taken orders in the church of England; and this circumstance increased their ministerial respectability in the general estimation; but it gave them no additional importance

importance in the opinion of the peculiar votaries of this connection, who were disposed to listen with profound attention to the effusions of the lowest and most illiterate mechanics. Mr. Wesley, speaking of these unlettered men, affirmed, that they had "help from God for that great work, the saving of souls from death, since he had enabled, and did enable them still, to turn many to righteousness.—Thus hath he destroyed the wisdom of the wise, and brought to nought the understanding of the prudent." Mr. Wesley introduced among his followers "agapæ," or love-meetings. Once in every quarter of a year, after the religious service of the day, a considerable number of persons, of both sexes, "broke bread" with each other. Alms were then collected for the poor members of the society. At these meetings the preachers and others related their respective "experience," and the service was enlivened by hymns, which were sung at certain intervals. These love-feasts were derived from the Moravians, with whom Mr. Wesley at first associated, but whose communion he soon renounced. In order to counteract the misconceptions which some persons might form of the character of the Methodists, Mr. Wesley stated the "distinguishing marks" of his followers. These marks, he said, were to be found, not in "their opinions of any sort," in their words and phrases, or in any desire of being "distinguished by actions, customs, or usages, of an indifferent nature, undetermined by the word of God;" nor did they lay the whole stress of religion upon any single part of it. But they were distinguished by having the love of God shed abroad in their hearts, by being always happy in God, ever resting on him, giving thanks for every thing, praying constantly with earnestness and fervour; by purifying their hearts from the lust of the flesh and of the eye, from envy and malice, from pride and petulance; by doing kind offices to neighbours and strangers, to friends and enemies; and by other fruits of a "living faith." Nothing, he added, was required by St. Paul but the faith here mentioned. By that alone could any one be justified, or accounted righteous before God; and the remission of sins could only be obtained through the merits of Christ, not by the good works or supposed deserts of individuals. Holiness of heart and life would flow from such faith; but good deeds without it would be inoperative and nugatory. No man could produce it in himself, as it was the work of omnipotence. It was the free gift of God to those who were before "ungodly and unholy, and fit only for everlasting destruction." He who received it was born again, yet was not so perfectly regenerate, as to be fully sanctified; for there would still be some struggles between the old and the new man, which would not cease before the Holy Spirit had given to the zealous Christian "a new and clean heart." He would then attain the "acmé" of sanctification, and be qualified for the society of "just men made perfect."

Among these Methodists dissentions existed at the time of the decease of their founder; but an interval of six years elapsed before their difference of sentiment produced an actual separation. The liberties of their church, and the rights of the people, formed the grounds of dispute. On pretence of giving due support to the plan of itinerancy, some leading ministers had endeavoured to obtain an exorbitant degree of power over the community and junior preachers; and they managed the conference in a way which tended to secure this power. Disgusted at these arbitrary proceedings, Mr. Kilham, and other members of the sect, applied to the general assembly for a redress of grievances, and for an admission of the laity to a proper share in the general government of the society. Repeated applications and remonstrances being wholly fruitless, and Mr. Kilham being expelled from the fraternity by the ruling party, about 5000 discontented members seceded from the connection in the year 1797, and formed independent arrangements on a popular basis. Another body of seceders, assuming the uncouth appellation of "Christian Revivalists," "claimed," says an historian of the Wesleyan sect, "a right to indulge their propensities to prayer and praise, at all times, and on all occasions." See Nightingale's "Portraiture of Methodism," cited in the last edition of Mosheim's Eccl. Hist. by Dr. Coote, vol. vi. p. 308—315. 8vo.

Before we close this article, we shall observe that Methodists of both descriptions are, in general, members of the established church; though they have been erroneously confounded with Protestant dissenters. Mr. Wesley would never allow of a separate communion, and required his followers to frequent the established church, when they had no opportunity of hearing their own preachers, and there to communicate. Of late, indeed, some alteration has taken place in this respect; and parties of the Wesleyans approach more nearly in principles and practice to Protestant dissenters. It is also well known, that the Methodists in Mr. Whitefield's connection, though intermixed with many who call themselves Dissenters, belonged for the most part to the church; and their more general departure from it was occasioned, when, at the request of the pious countess above-mentioned, episcopal ordination was refused to her ministers. Few of them yet understand or adopt the discriminating principles of Dissenters. The ministers, who have been qualified for the exercise of their functions by ordination according to the rites of the church, and who still continue in it, are in popular language called Methodists, or now, more generally, *evangelical* clergy; an appellation appropriating to themselves a distinguishing and peculiar character, which others of their own body are not disposed to allow them, and which, as some of them say, is, with respect to their sentiments and preaching, invidious and degrading. It is our province, in a work of this nature, to state facts and opinions justly and candidly as far as we are able; and we leave contending parties, both *in* and *out* of the church, to settle their differences among themselves.

METHODISTS, in *Medical History*, a title assumed by a sect of physicians at Rome, in order to distinguish themselves from the two opposite sects, the Empirics and Dogmatists, (see EMPIRIC,) with either of which they refused to arrange themselves. The Methodist physicians, as Celsus informs us, generally considered Themison as their founder, who was followed as a leader by Thessalus, and afterwards by Soranus of Alexandria, the last of whom practised at Rome, during the reigns of Trajan and Hadrian. A bold charlatan, Asclepiades, who settled at Rome about the time of the Mithridatic war, was the first, however, who maintained the principles adopted by this sect. Borrowing the doctrine of atoms laid down by Epicurus, he attempted to account for all diseases upon the obstruction to the circulation of the atoms, occasioned by two opposite states of the system, which he denominated *strictum* and *laxum*, or states of constriction and relaxation. Every disease, which exhibited obvious marks of retention, or appearances of hardness, tumefaction, or external inflammation, was ascribed to the state of constriction; and the opposite phenomena of augmented discharges, softness and diminution of bulk, to the condition of laxity. This doctrine became popular, partly in consequence of the self-confidence of its professors, and the loudness of their declamation against former systems, and partly from the precision and formality of the regimen which they prescribed: and its progress was, perhaps, not a little a little aided by the ſimplicity with which it ſeemed to explain all the phenomena of diſeaſe, and by the indolence which it ſanctioned in the practitioner; inaſmuch as it rendered all nice diſcrimination of ſymptoms, and particular inveſtigation of local diſeaſe, unneceſſary. It was enough to aſcertain the claſs in which any diſeaſe was to be arranged, and the general treatment would ſerve for all; the obſervation both of exciting and of proximate cauſes was deemed entirely ſuperfluous. "As ſoon as it was known," ſays Celſus, "to which of theſe claſſes a diſtemper belonged, if the body were bound, it muſt be opened; if it laboured under a flux, it muſt be reſtrained; and if it were of a mixed nature, the moſt urgent malady muſt be firſt oppoſed." For they were obliged to admit, in ſome caſes, the inconſiſtency of both *ſtrictum* and *laxum* occurring at the ſame time, in different organs of the body.

The abſurdity of founding the practice of medicine upon theſe very general principles has been pointed out, with his uſual force, by Celſus. He conſidered the Methodiſts as even below the Empirics, in the accuracy of their practical views: ſince the Empirics attended to many circumſtances of a diſeaſe, while the Methodiſts only obſerved the moſt obvious, and even the moſt common appearances. Like the farriers, who ſuperintend the diſeaſes of ſheep and cattle, but cannot learn from theſe dumb animals the peculiar ſymptoms of their complaints, they regard only a few, which are common to all. "Neque adjectum quicquam Empiricorum profeſſioni, ſed demtum eſt; quoniam illi multa circumſpiciunt, hi tantum facillima, et non plus quam vulgaria. Nam et hi, qui pecoribus ac pimentis medentur, cum propria cujuſque ex mutis animalibus noſſe non poſſint, communibus tantummodo inſiſtunt." (Celſ. de Medicina. *Præf.*) This intelligent writer then goes on to ſhew the inſufficiency of ſuch general indications in practice. In the ſtate of laxity, for inſtance, he remarks, "it is one thing to vomit bile, another to vomit blood, and another to reject the food; and there is much difference between a ſimple purging, and one attended with tormina; *i. e.* between a mere diarrhœa and a dyſentery; and likewiſe between a waſting from profuſe ſweats, and a mere maraſmus. And not one of theſe complaints is to be cured exactly in the ſame manner as another."

We have already pointed out the ſimilarity between this doctrine and that of the Brunonian ſyſtem, which has been the cauſe of much controverſy in our own times; the diſtinguiſhing features of which were, the reference of all diſeaſes to two oppoſite conditions of the conſtitution, *ſthenia* and *aſthenia*, or ſtrength and debility, (which might with almoſt equal propriety have been called *ſtrictum* and *laxum*,) and the conſequent excluſion of all particular inveſtigation of the minute diſtinctions in the phenomena of diſeaſes, which it encouraged. See MEDICINE, *Hiſtory of.*

The practice of the Methodiſts was particularly diſtinguiſhed by their rejection of purgative medicines; by their rigid and formal regimen, eſpecially in the methodical abſtinence which they enforced for a certain number of days; and by their copious uſe of warm ablutions, fomentations, cataplaſms, and frictions with oil, together with free bleeding, in diſeaſes aſcribed to ſtricture; and a ſimilar routine with cold drinks, and cold and corrugating applications, in diſorders attributed to laxity. An epitome of *methodiſtic* medicine has been handed down by Cælius Aurelianus, who tranſlated the original work of Soranus, which is loſt. See his treatiſe "De Morbis Acutis et Chronicis:"—alſo Le Clerc Hiſt. de la Medecine; Walker's Memoirs of Medicine.

METHODIUS, in *Biography*, a Chriſtian biſhop and martyr, who flouriſhed towards the cloſe of the third century; and unleſs there were two of the ſame name, who lived about this period, he was biſhop of ſeveral places, *viz.* of Olympus, in Lycia, of Tyre, and of Patara, &c. He is not mentioned by Euſebius in his Eccleſiaſtical Hiſtory, which has been aſcribed, not without probability, to his reſentment againſt him for having written with ſeverity againſt Origen, of whom, it is known, that Euſebius was a great admirer. There were two opinions concerning the death of this prelate; ſome ſay he ſuffered under Decius, or Valerian, and others contend, that he was one of thoſe who ſuffered in Diocleſian's perſecution. He is highly applauded by Epiphanius, Jerome, and others, by whom he is characteriſed as a learned and eloquent man, and a zealous defender of the truth. Lardner has given a pretty full account of his works, for which we refer to the third volume of the 8vo edition, 1788. This learned and candid critic ſays, that in the Remains of Methodius there are many interpretations of texts of ſcripture, which, in his opinion, do little honour to the author's judgment, and he gives inſtances in proof of this deciſion. Dr. Lardner likewiſe obſerves, that the Remains of Methodius clearly prove, that he admitted into the canon of the holy ſcriptures the four goſpels, the acts of the Apoſtles, the epiſtles of St. Paul, and the epiſtle to the Hebrews as one of them. He alſo owned as authentic the firſt epiſtle of St. Peter, and the firſt of St. John. His opinion about the reſt is not known. He quotes the Revelations as a book of ſacred ſcripture, written by John, whom he probably regarded as the apoſtle and evangeliſt. Lardner.

METHODIUS, ſurnamed the *Confeſſor*, who flouriſhed about the middle of the ninth century, was born at Syracuſe. Having received a good education, he went to Conſtantinople, where he embraced a religious life, and took up his reſidence in a monaſtery at the iſle of Chios. He was afterwards ordained prieſt by the patriarch Nicephorus, and upon the expulſion of that prelate from the ſee of Conſtantinople, was ſent by him to Rome to implore aſſiſtance from pope Paſchal in his behalf. Upon his return to Greece, after the death of that patriarch, he ſignalized himſelf by his zeal for image-worſhip, on which account he was committed to priſon, and endured many indignities for ſeveral years. He recovered his liberty completely in the year 842, and was in a ſhort time preferred to the patriarchate of the church of Conſtantinople. As ſoon as he was quietly ſettled in his ſee, he introduced the ſuperſtition of image-worſhip into the Greek church. Methodius died in the year 847. He was author of ſeveral works, among which was a "Conſtitution, or Manual for Perſons who, after having apoſtatized, returned again to the Profeſſion of the Chriſtian Faith." Moreri. Moſheim's Eccl. Hiſt.

METHONICA, in *Botany*, Juſſ. 48. Herm. Lugd. Bat. 688. t. 689, the Malabar name of the Superb Lily. See GLORIOSA.

METHUEN, in *Geography*, a town of America, in Eſſex county, Maſſachuſetts, on the N. bank of Merrimack river, between Dracut and Haverhill. It contains two pariſhes and 1253 inhabitants.

METHULLY, a town of Hindooſtan, in Guzerat; 15 miles S.W. of Gogo.

METHWOLD, a ſmall market-town in the hundred of Grimeſhoe and county of Norfolk, England, is ſituated four miles from Stoke Ferry, and 86 from London. It derived its name from its ſcite, and was anciently written Methelwalde, or Midlewolde, being the wold between Northwolde and Hockwolde. The church, which appears to have been built in the reign of Edward II., is a regular edifice with a nave, a nave, aifles, and chancel. At the weft end of the nave is a fquare tower, embattled; on this is raifed another tower of an octangular fhape; and from the latter rifes a fpire. The population of Methwold in the year 1801, according to the return then made to parliament, was 865, occupying 134 houfes. The market, which is kept on Tuefdays, was formerly confiderable, but is now almoft difufed: an annual fair is held on St. George's day. The town has been, from time immemorial, proverbially famous for its extenfive rabbit warrens.

In this parifh ftood Stevefholm or Shifham priory, which was given by William earl of Warren, in the reign of king Stephen, as a cell to the priory of Caftle Acre. At the diffolution it was granted to the family of Mundeford, and was afterwards conveyed to that of Seabright. Blomefield's Hiftory of Norfolk, vol. ii. Beauties of England, vol. xi. by J. Britton.

METI, a town of Abyffinia, near the coaft of the Red fea. N. lat. 13° 30'. E. long. 42° 30'.

METIMCUS, two iflands of America, near the coaft of Main. N. lat. 43° 50'. W. long. 68° 15'.

METIMIN, a town of Ruffia, near the Pacific ocean. N. lat. 64° 55'. E. long. 180° 34'.

METITCHE, or METTIJIAH, a plain in the territory of the city of Algiers, which commences about half a mile N.E. of the city and ftretches 50 Englifh miles in length, and 20 in breadth, as far as the branch of mount Atlas, at the foot of which lies the town of "Belida." This plain is well cultivated and well watered, and is in this refpect fuperior to the other diftricts of the kingdom. It is juftly reckoned, as Shaw fays, the garden of the whole kingdom.

METIUS, ADRIAN, in *Biography*, a celebrated Dutch mathematician, who flourifhed in the 16th and 17th centuries, was a native of Alkmaer. He purfued his ftudies at a German univerfity, where he afterwards taught the mathematics with great reputation for feveral years, and afterwards became profeffor of thofe fciences at the univerfity of Franeker. He was author of feveral books on fpherics, aftronomy, and arithmetic. He had a brother James, for whom he claimed the honour of having been the firft inventor of the telefcope; but according to Borelli's account of the difcovery of that inftrument, it is highly improbable, as it is generally believed, that Zacharias Janfen, a fpectacle maker at Middleburg, was the original inventor, (fee TELESCOPE,) and that James Metius purchafed telefcopes of Janfen's children, by which he became acquainted with their conftruction and principles.

METKERKE, ADOLPHUS VAN, was born at Bruges in 1528, and fpent the greateft part of his life in the fervice of the revolted ftates of the Low Countries, in the quality of counfellor of ftate, and envoy to the foreign potentates. In the latter ftation he was at the court of queen Elizabeth, when he died, in 1591, of grief, it was faid, on account of the lofs of his fon Nicholas, an active commander before Deventer. He was a man of great learning, and was author of the following works; "A Tranflation, with Notes, of fome Pieces of Theocritus, Bion, and Mofchus;" "Latin Poems;" "A Treatife in Latin on the true Pronunciation of the Greek Language;" "A Collection of the Proceedings at the Peace concluded at Cologne in 1579." He took a part in other works, particularly in "The Lives of the Cæfars;" "The Medals of Magna Grecia," and "The Fafti Confulares," publifhed by Goltzius.

METO, or METON, a celebrated mathematician of Athens, who flourifhed 432 B.C., was the fon of Paufanias. He obferved, in the firft year of the 87th Olympiad, the folftice at Athens, and publifhed his cycle of 19 years by which he endeavoured to adjuft the courfe of the fun and moon, and to make the folar and lunar years begin at the fame point of time. This is called the Metonic period, or cycle. It is alfo called the golden number, from its great ufe in the calendar. (See CYCLE.) It is known that Meton was living about the year 412 B.C., for when the Athenian fleet was fent to Sicily, he efcaped from being embarked on that difaftrous expedition by counterfeiting an appearance of idiotifm. Moreri.

METOCHE, Μετοχε, in the *Ancient Architecture*, a term ufed by Vitruvius, to fignify the fpace or interval between the dentils. See DENTICLES.

Baldus obferves, that, in an ancient MS. copy of that author, the word *metatome* is found for *metoche*. Hence Daviler takes occafion to fufpect, that the common text of Vitruvius is corrupted, and concludes, that it fhould not be *metoche*, but *metatome*, q. d. fection.

METOCHITA, THEODORE, in *Biography*, a modern Greek hiftorian, who flourifhed in the 13th and 14th centuries. He attained to high honours in the Conftantinopolitan empire, but in the reign of Andronicus the younger, he was banifhed and his goods confifcated. He was afterwards recalled, and ended his life in a monaftery of his own foundation, in 1332. He was a man of extenfive and very deep learning, and was entitled by his contemporaries a living library. He wrote "A Compendium of Roman Hiftory, from Julius Cæfar to Conftantine," firft publifhed with notes and a Latin verfion by Meurfius, in 1618; "A Conftantinopolitan Hiftory," in one book; "A facred Hiftory;" and "A Paraphrafe on Ariftotle's Phyfics."

METONIC CYCLE, in *Chronology*. See CYCLE, and *Golden* NUMBER.

METONYMY, Μετωνυμια, from μετα, *trans*, and ονομα, *nomen*, *name*; a rhetorical trope confifting in a tranfmutation or change of names; or a putting of the effect for the caufe, or the fubject for the adjunct; and *vice verfâ*.

The metonomy is the moft confiderable of all the tropes next to a metaphor, whether we confider its force and elegancy, or the frequent ufe of it both in fpeaking and writing. It is fometimes alfo called *tranfnominatio*, and differs not much from the hypallage.

There are four kinds of metonymies in principal ufe: the *firft*, called a metonymy of the *caufe*, when the external caufe is put for the effect; this caufe is either efficient or final. Of the former kind are fuch metonymies, where we put the inventor for the thing invented; as Bacchus for wine, Ceres for bread. Metonymies of the final caufe are fuch, by which the end in doing a thing is put for the thing done. Such is that of Virgil (Eclog. x. v. 41.), "Phillis fhould garlands crop," by which are meant flowers for making garlands. The *fecond* metonymy puts the effect for the caufe, whether the agent or only the means and inftrument: thus Virgil, Æn. vi. v. 844, calls the two Scipios the deftruction of Libya, becaufe they were the agents who effected it; and Horace, Carm. i. 1, 2. compliments Mæcenas with the titles of being his guard and honour, that is, his guardian and the author of his honour: and the author is put for his works. The *third* is, when the fubject is put for the adjunct. By fubject here, in a large fenfe of the word, may be underftood that, wherein fome other thing is contained, or about which it is converfant; as likewife the poffeffor with refpect to the thing he poffeffes, and the thing fignified when put for the fign of it: thus, in the firft of thefe ways, the feat of any faculty or affection is put for the faculty or affection itfelf; as in the phrafes, a man of a clear head or of a warm heart: the place, where any actions are performed, is put for the actions

actions done in it; the country or place of residence for the inhabitants; the time for the persons living in it: in the second way, the object is used for the person, or thing employed about it: as when Cicero, pro Mil. cap. 4. says, in time of battle, the laws, *i. e.* the judges, are silent. By the third way, we say to destroy or ruin a man, meaning not his person but his estate. In the last way, statues and pictures are called by the names of the persons whom they represent.

The *fourth* kind of metonymy is that in which the adjunct is put for the subject, which is done in the same variety of ways as the former. Thus Virgil says, (Æn. i. v. 704.) "they lie down upon purple," that is, couches dyed with purple. Also, "Hope deferred maketh the heart sick," where hope is put for the thing hoped for. Titus is thus called by Suetonius "the love and delight of mankind." Thus also, we say of a person, "He has served so many campaigns," meaning so many summers. Moreover, thus a "sceptre" is put for the regal dignity, and the "sword" for the authority of the magistrate.

Vossius adds two other species of metonymy, *viz.* of the antecedent and the consequent, which bear some analogy to the cause and effect, as the one does at least give occasion to the other. By the former, "to hear," when spoken of a superior, sometimes signifies to grant or comply with, and of an inferior to obey: by the latter it is not unusual to say, "I subscribe," or set my hand to such a thing, meaning that we assent or agree to it, &c.

METOPE, or METOPA, in *Architecture*, the square space or interval between the triglyphs, in the Doric frieze.

The word, in the original Greek, signifies the distance between one aperture or hole and another, or between one triglyph and another; the triglyphs being supposed to be solives or joists that fill the apertures. It is derived from *μετα*, *inter*, *between*, and *οπη*, *foramen*.

The ancients used to adorn these parts with carved works, or paintings representing the heads of oxen, vessels, basons, and other utensils of the heathen sacrifices.

As there is found some difficulty in disposing the triglyphs and metopes in that just symmetry which the Doric order requires; some architects make it a rule, never to use this order but in temples.

METOPE, *Semi*, is a space somewhat less than half a metope, in the corner of a Doric frieze.

Le Clerc observes, that the beauty of metopes consists in their regularity, on appearing to be perfect squares; and yet, when they are equally square, they appear to be less in height than in breadth, on account of the projecture of the little bandelet; for which reason they should be made a minute or two more in height than in breadth, in order to make their appearance uniform.

He also observes, that when the triglyphs and metopes follow each other regularly, the columns must only stand one by one; excepting those of the inner angles, which ought always to be accompanied by two others, one on each side; and here it is worth remarking, that these two columns, which accompany that of the angle, are not less necessary on account of the solidity of the building, than of the regularity of the intercolumniations.

METOPIUM, in *Botany*, a name given by Pliny to the plant which produces the gum ammoniacum. He says that the ancient Greeks called it also by this name, but in that he errs. See AMMONIAC.

METOPOSCOPY, Μετωποσκοπια, from *μετωπον*, *frons*, *forehead*, and *σκοπια*, *inspection*, of *σκεπτομαι*, *I view*, the art of discovering the temperament, inclinations, and manners of persons, by inspecting their features, and the lines in their faces, and especially of their foreheads.

Metoposcopy is no more than a branch of physiognomy; the latter taking its conjectures from all parts of the body; but both the body and the branch are extremely precarious, not to say vain.

Ciro Spontoni, who has written on the subject of metoposcopy, observes, that there are seven principal lines to be considered in the forehead; each of which has its peculiar planet. The first is the line of Saturn, the second of Jupiter, &c.

METOSIS, in *Surgery*, an amaurosis, or rather a blindness, from excessive short-sightedness, since *amaurosis* implies that the defect of sight is owing to torpor, or insensibility of the retina and optic nerve. See GUTTA *Serena*.

METRAHENNY, or MINIET RAHINÉ, in *Geography*, a town of Egypt; 6 miles S. of Gizeh.

METRAMA, a river of Naples, which rises in Calabria Ultra, and runs into the Mediterranean; 4 miles S. of Nicotera. N. lat. 38° 30'. E. long. 16° 15'.

METRE, or METER, Μετρον, in *Poetry*, denotes a system of feet of a just length. Aristides defines metre, a system of feet composed of dissimilar syllables, of a just extent. In which sense metre amounts to much the same with genus carminis, or the sort of verse, and differs from rhythm. See PROSODY.

It was during the reign of Edward VI. that metrical psalmody, in the same manner as is still practised in our parochial churches, had its beginning, or at least became general in England, by the version of Thomas Sternhold, John Hopkins, and others; which, though it now appears bald, coarse, and despicable, was then equally refined with the poetical taste of the most polite courtiers and polished scholars of the nation. But time, which has added strength and energy to the *prose* translation of the psalms, as well as other parts of scripture, and made them still more venerable, has rendered the *verse* of these translators a disgrace to our literature and religion. See PSALMODY, *Metrical*, CLEMENT MAROT, GOUDIMEL, and CLAUDE LE JEUNE.

METRE, in the *French Measures*, is the ten millionth part of a quadrant of the meridian, which is adopted as the unit of length; and from which, by multiplication and division, all other measures are derived. The length of the quadrant was computed by measuring an arc of the meridian between the parallels of Dunkirk and Barcelona, and found to be 5,130,740 French toises. This number, divided by ten millions, gives 443,296 French lines, the length of the metre, which is equal to 36.9413 French inches, or 39.3702 English inches. See MEASURE and STANDARD.

METRE, or *Meter*, a measure for oil and other liquids in Turkey. The meter weighs eight okes, or 22½lb. avoirdupois.

METRETES, the name of a measure used among the ancients, containing somewhat more than nine gallons.

METRICAL VERSES, are those consisting of a determinate number of long and short syllables; as those of the Greek and Latin poets.

Capellus observes, that the genius of the Hebrew language is incompatible with metrical poetry.

METRICE, or METRICA, among the *Ancients*, was that part of poetry employed about the quantities of syllables, feet, sorts of metre, or verse, &c.

METRO, in *Geography*, a river which traverses the duchy of Urbino, and runs into the Adriatic, N. lat. 43° 50'.

METROCELIDES, from *μητηρ*, *a mother*, and *χηλις*, *a mole*, in *Surgery*. See NÆVUS *Maternus*.

METROCOMIA, from *μητηρ*, *mother*, and *κωμη*, *town*, or *village*, a term in the *Ancient Church History*, signifying a borough,

borough, or village, that had other villages under its jurisdiction.

What a metropolis was among cities, a metrocomia was among country towns. The ancient metrocomiæ had each its chorepiscopus or rural dean, and here was his see or residence. See Metropolis and Chorepiscopus.

METROMETER, Fr., a machine to determine the time of a piece of music. It requires a pendulum, which, while a movement is performing, may be lengthened or shortened at the pleasure of the composer, till the oscillations exactly agree with the bar, or any of its accented parts. The length of the pendulum must be specified at the beginning of a piece. Many attempts at such an expedient have been made; but we believe it has never been brought to perfection: if it had in Handel's time, many of his compositions would not be frequently injured by being performed too fast or too slow, to satisfy those who remember his works performed under his own direction.

METRONOMII, Μετρονομοι, among the Athenians, officers that inspected all sorts of measures, except those of corn; there were five of them in the city, and double that number in the Pyræus, in which the greatest mart in Attica was kept.

METROPI, in *Geography*, a town of European Turkey, in the province of Livadia; 28 miles S. of Athens.—Also, a small island in the gulf of Engia; 3 miles W. of Engia.

METROPOLI, a town of the island of Crete or Candia, said to be situated on the scite of the ancient *Gortyna;* which see; 22 miles S. of Candia. N. lat. 35° 1′. E. long. 25° 4′.

METROPOLIS, Μητροπολις, from μητηρ, *mother*, and πολις, *city*, the *mother-city*, &c. the capital of a country, or province: or the principal city, and, as it were, mother of all the rest.

Metropolis is also applied to archiepiscopal churches, and sometimes to the principal, or mother-church of a city. The Roman empire having been divided into thirteen dioceses, and one hundred and twenty provinces, each diocese and each province had its metropolis, or capital city, where the proconsul, or the vicar of the empire, had his residence.

To this civil division the ecclesiastical was afterwards adapted, and the bishop of the capital city had the direction of affairs, and the pre-eminence over all the bishops of the province. His residence in the metropolis gave him the title of *metropolitan*. See Diocese.

The erection of metropolitans is referred to the end of the third century, and was confirmed by the council of Nice. Indeed archbishop Usher, and De Marca, maintain it to be an establishment of the apostles; but in vain: for it is next to certain, that the ecclesiastical government was regulated on the plan of the civil; and that it was hence the name and authority of metropolitans were given to the bishops of the capital cities of the empire, or the provinces that composed it. This is so true, that, in the contest between the bishop of Arles and the bishop of Vienne, each of whom laid claim to the metropolitanship of the province of Vienne, the council of Turin appointed, that whichever of them could prove his city to be the civil metropolis, should enjoy the title and rights of ecclesiastical metropolitan.

Nothing is more evident than the perfect equality that reigned among the primitive churches; nor does there even appear, in the first century, the smallest trace of that association of provincial churches, from which, says Mosheim, councils and metropolitans derive their origin. (See Diocese.) The order and decency of those assemblies which were called councils, and introduced towards the close of the second century, required, says this author, that some one of the provincial bishops met in council, should be invested with a superior degree of power and authority; and hence, he adds, the rights of metropolitans were derived. See Patriarchs.

Though the ecclesiastical government, however, was modelled on the political, yet, in Gaul, and some other countries, the distinctions of metropolitan and primate were not observed till very late. As the præfectus Galliæ resided by turns at Trevoux, Vienne, Arles, and Lyons, he communicated the rank and dignity of metropolitan and primate to each of them in their turn; and yet none of the Gallican bishops assumed to themselves the rights, nor even the precedence, of metropolitans. The episcopate levelled them all, and they had no regard but to the privileges of seniority. This equality lasted till the fifth century, when the contest between the bishops of Vienne and Arles was set on foot.

M. Du Pin observes, that in the provinces of Africa, excepting those of which Carthage was the metropolis, the place where the most aged bishop resided became the metropolis: the reason of which, without doubt, was this, that neither the proconsul, nor præfectus, ever fixed their residence any where.

The same author observes, also, that in Asia there were metropolises merely nominal; that is, which had no suffragan, nor any rights of metropolitans. The bishops of Nice, Chalcedon, and Berytus, had the precedence of the other bishops, and the title of metropolitans, but this, without any other prerogative besides the honour of the appellation; they themselves being subject to their metropolitans.

A metropolitan has the privilege of ordaining his suffragans; and appeals from sentences passed by the suffragans are preferred to the metropolitan. See Archbishop.

The name metropolis was originally given to those Greek cities, which had established colonies in other places; and to these certain rights or privileges belonged, partly *honorary*, and partly *profitable*. Those of the first kind principally related to religion. *E. g.* The colonies were obliged to send annually to their metropolis deputies for offering sacrifices on their behalf to the gods of the country, and to present to them their first fruits. If the sacred fire should by any accident be extinguished, the colonies could not rekindle it any where but in the prytaneum of their founders. The colonies were under an obligation to provide themselves with priests, particularly those of their tutelar deity from their metropoles. The first places in the public solemnities, their games, &c. belonged to citizens of their respective metropolis. It was also the custom for the colonies to adorn the temples of their ancient country with considerable presents, such as the spoils of enemies, trophies, statues, and other embellishments; and it was also usual for the greater number of the Greek cities to pay a yearly tribute of certain measures of grain to that of Athens. Among the profitable rights we may reckon the following: the citizens of the metropolis had power of forming alliances, contracting marriages, &c., without having their children considered as strangers; they had likewise the power of purchasing land, and other commodities, in the territory of the colonies; the rights of hospitality took place between the metropolis and its colonies; and, moreover, the metropolis had a right of appointing legislators for their colonies, establishing their form of government, and reviving certain practices that had been abolished: they might also send new citizens into their colonies, who might share in common the benefits of the ancient colonists: generals were sometimes obtained from the metropolis, and new establishments required its sanction; but the most important right was that of demanding

manding fuccour from its colonies in time of war, both of foldiers and of fhips, and affording an afylum to the citizens of the befieged metropolis. Befides thefe general privileges, fome metropoles had peculiar claims on their colonies. The metropolis, on the other hand, had certain fervices which they were required to perform on behalf of their colonies; and if they failed, the colonies were juftified in withdrawing from them their refpect and obedience. The title of metropolis was lefs regarded among the Romans; for though they multiplied their colonies, they had but one metropolis, which was Rome; and as this was the firft city of an immenfe empire, they confidered the inhabitants of colonies merely as fubjects. In general, however, they regarded as metropoles the cities which we call "capitals," and thefe were places, in which were held the general affemblies of the province, or where exifted tribunals of the laft refort.

METROPROPTOSIS, from μήτρα, *the womb*, and προπίπτειν, *to fall down*, in *Surgery*. See PROLAPSUS *Uteri*.

METROSIDEROS, in *Botany*, fo named by Dr. Solander, from μήτρα, *the pith or heart of a tree*, and σίδηρος, *iron*, alluding to the hardnefs and colour of the wood.—Sm. Tr. of Linn. Soc. v. 3. 266. Willd. Sp. Pl. v. 2. 952. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 3. 183. Gærtn. t. 34. f. 2. and f. 9. Lamarck Illuftr. t. 421. f. 3. (Angophora; Cavan. Ic. v. 4. 21. Leptofpermum; Forft. Gen. t. 36. f. *a*—*e* and *m*—*t*.)—Clafs and order, *Icofandria Monogynia*. Nat. Ord. *Hefperideæ*, Linn. *Myrti*, Juff.

Gen. Ch. *Cal.* Perianth half fuperior, with five fpreading teeth or fegments. *Cor.* Petals five, roundifh, concave, inferted into the rim of the calyx, alternate with its fegments; rude, and often rough, at the keel externally. *Stam.* Filaments numerous, inferted into the calyx in feveral rows, thread-fhaped, much longer than the corolla; anthers fmall, roundifh, two-lobed. *Pift.* Germen in the bottom of the calyx, roundifh; ftyle fimple, angular, erect, much fhorter than the ftamens; ftigma quite fimple. *Peric.* Capfule roundifh or ovate, coated in the lower part, of three cells, and as many abrupt valves, burfting at the upper part, the partitions from the centre of the valves. *Seeds* feveral, imbricated, roundifh or oblong, inferted into the central column.

Eff. Ch. Calyx five-cleft, half fuperior. Petals five. Stamens much longer than the corolla. Stigma fimple. Capfule of three cells.

Sir Jofeph Banks and Dr. Solander firft diftinguifhed this genus from LEPTOSPERMUM and MELALEUCA; fee thofe articles. To the latter it is moft allied in habit, but differs in having diftinct and fimple ftamens. The length of thofe organs, but more efpecially the fimple, not capitate, ftigma, diftinguifhes it from *Leptofpermum*, and the habit is totally different. Moft of the fpecies are large handfome fhrubs or trees, with long or broad, moftly fmooth and entire, leaves, and fine large, white or crimfon, flowers, confpicuous for their long and copious ftamens. Thefe plants are difpofed in two fections, according to the fituation of their leaves.

Section 1. *Leaves oppofite.*

1. M. *hifpida.* Rough Metrofideros. Sm. Tr. of L. Soc. v. 3. 267. n. 1. Exot. Bot. v. 1. 81. t. 42. Ait. n. 1. (M. anomala; Vent. Malm. t. 5. M. hirfuta; Andr. Repof. t. 281. Angophora cordifolia; Cavan. Ic. v. 4. 21. t. 338.)—Leaves oppofite; heart-fhaped and clafping the ftem at their bafe. Young branches, flower-ftalks and calyx briftly.—Gathered near Port Jackfon, New South Wales, by Dr. J. White. It was raifed from feeds in England by Meffrs. Lee and Kennedy about the year 1789, and is now not very unfrequent in the more curious greenhoufes, flowering in July and Auguft. The *ftem* is ufually four or five feet high, probably much more in New Holland, rigid, branched, round, and leafy. *Leaves* evergreen, very rigid and coriaceous, harfh and fomewhat hifpid, nearly feffile, oblong, obtufe, waved, a little revolute and flightly crenate, with one rib and many crofs parallel veins; glaucous beneath: clafping the ftem with their dilated heart-fhaped bafe. The younger *branches* are downy and briftly, terminating in copious, umbellate or cymofe, large, white *flowers*, whofe ftalks and calyx are clothed with reddifh-brown, prominent, briftly hairs, like thofe of the beautiful Rofe Acacia, *Robinia hifpida*. This is one of the moft ftately plants, when in perfection, that have been procured from New Holland. Ventenat has figured fo miferable a fpecimen, that it could fcarcely be recognized.

2. M. *floribunda.* Many-flowered Metrofideros. Sm. n. 2. Ait. n. 2.—Leaves oppofite, ftalked, ovato-lanceolate. Panicle crofs-branched. Flower-ftalks umbellate.—Native of New South Wales. Sent by fir J. Banks, about 1788, to Kew, where it blooms in the greenhoufe about July and Auguft. A more fpreading, flender and fmooth *fhrub* than the preceding, with long, lanceolate, or flightly ovate, pointed, entire *leaves*, refembling thofe of an *Eucalyptus*. The *flowers* are copious, white, much fmaller than the former, in numerous fmall *umbels*, collected into large, lax, crofs-branched, occafionally hifpid, *panicles*. *Calyx* fmooth, with fharp prominent teeth.

3. M. *coftata.* Angular-fruited Metrofideros. Gærtn. v. 1. 171. t. 34. f. 2. Sm. n. 3. (Angophora lanceolata; Cavan. Ic. v. 4. 22. t. 339.)—Leaves oppofite, ftalked, linear-lanceolate, pointed, oblique. Panicle repeatedly crofs-branched. Flower-ftalks imperfectly umbellate.—Native of New South Wales. *Leaves* narrower, longer, more rigid and fhining, than the laft, as well as more oblique, or falcate. *Panicle* more irregularly and repeatedly branched, more ftout, angular, and invariably fmooth, but lefs decidedly umbellate in its ultimate divifions. *Flowers* twice as large, yellowifh-white, the ftrong angles of the *calyx* permanent in the obovate woody *fruit*.

4. M. *diffufa.* Spreading Metrofideros. Sm. n. 4. Willd. n. 4. (Melaleuca diffufa; Forft. Prod. 37. M. lucida; Linn. Suppl. 342.)—Leaves oppofite, ovate, veiny; fmooth on both fides. Panicles axillary and terminal, with oppofite flower-ftalks.—Gathered by Forfter in New Zealand, and by Nelfon in Otaheite. We are indebted to fir J. Banks for a fine fpecimen from the laft-named ifland. The *ftem* is much branched, and by the name we prefume it fpreads horizontally. *Leaves* fmooth, numerous, on fhortifh thick ftalks, ovate or obovate, one and a half inch long, with a ftrong mid-rib, and a pair of very flight evanefcent marginal ones; the crofs veins numerous, fine and reticulated. *Flowers* in denfe, level-topped panicles. *Calyx* fmooth, fhort, hemifpherical, without angles; the teeth broad and blunt. The *petals*, and long *ftamens* and *ftyle*, appear to us crimfon; the younger Linnæus judged them, by his ill-dried fpecimen, to be yellow. The valves of the ripe *capfule*, befprinkled externally with large refinous dots, rife half their length above the *calyx*, and have not the obtufe or abrupt termination obfervable in *M. coftata*. Indeed the fpecies before us, with the four or five following, fhew many indications of a generical difference from the firft three, which perhaps, if they were compared alive, might be more evident.

5. M. *villofa.* Hoary Metrofideros. Sm. n. 5. Willd. n. 5. (Melaleuca villofa; Linn. Suppl. 342, excluding the fynonym. M. æftuofa; Forft. Prod. 38. Leptofpermum collinum; Forft. Gen. 36. n. 2.)—Leaves oppofite, ovate, veiny; downy beneath. Panicles denfe, axillary and terminal.

minal, oppoſite, downy. Flowers ſeſſile, crowded.—Gathered in Otaheite by the Forſters, as well as by Mr. Archibald Menzies. The ſize and habit are like the laſt, but the fine downy hoarineſs of the *flower-ſtalks*, *calyx*, tender *branches*, and backs of the younger *leaves*, characteriſe the preſent beautiful ſpecies. The back of each little *calyx-tooth* is ſmooth, though the *petals* are externally hoary. The latter, like the very long *ſtamens* and *ſtyle*, are crimſon. The *leaves* are broadiſh-ovate, or obovate, with a ſhort, blunt, channelled point. Mr. Menzies informs us this was called *Metroſideros ſpectabilis* by the late Dr. Solander; therefore it muſt be Gærtner's t. 34. f. 9.

6. M. *florida*. Flowery Metroſideros. Sm. n. 6. Willd. n. 6. (Melaleuca florida; Forſt. Prod. 37. Leptoſpermum ſcandens; Forſt. Gen. 36. n. 1. t. 36. f. *a* — *d*.)—Leaves oppoſite, elliptic-oblong or obovate, veiny, ſmooth. Panicle denſe, terminal. Calyx turbinate, ſmooth.—Native of New Zealand. A fine ſpecies, ſmooth in every part, with long, leafy, round *branches*. *Leaves* blunt, near two inches in length. *Flowers* large and handſome, crimſon, in denſe obtuſe terminal panicles, whoſe ſtalks are uſually three-flowered. The *calyx* is remarkably elongated, ſwelling gradually upward, with a wide mouth and ſhort blunt teeth. The *ſtyle* is remarkable for its great ſize, being, like the ſtamens, above an inch long, with a very ſlightly dilated *ſtigma*, permanent. We know nothing of the *fruit* but from Forſter, who repreſents the ſeeds as ſmall and ſlender, yet he appears not to have ſeen them ripe.

7. M. *umbellata*. Umbellate Metroſideros. Cavan. Ic. v. 4. 20. t. 337.—Leaves oppoſite, lanceolate, pointed, ſmooth. Flowers in terminal ſimple umbels. Calyx turbinate, ſilky, with naked teeth. Petals oblong.—Gathered in New Zealand by Mr. Menzies, who gave us a ſpecimen by the name of *M. lucida*, of which finding no traces in authors, we adopt that of Cavanilles, who ſays his ſpecimens were gathered by Lewis Née, near the town at Port Jackſon, New South Wales. We have however never heard of it from thence by any other means. The *ſtem* is ſaid to be eight or ten feet high. The *branches* are erect, repeatedly forked, ſmooth, leafy, round, or ſlightly angular. *Leaves* one and a half or two inches long, elliptic-lanceolate, tapering at each end, ſlightly revolute, on ſhort thick ſtalks; the under ſide paleſt, moſt opaque, dotted. *Flowers* large, red, in ſimple very cloſe umbels, the ſtalks being extremely ſhort and thick. *Calyx* turbinate, much dilated upwards, very ſilky, except the teeth, which are broad, obtuſe, and naked, glandular at the back. *Petals* elliptic-oblong, twice the length of the calyx-teeth. *Stamens* and *ſtyle* thrice as long as the petals.

8. M. *glomulifera*. Cluſter-flowered Metroſideros. Sm. n. 7. Ait. n. 3.—Leaves oppoſite, ovate, reticulated with veins; downy beneath. Heads of flowers lateral, ſtalked, downy as well as the bracteas.—Gathered near Port Jackſon by the late Mr. David Burton. Mr. Brown ſent it in 1805 to Kew garden, where it bloſſoms in May and June. This ſpecies ſeems arboreſcent. The *leaves* are ovate or oblong, greyiſh, with innumerable ſmall reticulated veins; rather downy beneath. *Flowers* whitiſh, in globoſe heads. *Footſtalks*, common *flower-ſtalk*, *calyx*, and *petals*, clothed with fine hoary down. *Stamens* and *ſtyle* reddiſh.

9. M. *anguſtifolia*. Narrow-leaved Metroſideros. Sm. n. 8. Ait. n. 4. (Myrtus anguſtifolia; Linn. Mant. 74, excluding the ſynonym of Burmann.)—Leaves oppoſite, linear-lanceolate, naked. Flower-ſtalks axillary, umbellate. Bracteas lanceolate, ſmooth, deciduous.—Native of the Cape of Good Hope, from whence it was ſent by Mr. Maſſon to Kew in 1787, but has not yet flowered there. A buſhy *ſhrub*, with ſmooth, narrow, lanceolate *leaves*, two inches long, one-third of an inch broad, finely dotted on both ſides. *Footſtalks* ſhort and thick. *Flowers* numerous, ſmall, white, in oppoſite, axillary, ſtalked, compound, downy, corymboſe cluſters. *Calyx* hemiſpherical, quite ſmooth, at length decaying, its ribs only remaining round the nearly globular capſule. It is ſingular that Thunberg, who ſent perfect ſpecimens, with ripe fruit, to Linnæus, ſhould ſtill retain this plant as a *Myrtus* in his *Prodromus*, p. 87.

Section 2. *Leaves alternate.*

10. M. *ciliata*. Fringed Metroſideros. Sm. n. 9. (Melaleuca ciliata; Forſt. Prod. 38. Leptoſpermum ciliatum; Forſt. Gen. 36. n. 3. t. 36. f. *r* — *t*.)—Leaves ſcattered, imperfectly oppoſite, elliptical, obtuſe, coriaceous, ſomewhat fringed at the baſe. Corymbs terminal, hairy.—Gathered by Forſter in the iſland of New Caledonia, not in New South Wales. A low buſhy *ſhrub*, with numerous, pale, thick and rigid, oval, concave *leaves*, like thoſe of a *Buxus* or *Celaſtrus*, an inch long, more or leſs; the young ones fringed at the baſe. The ſhort thick *footſtalks* are alſo hairy while young. *Flowers* deep red, large and handſome, moſt like thoſe of our fourth, fifth, and ſeventh ſpecies, a few together at the ends of the branches, on corymboſe, ſlightly hairy ſtalks. *Calyx* ſhort, broad and depreſſed, a little hairy, its teeth oblong, fringed. *Petals* obovate, fringed, rather longer than the calyx-teeth. *Stamens* and *ſtyle* very long. *Capſule* broad, tumid, dotted with numerous prominent reſinous glands, and riſing, in three rounded lobes, much above the rim of the calyx. It is greatly to be wiſhed that this ſpecies, and ſuch as moſt reſemble it, could be obtained for the gardens of Europe.

11. M. *linearis*. Linear-leaved Metroſideros. Sm. n. 10. Ait. n. 5. (Melaleuca linearis; Schrad. Sert. Hannov. 19. t. 11.)—Leaves ſcattered, linear, channelled, acute, roughiſh, rigid. Flowers lateral, crowded, ſeſſile.—Native of New South Wales. Communicated to the Kew garden by ſir J. Banks, about the year 1788. A ſtout and rigid *ſhrub*, or ſmall *tree*, with round ſmooth *branches*. *Leaves* not unlike thoſe of ſome kinds of Fir, in their general appearance, being very numerous, ſcattered, crowded, ſeſſile, three or four inches long, ſcarcely more than a line broad, ſingle-ribbed, thick-edged, entire, roughiſh to the touch, dark green, bluntiſh with a ſmall pungent point. *Flowers* ſeſſile, in conſiderable numbers round the young branches, for the ſpace of three inches or more, ſpreading every way, the branch being continued and leafy beyond them. *Calyx* bell-ſhaped, ſmooth and even, with broad, triangular, convex, deciduous teeth. *Petals* orbicular, convex, green, often ſlightly downy. *Stamens* and *ſtyle* an inch long, prominent, of a beautiful ſhining crimſon. *Capſules* globoſe, ſomewhat depreſſed, with a very thick ſmooth coat from the body of the calyx, often crowding each other into an angular ſhape. Their little convex valves ſcarcely riſe above the even rim of the calyx.

12. M. *lanceolata*. Lanceolate Metroſideros. Sm. n. 11. Ait. n. 6. (M. citrina; Curt. Mag. t. 260. M. lophantha; Venten. Jard. de Cels, t. 69. M. marginata; Cavan. Ic. v. 4. 18. t. 332.)—Leaves alternate, lanceolate, pointed, ſmooth. Flowers lateral, crowded, ſeſſile.—Native of New South Wales. Frequent in greenhouſes. This firſt flowered in the late Marchioneſs of Rockingham's collection about the year 1790. It differs from the laſt only in foliage, the *leaves* of the preſent being truly lanceolate, about two inches in length, and half an inch broad, with a ſlender marginal rib. They are ſmooth on both ſides, plentifully dotted. *Flowers* exactly like the laſt. The *calyx* is ſometimes downy,

downy, but not ſo conſtantly as we originally thought. Every part when bruiſed is highly aromatic.—In the Tranſ. actions of the Linn. Soc. v. 9. 117, a ſuſpicion is mentioned that this and the foregoing, and even the following, may be merely varieties of one ſpecies. We have ſeen from the ſeeds of one ſingle capſule of the *lanceolata*, plants produced greatly differing in the breadth of their *leaves*, inſomuch that we are almoſt perſuaded of the former part of the poſition; but the following appears too different in other reſpects, to be confounded with either of thoſe plants. We have determined to keep them all ſeparate, for the preſent at leaſt, till Mr. Brown, who has ſeen them wild, ſhall give his opinion.

13. M. *ſaligna*. Willow-leaved Metroſideros. Sm. n. 12. Ait. n. 7. Venten. Jard. de Cels, t. 70.—Leaves alternate, lanceolate, tapering at each end, pointed. Flowers lateral, crowded, ſeſſile, ſmooth in every part.—Native of New South Wales. Sent to Kew by ſir J. Banks about the year 1788. It flowers in May and June, and differs from *M. lanceolata* in its leſs rigid *leaves*, tapering remarkably at each extremity; *flowers* not above half ſo large, with yellowiſh *ſtamens*, their *petals* not even fringed, but quite ſmooth in every part, as well as the *calyx*. To theſe marks the ingenious Ventenat added, that the ſcales of the *buds* are externally ſtriated, which is not the caſe in the *lanceolata*. Finally, the *ſaligna* has no aromatic flavour.

14. M. *viminalis*. Wand-like Metroſideros. Gærtn. v. 1. 171. t. 34. f. 4. Willd. n. 13.—Leaves alternate, linear-lanceolate. Flowers lateral, crowded, ſeſſile, downy.—Native of New Holland. Very different from the laſt, its *leaves* being more linear, and not tapering towards the extremities. The *flowers* are downy, and rather ſmaller. We have ſeen it in ſir J. Banks's herbarium only.

15. M. *capitata*. Round-headed Purple Metroſideros. Sm. n. 13. Willd. n. 14.—Leaves ſcattered, rough-edged, obovate, with a minute point. Heads of flowers terminal. Calyx and young branches hairy.—Found near Port Jackſon, New South Wales, by Dr. J. White. We have not heard of it in any garden. It ſeems rather a humble, much-branched *ſhrub;* the *branches* often cluſtered, hairy when young, round and rather ſlender; clothed with numerous, ſcattered, obovate, ſeſſile *leaves*, rough, or finely ſerrated, at the edges, from a quarter to half an inch long, with a little recurved point; their ribs three or five, not very apparent; both ſides finely dotted, the edges ſometimes fringed. *Flowers* numerous, purple, in little, round, compact, terminal heads; the *calyx* clothed with long, ſoft, hoary hairs. *Bracteas* lanceolate, fringed, deciduous. The *leaves* are ſcarcely aromatic, but rather aſtringent, with a ſlight flavour like tea.

16. M. *ericifolia*. Heath-leaved Metroſideros.—Leaves imbricated, linear, pointed, hairy; channelled above; convex beneath. Heads of flowers terminal. Bracteas feathery. Calyx ſmooth.—This hitherto nondeſcript ſpecies was gathered by Mr. A. Menzies, near King George's ſound, on the weſt coaſt of New Holland. It has the habit of an *Erica, Dioſma*, or *Phylica*. The *ſtem* is leafy, erect, with copious, ſhort, leafy, lateral *branches*. *Leaves* very numerous, crowded, about a quarter of an inch long, nearly linear, blunt, with a ſmall point, dotted, hairy, dark green, entire; convex beneath; ſlightly concave, or channelled, above. Heads of *flowers* terminal, about the ſize of the laſt. *Bracteas* lanceolate, covered at the back with long ſoft hairs, deciduous. *Calyx* turbinate, dotted, naked. The *petals* appear to be purpliſh. The *leaves* have a ſlight aſtringency, with ſome flavour of turpentine, but by no means powerful. We have not ſeen the *capſule*.

We are well aware that the habit of the two laſt ſpecies, is ſo different from the three which immediately precede them, eſpecially their infloreſcence; and all theſe together are ſo unlike thoſe deſcribed in the former ſection, that it is highly probable ſome good generic difference is to be found in their fructification. On this ſubject, as on many ſimilar ones, we muſt wait for the information of Mr. Brown, who alone has compared them all in their native country.

METROVITZ, in *Geography*, a town of Dalmatia; 6 miles N. of Narenta.

METSAMAA, a town of Sweden, in the government of Abo; 38 miles N.N.E. of Biorneborg.

METSCHOVSK, a town of Ruſſia, in the government of Kaluga; 40 miles W.S.W of Kaluga. N. lat. 54° 12'. E. long. 34 50'.

METTESHEP, or METTENSCHEP, in our *Old Writers*, an acknowledgment paid in a certain meaſure of corn; or a fine or penalty impoſed on tenants, for defaults in not doing their cuſtomary ſervice in cutting the lord's corn.

METTIJIAH, in *Geography*. See METITCHE.

METTINGEN, a town of Germany, in the county of Tecklenburg; 6 miles N. of Tecklenburgh.

METTINICK ISLAND, an iſland in the Atlantic, near the coaſt of Main. N. lat. 43° 51'. W. long. 68° 59'.

METTSECOUBE', a ſmall iſland, or perforated rock, in the Mediterranean, on the coaſt of Algiers; where, it is ſaid, Raymond Lully, in his miſſion to Africa, frequently retired to meditate; ſix miles N. of Boujeiah.

METTYCONDA, a town of Hindooſtan, in Myſore; 25 miles N. of Bangalore.

METUALES, or MUTUALES, a people of Aſia, diſperſed in great numbers all over Syria; ſo called from Mutual, a celebrated captain, who deſtroyed the current religion of the Perſians, in order to ſubſtitute Mahometaniſm inſtead of it. The Mutuales are, therefore, ſchiſmatic Mahometans. They admit the Koran as a ſacred book, and Mahomet as the firſt of prophets; and they alſo venerate Jeſus Chriſt, after the manner of the Turks. The Mutuales renounce the ſucceſſion of Mahomet, except Ali, whom they acknowledge as diſtinguiſhed among all the diſciples of the prophet by his ſkill in war, and his knowledge in letters. All forms of religion are held by them in the ſame contempt. Extreme hunger alone can conſtrain them to eat with Chriſtians.

METULÆ, a town of Sardinia; 18 miles W.N.W. of Villa d'Igleſias.

METUPETTA, a town of Hindooſtan, in the Carnatic; 30 miles S.E. of Tanjore.

METWAY HARBOUR, a bay on the S. coaſt of Nova Scotia. N. lat. 44° 10'. W. long. 64° 30'.

METYS, a word uſed by many of the ancient writers to expreſs a ſubſtance collected by bees, in order to the ſtopping up cracks and crevices in their hives.

The old authors mention three kinds of ſubſtances uſed by the bees on this occaſion, the *metys*, *piſſoceros*, and *propolis*. The moderns uſe only the latter term to expreſs every thing of this kind: the metys and piſſoceros ſeeming to have been only the ſame propolis, more or leſs mixed with wax. The ſubſtance is a reſin, of a middle conſiſtence between the hard and the fluid ones. It is uſually of a reddiſh-brown on the ſurface, and yellow within, and is collected from ſeveral trees, of which the poplar ſeems to be the principal, and the willow the next.

METZ, plur. *Metzen*, in *Commerce*, a corn meaſure in Germany. At Augſburg, 8 metzen = a ſchaf, and the metz = 4 vierlings, 16 viertels, or 64 maeſſals: 100 metzen = about 81 Wincheſter buſhels. At Vienna, 30 metzen = a muth;

muth; the metz is divided into 4 viertels = 8 achtels = 16 muhlmassels = 32 sudarmassels = 128 bechers, and it contains 3100 French cubic inches = 3753 English ditto; hence 4 metzen = 7 Winchester bushels; and a muth = 6½ English quarters nearly. See *Tab.* XXI. *of* MEASURES.

METZ, in *Geography*, a city of France, chief place of a district, and capital of the department of Moselle, situated at the conflux of the Seille and Moselle, and containing three cantons, corresponding to the three divisions of the city: the first includes 6455, and its canton 147,81 inhabitants, in 24 communes; the second contains 12,355, and its canton 14,958 inhabitants, in 11 communes; and the third part has 13,289, and its canton 15,000 inhabitants, in 4 communes. The whole extent of its territory comprehends 245 kiliometres. Metz is divided into the Old and New Town: the former is large, with narrow streets; but the houses, although built in the old style, are handsome. The New Town is also large, but more beautiful than the other. Besides its fortifications, it has three citadels. Its bishop, before the revolution, assumed the title of prince of the Roman empire; he was suffragan to the archbishop of Treves, and his diocese comprehended 613 parishes, and his revenue was 120,000 livres. Exclusively of the cathedral, it contained three chapters, sixteen parish churches, six abbies, and a college. The Jews, who are numerous in this city, have a synagogue. The country round Metz, called the Meszin, is tolerably fertile, and produces a little wheat. This was anciently a part of the kingdom of Australia; and Metz was its capital and the royal residence. When the children of Charles the Great and Louis the Pious divided the dominions of that crown, the kingdom of Lorrain arose out of the ruins of that of Australia; and about the termination of the second royal line of France, Metz, Toul, and Verdun, shook off the yoke, and put themselves, as free cities, under the protection of the emperor. In 1552, these cities placed themselves under the protection of the French, till the peace of Westphalia in 1648, when the three bishoprics were absolutely transferred to France; 30 miles S. of Luxemburg. N. lat. 49° 7'. E. long. 6° 15'.

METZERWISE, a town of France, in the department of the Moselle, and chief place of a canton, in the district of Thionville. The place contains 607, and the canton 13,439 inhabitants, on a territory of 295 kiliometres, in 45 communes.

METZONA, a town of European Turkey, in Epire; 25 miles E. of Arta.

METZU, GABRIEL, in *Biography*, one of the most ingenious painters of the Flemish school. He was born at Leyden in 1615. It is not exactly known with whom he learned the rudiments of the art, nor does it much concern us to be informed of it, as his style is entirely his own, having great completion in the finishing, with breadth and freedom quite unlike the tedious minute exactness of Gerard Dow, or still more that of Mieris.

Metzu generally painted small pictures of subjects taken from ordinary occurrences happening among the more polished class of his countrymen. A morning visit at a lady's toilette; a conversation or concert among people dressed in the best style of the time in Flanders; a gentleman stopping to drink at an inn, &c.; such are the objects which generally compose his pictures, in the execution of which one is at a loss to know whether most to admire the beauty of arrangement in the forms, the clearness and harmony of the tones, or the extreme delicacy, breadth, and truth in the execution. His works are by no means scarce in this country, and are eagerly bought at high prices.

He was severely afflicted with the stone, the effect of, and which was probably increased by, his unremitting assiduity. Having, at the age of 43, consented to undergo the operation of cutting for extraction, his constitution was found too weak to support the trial, and he did not survive it.

MEVA, or GNIEV, in *Geography*, a town of Prussia, in Pomerelia, on the Vistula; 22 miles S. of Dantzic.

MEVANGFANG, a town of Upper Siam; 115 miles N. of Porselone.

MEVELEVITES, in *Modern History*, a sort of dervises, or religious, among the Turks, so called from Meveleva, their founder. They affect to be very patient, humble, modest, and charitable; but in reality are very debauched and dishonest.

MEVIUM, a name mentioned by Fallopius and others, as given by some medical writers to the venereal disease.

MEVIUS, DAVID, in *Biography*, a learned jurist, and privy-counsellor to the king of Sweden, was employed in various negociations by Charles XI., and drew up the regulations by which the German provinces, occupied by Sweden, were to be governed. He wrote "Commentaries on the Law of Lubeck;" "Counsels or Deliberations;" and "Universal Jurisprudence."

MEULAN, in *Geography*, a town of France, in the department of the Seine and Oise, and chief place of a canton, in the district of Versailles. The place contains 2100, and the canton 12,584 inhabitants, on a territory of 130 kiliometres, in 20 communes.

MEULEBECHE, a town of France, in the department of the Lys, and chief place of a canton, in the district of Courtray. The place contains 6660, and the canton 12,506 inhabitants, on a territory of 90 kiliometres, in four communes.

MEULEN, ANTHONY FRANCIS VANDER, in *Biography*. This painter was born at Brussels in 1634. He was a disciple of Peter Snayers, a battle painter of considerable note, and his early progress gave strong promise of his future eminence.

His ingenious pictures attracted the attention of M. Colbert, the minister of Louis XIV., who induced V. Meulen to leave Brussels, and settle in Paris; and soon afterwards introduced him to the king, who appointed him to attend and paint the scenes of his military campaigns, gave him a pension of 2000 livres, and paid him besides for his performances. He made sketches of almost all the most remarkable events that occurred in these expeditions of Louis; designing upon the spot the encampments, marches, sieges, &c. of the armies; the huntings of the king; the assembling of the officers, &c.: from these he composed his pictures, which are skilfully arranged, with great bustle, animation, and spirit, and executed with a very agreeable, though not always a natural tone of colour, and with a sweet and delicate pencil. Some of his pictures exhibit uncommon skill and taste in composition. Frequently the scene he had to paint was flat and insipid, such as a marshy country before long extended walls; even these he contrived to render agreeable by his judicious management of the chiaro-scuro, and the pleasing groups which he displayed with his figures, which, though dressed in the stiff uncouth frippery of the French court of that period, are handled with so much delicacy and corresponding taste, that they never fail to please. He was particularly skilful in pourtraying the actions of the horse, of which he has left behind him a number of excellent studies, drawn with great care from nature. His pictures frequently include a great extent of country, and an immense number of objects. His perfect knowledge of perspective enabled him to manage

manage the objects and diſtances with the greateſt eaſe and effect, ſo that the eye accompanies the figures without confuſion, and aſſigns to each its due action and diſtance. He lived not beyond the age of 56, but left a great number of pictures, moſt of which are in France, but they are not very unfrequent in this country.

MEUM, in *Botany*, ſuppoſed to be the μηον of Dioſcorides, which is ſo far correct only as they are both of the umbelliferous order; for the plant deſcribed by that ancient author, is ſaid to be ſometimes two cubits high; our's is ſcarcely about a foot. See LIGUSTICUM, ſpecies twelve; for *Oethuſa* read *Aethuſa*.

MEUN, or MEUNG, JOHN DE, in *Biography*, an old French poet, was born at Meun, on the river Loire, in the year 1280. He was well acquainted with the ſtudies of the age, but poetry was his favourite purſuit, and having a turn for ſatire and lampoon, he occaſionally offended thoſe who were diſpoſed to be friendly towards him. Some court ladies, ſmarting under his laſh, once ſeized him, with the reſolution of taking their revenge, but he eſcaped the threatened puniſhment, by deſiring the moſt unchaſte to inflict the firſt blow. He died about the year 1364. By his laſt will, he directed that his body ſhould be interred in the church of the Dominicans at Paris, bequeathing to them, in the way of recompence, a heavy cheſt, which was not to be opened till after the funeral. The contents proved to be of no value whatever, which ſo enraged the holy fathers, that they ordered the dead body to be diſinterred: this coming to the knowledge of the parliament, an order was iſſued to inſiſt upon their giving it an honourable burial in their cloiſter. The principal work of this author was the continuation of the "Roman de la Roſe," begun by William de Lorris. De Meun's addition conſtitutes more than three-fourths of the whole; it is leſs poetical than the firſt part, but has more of ſatire and real manners. An edition of this poem was publiſhed by Du Freſnoy, in three vols. 12mo. to which other pieces are added. Moreri.

MEUN, in *Geography*, a town of France, in the department of the Loiret, and chief place of a canton, in the diſtrict of Orleans; 10 miles S.W. of Orleans. The place contains 4418, and the canton 9525 inhabitants, on a territory of $207\frac{1}{2}$ kiliometres, in 8 communes.

MEURJE', a town of Egypt, on the right bank of the Nile; 23 miles S. of Achmim.

MEURS, or MORS, late a principality of Germany, ſurrounded by the duchies of Juliers, Cleves, and Berg, the archbiſhopric of Cologne, and the duchy of Gueldres; about eight miles long, and as many broad. It abounds with corn, cattle, and deer. To the E. its limits are formed by the Rhine, and it is watered by ſeveral ſmaller rivers and brooks. This principality is now annexed to France, and included in the department of the Roer.

MEURS, a town of France, in the department of the Roer, and chief place of a canton, in the diſtrict of Creueldt; formerly capital of the above-mentioned principality. The town is ſmall but fortified. It has a Calviniſtic church and a Latin ſchool. The place contains 2111, and the canton 9144 inhabitants, in 15 communes; 13 miles S.E. of Gueldres. N. lat. 51° 13′. E. long. 6° 30′.

MEURSIUS, JOHN, in *Biography*, was born at Loſdun, near the Hague, in the year 1579. He was an early proficient in claſſical literature, and compoſed Latin orations and Greek verſes with facility before he was thirteen years of age. He received his academical learning at Leyden, and engaged in the education of Barneveldt's ſons; whom he afterwards accompanied on their travels. He ſpent ſome time in the ſtudy of the law at Orleans, and in 1608 was made doctor of that faculty. He viſited ſeveral courts of Europe, formed an acquaintance with many learned foreigners, and examined the moſt celebrated libraries. On his return to Holland he was appointed to the profeſſorſhip of hiſtory at Leyden in 1610, and next of the Greek language; and in the following year the ſtates of Holland nominated him their hiſtoriographer. The wretched fate of Barneveldt involved the happineſs of his friend and adherent Meurſius, and though his attention to the duties of his office had given his enemies no pretext for depriving him of his ſituation; yet they found means to render his ſituation ſo uneaſy, that he only waited for an occaſion to quit it with honour. This at length arrived, when, in 1625, he received an invitation from Chriſtiern IV., king of Denmark, to occupy the profeſſorſhip of hiſtory and politics in his new univerſity of Sora, together with the poſt of royal hiſtoriographer. Theſe offices he readily accepted, and removed to Denmark, where he continued to ſupport his high reputation, and obtained the eſteem of his ſovereign and the court. He died at Sora in the year 1639, leaving behind him a high character for profound learning, to which his various works bear ample teſtimony. His chief publications related to the language and antiquities of Greece, *viz.* "De Populis Atticis;" "Atticarum Lectionum, lib. iv.;" "Archontes Athenienſes;" "Fortuna Attica;" "Athenæ Atticæ;" "De Feſtis Græcorum;" all which have been admitted into the collections of Grævius and Gronovius. The writings of Meurſius were publiſhed collectively in twelve volumes folio, 1741. Moreri.

This learned laborious critic and antiquary, was the firſt who publiſhed the Greek text of the three books of Ariſtoxenus upon muſic, followed by the Greek treatiſes of Nichomachus and Alypius, with notes by the editor; which Meibomius has cenſured, as he has thoſe of Gogavinus, Kircher, and all thoſe who preceded him in commenting, tranſlating, or even mentioning any of the ſeven Greek writers upon muſic that are come down to us, and which he has tranſlated into Latin, and been ſeemingly more ſucceſsful in tranſlating and explaining than any other critic or commentator who has had the courage to undertake ſo difficult a taſk.

Meurſius's edition of Ariſtoxenus, Nichomachus, and Alypius, was publiſhed at Leyden, 1616, 4to. See Fabricius Bibl. Græca.

MEURTE, in *Geography*, a river of France, which riſes near St. Diey, in the department of the Voſges, and joins the Moſelle, 5 miles below Nancy.

MEURTE, or *Meurthe*, one of the ten departments of the N.E. region of France, formerly Toulois, and the S. part of Lorraine, bounded on the N. by the department of the Moſelle, on the E. by that of the Lower Rhine, on the S. by that of the Voſges, and on the W. by that of the Meuſe, in 48° 40′ N. lat. Its length is 26 French leagues, and breadth 16, and its extent in kiliometres is 6430, or 310 ſquare leagues; and the number of its inhabitants is 342,107, or, according to Haſſenfratz, 351,161; it is divided into 5 circles, and 29 cantons, and 718 communes, or, according to Haſſenfratz, 9 circles, and 74 cantons: the five circles are as follow, *viz.* Toul, including 59,689 inhabitants; Nancy, 88,384; Chateau-Salins, 50,554; Sarrebourg, 56,091; and Luneville, 87,389: its capital is Nancy. The contributions of this department, in the 11th year of the French era, were 2,681,581 fr.; and its expences charged for adminiſtration, juſtice, and public inſtruction, 348,829 fr. 33 cents. The ſoil of the plains is fertile in grain, wine, fruits,

&c.; and that of the hills is covered with wood and pastures. Here are iron mines, quarries of marble and stone, mineral springs, &c.

MEVSAK, a town of Arabia, in the province of Hedsjas; 60 miles N.E. of Vadilkova.

MEUSE, a river of France, which rises at a village called Meuse, in the department of the Upper Marne, and after being joined by various other rivers in its course, it divides into two streams, the upper one towards the N. taking the name of Merwe, which it preserves, as well as that of Meuse, till it joins the German ocean, after passing the islands of Holland and Zealand.

Meuse, one of the ten departments of the N.E. region of France, composed of Verdunois and Barrois; bounded on the N. by the duchy of Luxemburg, on the E. by the departments of the Moselle and the Meurte, on the S. by those of the Marne and Vosges, and on the W. by those of the Marne and the Ardennes, in N. lat. 49°; 33 Fr. leagues long, and 16 broad, in territorial extent 6275 kiliometres, or 318 square leagues; the number of its inhabitants is 275,898, or, according to Hassenfratz, 268,108; it is divided into 4 circles, 28 cantons, and 591 communes; or, according to Hassenfratz, into 8 circles and 79 cantons; its four circles are Bar-sur-Ornain, containing 74,168 inhabitants; Commercy, 73,103; Montmedy, 59,572; and Verdun, 69,055. Its capital is Bar-sur-Ornain. Its contributions in the eleventh year of the French era were 2,424,922 fr., and its expences amounted to 231,113 fr. 66 cents. This department is diversified with hills and plains, yielding fruits, grain, and pastures. It has mines of iron and other metals.

Meuse, *Lower*, one of the thirteen departments of the region of France, called the Reunited country, formed of a part of Gueldres, and of the territories of Liege, Maestricht, and Venloo; bounded on the N. by Brabant, on the E. by the department of the Roer, on the S. by that of the Ourthe, and on the W. by that of the Dyle, and that of the Two Nethes, in N. lat. 50° 50′: its territory comprehends 3622½ kiliometres, or 190 square leagues, and it contains 232,662 inhabitants; or, according to Hassenfratz, 216,566. It is divided into three circles, 23 cantons, and 310 communes; or, according to Hassenfratz, three circles and 30 cantons: the circles are Maestricht, including 107,410 inhabitants; Hasselt, 60,399; and Ruremond, 64,853. Its capital is Maestricht. Its contributions in the year eleven were 1,600,995 fr., and its expences 205,543 fr. 33 cents. This department is partially fertile, and yields grain, fruits, and good pastures.

MEUTANG, in *Botany*, the name of a flower much esteemed by the Chinese, which, on that account, they call the king of flowers. It is larger than our rose, and imitates its figure, only its leaves are more expanded. As its smell comes short of that of the rose, so in beauty the rose is outdone by it. It has no prickles, and its colour is a mixture of white with purple, but so as to incline most to white; yet sometimes there are found reddish and yellow ones. The tree it grows on is not unlike our alder-tree, and is cultivated throughout that large empire with great care, being covered in the summer time with a shade to defend it from the scorching heat of the sun.

MEW Island, in *Geography*, a small island in the East India sea, near the W. coast of Java; three miles N.E. of Java Head.

Mew *Islands*, a cluster of small islands on the coast of Honduras, S. of Cape Camaron.

Mew *Stone*, a small island, or round elevated rock, in the Southern India ocean, near the coast of Van Diemen's land. S. lat. 43° 46′. E. long. 146° 24′.—Also, a large rock in the English channel, on the S. coast of Devonshire, E. of the entrance into Plymouth sound; four miles S. of Plymouth. N. lat. 50° 18′. W. long. 3° 59′.

MEWAT, a hilly and woody tract of Hindoostan, lying on the S.W. of Delhi, and on the W. of Agra; confining the low country along the western side of the Jumnah river, to a (comparatively) narrow slip, and extending westwards about 130 British miles. Its length from N. to S. is about 90 miles. This tract, although situated in the heart of the empire of Hindoostan, that is, within twenty-five miles of its former capital, Delhi, is inhabited by people, who have ever been characterised as the most savage and brutal, and whose chief employment is robbery and plundering. In 1265, 100,000 of these wretches were put to the sword; and a line of forts was constructed along the foot of their hills. At the present time, says major Rennell, Mewat is so notorious a nursery for thieves and robbers, that parties of "Mewatti" are taken into pay by the chiefs of Upper Hindoostan, for the purpose of distressing the countries which are made the seat of warfare. In Acbar's division, this tract made a part of the soubahs of Delhi and Agra; but most of it was included in the latter. Mewat contains some strong fortresses, on steep or inaccessible hills; among which is Alwar, or Alvar, the citadel of Macherry Rajah. It has very often changed masters, during the contests between its native rajahs (or kauzadeh), and the Jats, the rajah of Joinagur, Nudjuff Cawn, and Madajee Sindia; and between these powers successively. Sindia has made a considerable progress in the reduction of it.

MEWING, a disorder incident to all kinds of birds; being the casting of their feathers.

MEXIA, Pedro, in *Biography*, chronicler to Charles V. is one of the few Spanish writers whose works have found their way into our language. He wrote a history of the Cæsars, which includes the German emperors, and is one of the translators of Edward Grimeston: he was author also of "Silva de varia Leccion," with the additions of its Italian and French translators in that "Treasury of ancient and modern Times," which is referred to by Grose, and of which the two parts having been published separately, are not easily to be met with together. Mexia was also the author of certain colloquies to the praise of the ass, in imitation of Lucian and Apuleius, and a history of Charles V. which he left unfinished, and which has never been edited. He was born at Seville, and died in or about the year 1552. Gen. Biog.

MEXICANO, or Adayes, a river of Louisiana, which, after pursuing a S.E. course, discharges itself into the gulf of Mexico, at Cabo du Nord, W. by S. of Ascension bay, and E. by N. of Trinity river. On its banks are rich silver mines.

MEXICO, one of the seven territories, or domains, into which the Spanish dominions in North America have been divided, sometimes improperly called *New Spain*; which is bounded on the N.W. by New Mexico, on the E. by the gulf of Mexico, on the S.E. by the isthmus of Darien, and on the S. and W. by the Pacific ocean. And though Mexico, called Old Mexico by way of distinction from New Mexico, is only a province or kingdom of New Spain, applied in its utmost extent, it is not restricted to the ancient kingdom, which extended from near the lake of Chapala in the north, to Chiapa on the river Tabasco, in the south, but includes many extensive provinces to the north. The provinces which the domain of Mexico comprehends, are

are Tabafco, Oaxaca or Guaxaca, Tlafcala, Mexico Proper, Zacatula, Mechoacan, Panuco, New Gallicia or Xalifco, and Nayarit ; fee each refpectively. Accordingly, the vice-royalty of New Spain comprehended feveral provinces, which were not fubject to the dominion of the Mexicans. The countries of Cinaloa and Sonora, that ftretch along the fide of the Vermilion fea, or gulf of California, as well as the immenfe kingdoms of New Navarre and New Mexico, which bends towards the W. and N., did not acknowledge the fovereignty of Montezuma, or his predeceffors. Thefe regions, not inferior in extent to the whole Mexican empire, have been reduced, fome of them to a greater, others to a lefs degree of fubjection, to the Spanifh yoke. They extended through the moft delightful parts of the temperate zone ; their foil is, in general, remarkably fertile ; and all their productions, whether animal or vegetable, are moft perfect in their kind. They have all a communication, either with the Pacific ocean or with the gulf of Mexico, and are watered by rivers which not only enrich them, but may become fubfervient to commerce. The peninfula of California, on the other fide of the Vermilion fea, difcovered by Cortes in the year 1536, feems to have been lefs known to the ancient Mexicans than the provinces which we have juft mentioned. On the E. of Mexico, Yucatan and Honduras are comprehended in the government of New Spain, though anciently they can hardly be faid to have formed a part of the Mexican empire. Still further E. than Honduras lie the two provinces of Cofta Rica and Veragua, which likewife belong to the vice-royalty of New Spain, but both have been fo much neglected by the Spaniards, and are of fo little value, that they merit no particular attention. Without attempting to afcertain precifely the limits of the ancient Mexican empire, which have been much controverted, we fhall give a brief geographical, hiftorical, and ftatiftical account of this empire, aided by the information which we derive from Clavigero, the abbé Raynal, Dr. Robertfon, Eftalla, &c. The name of "Anahuac," fignifying near the water, originally given to the vale of Mexico only, from the circumftance of its principal cities being fituated on fmall iflands, and on the borders of two lakes, was afterwards ufed to denominate the whole territory, now known under the appellation of New Spain. This extenfive country was then divided into the kingdoms of Mexico, Acolhuacan, Tlacopan, and Michuacan ; into the republics Tlaxcallan or Tlafcala. Chollollan, and Huexotzinco, and feveral other diftinct ftates. Thofe who wifh to know the exact fituation of thefe feveral countries may confult the tedious detail of Clavigero. The kingdom of Mexico, although the moft modern, was much more extenfive than all the other kingdoms and republics above-mentioned taken collectively. It extended towards the S.W. and S., as far as the Pacific ocean ; towards the S.E. as far as the vicinity of Quauhtemallan ; towards the E., exclufive of the diftricts of the republics, and a fmall part of the kingdom of Acolhuacan, as far as the gulf of Mexico ; towards the N., to the country of the Huaxtecas ; towards the N.W. it bordered on the barbarous Chichémicas, and the dominions of Tlacopan, on the weftern border of the lake of Tezcuco, and Michuacan, the moft wefterly kingdom of all, were its boundaries towards the weft. The whole of the Mexican kingdom, fays Clavigero, was comprehended between the fourteenth and twenty-firft degrees of N. lat., and between 271 and 283 degrees of longitude taken from the meridian of the ifland of Ferro. The fineft diftrict of this country, with regard to fituation, as well as population, was the vale of Mexico, crowned by beautiful and verdant mountains, whofe circumference, meafured at their bafe, exceeded 120 miles. A great part of the vale is occupied by two lakes, the upper one of fweet water, the lower one brackifh, communicating by a canal, and in circumference not lefs than 90 miles. Befides Mexico, Acolhuacan, and Tlacopan, there were, fays Clavigero, 40 eminent cities in this delightful vale, and innumerable villages and hamlets. The principal inland provinces to the N. were the Otomies ; to the S.W., the Matlatzincas and the Cuitlatecas ; to the S. the Tlahuicas, and the Colhuicas ; to the S.E. were the provinces of the Mixtecas, the Zapotecas, and the Chiaponecas. Towards the E. were the provinces of Tepeyacac, the Papolocas, and the Totonacas. The maritime provinces of the Mexican gulf were thofe of Coatzacualco, and Cuatlachtlan, called by the Spaniards Cotafta. The provinces on the Pacific ocean were thofe of Coliman, Zacatollan, Tototepec, Tecuantepec, and Xoconochco. The whole country of Anahuac was, generally fpeaking, well peopled. The land is, in great part, mountainous, covered with thick woods, and watered by large rivers, fome of which run into the gulf of Mexico, and others into the Pacific ocean. Here are feveral lakes which not only embellifh the country, but afford convenience to commerce. The climate of the countries of Anahuac varies according to their fituation. The maritime countries are hot, and for the moft part moift and unhealthy. The high lands, and efpecially thofe that are near to elevated mountains covered with fnow, are cold. In the other inland countries, the temperature is fuch, that the inhabitants feel neither the rigour of winter nor the heats of fummer. However, the agreeablenefs of the climate is counterbalanced by thunder-ftorms, which are frequent in fummer, and alfo by earthquakes. Some of the mountains are volcanic, and occafionally emit fire. The mountains of Anahuac abound in ores of every kind of metal, and a variety of other foffils. Different parts of the country alfo furnifh precious ftones ; and alfo feveral kinds of ftone, valuable in architecture, fculpture, and the arts. The vegetable kingdom is no lefs productive than the mineral. Hernandez, in his "Natural Hiftory," defcribes about 1200 plants, natives of this country ; fome efteemed for their flowers, fome for their fruit, fome for their leaves, fome for their roots, fome for their trunk or wood, and others for their gum, refin, oil, or juice. The country yields, by culture, the cocoa-tree, the plantain, the citron, orange, and lemon : the fruits are numerous and various, but it is needlefs to recount them all : we fhall content ourfelves with fpecifying the cocoa-nuts, vanilla, Chili or great pepper, cotton, and achiote or rocou. The country alfo produces wheat, barley, rice, peas, beans, lentils, and other leguminous vegetables. Mexico is particularly diftinguifhed by the excellence, variety, and plenty of its timber. Hernandez defcribes about one hundred fpecies of trees. It alfo affords various forts of plants, that yield profitable refins, gums, oils, and juices. The quadrupeds are horfes, affes, bulls, fheep, goats, hogs, dogs, and cats, which have all fuccefsfully multiplied, though, as fome approved writers fay, not without degenerating. The ancient quadrupeds common to Mexico and the old continent, are lions, tigers, wild cats, bears, wolves, foxes, ftags both common and white, bucks, wild goats, badgers, polecats, weazels, martins, fquirrels, rabbits, hares, otters, and rats. There are other quadrupeds common to Mexico and other regions of the new world, which we fhall not enumerate. The quadrupeds peculiarly belonging to Anahuac are the cojotl, refembling, in various refpects, the adive or chacal ; the tlacojotl, about the fize of a dog, and the largeft quadruped of thofe who live under the earth ; three fpecies of quadrupeds fimilar to dogs ; an animal belonging to the genus of wild cats, called ocotochtli ; the cajopollin, of the

 fize

fize of a common moufe; the tozan, about the bulk of an European mole, but otherwife very different; the ahuitzotl, an amphibious animal; and the hedge-hog, or porcupine of Mexico. As for birds, their number, variety, and many valuable qualities have occafioned fome authors to obferve, that as Africa is the country for beafts, fo Mexico is the country of birds. We cannot be detained in fpecifying particulars. The reptiles of Mexico may be referred to the four claffes of four-footed, and of apodes, or thofe without feet. In the lake of Chalco there are three very numerous fpecies of frogs, of three very different fizes and colours, and very common at the tables in the capital. The ferpents are very various both in fize and colour, fome poifonous and others harmlefs. The rivers, lakes, and feas of Anahuac abound with an innumerable variety of fifhes. The Mexican infects, flying, terreftrial, and aquatic, are very numerous. Scolopendras, fcorpions, fpiders, and ants are very common. The cochineal furnifhes a very confiderable article of culture and of commerce.

As to the perfons and manners of the natives we may obferve, that they are generally fomewhat above the middle fize, and well-proportioned in all their limbs: they have good complexions, narrow foreheads, black eyes, firm, regular, white teeth, thick, black, coarfe, gloffy hair, thin beards, and generally no hair upon their legs, thighs, and arms: their fkin is of an olive colour. Few deformed perfons are feen; and though they cannot be called beautiful, they do not verge to the other extreme. The young women are many of them fair and beautiful, and modeft and engaging in their manners. The conftitutions of thefe people are robuft and their health found. Some of them attain to the age of one hundred years. Although in eating they are moderate, their paffion for ftrong liquors is indulged to excefs. The ftate of civilization among the Mexicans, when they were firft known to the Spaniards, which was much fuperior to that of the Spaniards themfelves when they were firft known to the Phœnicians, that of the Gauls when firft known to the Greeks, or that of the Germans and Britons when firft known to the Romans, are fpoken of in terms of high commendation by Clavigero. He fays, we have known among the Mexicans fome good mathematicians, excellent architects, and learned divines. Of their difpofition and general conduct he feems difpofed to judge very favourably. He concludes with obferving, that the character of the Mexicans, like that of every other nation, is a mixture of good and bad: but the bad may be eafily corrected by a proper education. The ancient Mexicans, he adds, manifefted more fire, and were more fenfible to the impreffions of honour: they were more intrepid, more nimble, more active, more induftrious than thofe of modern times; but they were, at the fame time, more fuperftitious and cruel. Authors, however, have differed much in their opinion with refpect to the talents, cultivation, and character of the ancient Mexicans. Whilft they have been extravagantly extolled by fome, they have been unduly depretiated by others. Dr. Robertfon has endeavoured to fteer a mean courfe in his defcription of thefe people; neither extravagantly commending them with Clavigero, nor finking them below their proper level with De Paw and others. After their fubjection to the Spanifh crown, thofe who firft became acquainted with them were not competent judges of their talents and characters. The rapacious adventurers who formed the train of Cortes, their conqueror, were incapable of judging or pronouncing juftly concerning either their mental or moral endowments. But before we form any eftimate of the degree in which they had cultivated their minds, or made any attainments in the fciences and arts, we muft advert to their origin and the early hiftory of their eftablifhment in Mexico. The perfons who firft peopled this country, as Clavigero fuppofes, came from the more northern parts of America, where their anceftors had been fettled for many ages. The Toltecas, according to the account given us by Clavigero, are the oldeft natives of whom we have any knowledge, and that is very imperfect. It has been an opinion adopted by feveral writers, among whom we particularize Siguenza, bifhop Huet, &c. that the Mexicans, and other nations of Anahuac, were the defcendants of Naphtahim, fon of Mizraim, and nephew of Ham. Thefe, it is faid, having left Egypt not long after the confufion of tongues, travelled towards America. The reafons on which this opinion is grounded, are the conformity of thefe American nations with the Egyptians in the conftruction of pyramidal edifices, of the ufe of hieroglyphics in the mode of computing time, in their drefs, and in fome of their cuftoms, and alfo the refemblance of the word "Teul" of the Mexicans to the "Theuth" of the Egyptians. Clavigero has examined the validity of thefe arguments, and fuggefted feveral objections to which they are liable. He feems to be of opinion, that the anceftors of the nations which peopled the country of Anahuac might pafs from the northern countries of Europe into the northern parts of America, or rather from the moft eaftern parts of Afia to the moft wefterly part of America. This opinion is fupported by the general tradition of thofe nations, which afferts that their anceftors came into Anahuac from the countries of the N. and N.W.; by the remains of many ancient edifices built by thefe people in their migrations, as well as the common belief of the people in the north; and alfo, by fome ancient paintings of the Toltecas, which reprefented the migration of their anceftors through Afia and the northern countries of America. This opinion, with regard to the firft peopling of America, has derived confirmation from fome modern difcoveries, which have afcertained the near approach of the moft eafterly coaft of America to the moft eafterly part of Afia; fo that if they were not, in fome remote age, contiguous, a paffage from the one coaft to the other might be eafily effected. The quadrupeds and reptiles of the new world, it is faid, paffed thither by land; and this opinion is founded on the prefumption that the two continents were formerly united, which is adopted by Acofta, Grotius, Buffon, and other perfons of eftablifhed reputation. Clavigero conjectures, that there was formerly a great tract of land which united the now moft eaftern part of Brazil to the moft weftern part of Africa; and that this whole fpace of land may have been funk by fome violent earthquakes, leaving only fome traces of it in the ifles of Cape de Verd, Fernando de Norona, Afcenfion, St. Matthew, and others, as well as many fand banks difcovered by different navigators. However this be, the Toltecas being banifhed, as they tell us, from their own country Huehuetapallan, fuppofed to be in the kingdom of Tollan, from which they derived their name, and fituated to the N.W. of Mexico, they began their journey in the year 1 "Tecpatl," that is 596 of our era. In every place to which they came, they remained no longer than they liked it, or could be accommodated with provifions; if they determined to make a longer ftay, they erected houfes, and fowed the land with corn, cotton, and other plants, the feeds of which they carried with them for the fupply of their wants. In this migrating manner they travelled fouthward for 104 years, till they arrived at a place which they called "Tollantzinco," about 50 miles E. of the fpot, where, fome centuries after, was founded the famous city of Mexico. In this country, however, they did not

not choose to settle, although the climate was mild and the soil fruitful; but in about twenty years after, they removed about 40 miles to the W. where, along the banks of a river, they founded the city of Tollan, or Tula, after the name of their native country. That city, supposed to be the oldest in Anahuac, and one of the most celebrated in the history of Mexico, was the capital of the Toltecan kingdom, and the court of their kings. This monarchy began, as it is said, in the year 8, "Acatl," that is, 607 of the Christian era, and lasted 384 years. The Toltecas were the most celebrated people of Anahuac for their superior civilization, and skill in the arts; whence it has been common in after ages to distinguish the most remarkable artists in an honourable manner, by the appellation of Toltecas. They always lived in society, collected into cities, under the government of kings and regular laws. They were not very warlike, and less turned to the exercise of arms than to the cultivation of the arts. The nations that have succeeded them have acknowledged themselves indebted to the Toltecas for their knowledge of the culture of grain, cotton, pepper, and other most useful fruits. Besides the arts which are dictated by necessity, they practised those which administer to luxury. They had the art of casting gold and silver, and melting them to whatever form they pleased, and acquired great reputation for the cutting of all kinds of gems; but nothing raised their character so high as their having been the inventors, or at least the reformers of that system for the arrangement of time, which was adopted by all the civilized nations of Anahuac. It is said, that observing in their own country, how the solar year exceeded the civil one by which they reckoned, about six hours, they regulated it by interposing the intercalary day once in four years, which they did more than 100 years before the Christian era. Their religion, indeed, was idolatrous, and they appear, by their history, to have been the inventors of the greatest part of the mythology of the Mexicans. During the four centuries of the monarchy of the Toltecas, they multiplied exceedingly, extending their population every way in numerous and large cities, but their circumstances changed, when in the first year of the reign of Topiltzin, they suffered for want of rain and the productions of the soil, and a great part of the nation died by famine and sickness. Topiltzin died in the second year "Tecpatl," *i. e* 1052 of the vulgar era, and with him the Toltecan monarchy terminated. The wretched remains of the nation sought new abodes; some removed to Yucatan, some to Guatemala, and some remained in the kingdom of Tula, and dispersed themselves in the vale where Mexico was afterwards founded. After the destruction of the Toltecas, for the space of one century, the land of Anahuac remained solitary and almost entirely depopulated, until the arrival of the Chachemecas. These came originally from the northern countries. Their native country was called, according to their account, "Amaquemecan," where, as they say, different monarchs ruled their nation for many years. In the character of these people a certain degree of civilization was blended with many traits of barbarity. They had distinctions between the nobility and commonalty, and the plebeians were accustomed to reverence those whose birth, merit, or favour with the prince raised them above the other ranks. They dwelt together in communities in places composed, as it is probable, of poor huts; but they neither practised agriculture, nor those arts which accompany civil life. They lived on game, and fruits, and roots, which the earth spontaneously produced. Their clothing was the skins of beasts, and their arms, the bow and arrow. Their religion consisted of the simple worship of the sun, to which pretended divinity they offered herbs and flowers which they found springing in the fields. One of their princes was sent by Xolotl, his father, to survey the country: and at length Xolotl determined to establish himself in Tenayuca, a place six miles distant from the scite of Mexico towards the N., and distributed his people among the neighbouring lands. In process of time he became acquainted with several Toltecan families, encouraged intermarriages and alliances with them, and from them acquired the arts of agriculture, the manner of digging metals, the art of casting them, and also of cutting stones, spinning and weaving cotton, and of other things, which contributed to improve their means of subsistence, their clothing, their habitations, and their manners. Xolotl obtained from time to time an accession of new settlers; among whom were some of distinguished rank and character; and particularly three princes, to two of whom he gave his two daughters in marriage. When this ceremony had taken place, he divided his kingdom into several distinct states, and assigned the possession of them to his sons-in-law, and the other nobles of each nation. The population daily increased, and with it the civilization of the people; but ambition began to produce injurious effects, and Xolotl, who had hitherto governed with mildness, was obliged to recur to the punishment of some rebels with death. Upon the decease of Xolotl, he was succeeded by his son Nopaltzin II.; and upon his death his son, Tlotzin III. ascended the throne; and the succession continued in his family; according to the following list of Chachemecan kings.

Xolotl began to reign in the		12th century.
Nopaltzin	- -	13th
Tlotzin	- - -	14th
Quinatzin	- -	14th
Techotlalla	- -	14th
Ixtlilochitl	in the year	1406
Nezahualcoyotl	- -	1426
Nezahualpolli	- -	1470
Cacamatzin	- -	1516
Cuicuitzcatzin	- -	1520
Coanacotzin	- -	1520

Such is the succession of Chachemecan kings, till their monarchy terminated. The Otomies are said to have been one of the most numerous nations which settled in the country of Anahuac: they were a rude and barbarous people, and in the time of the Mexican kings they were treated as slaves. Anciently they were renowned for their dexterity in the chace; at present they traffic in coarse cloths for the dress of the other Indians. The Tarascas, who occupied the extensive, rich, and pleasant country of Michuacan, settled many cities and villages; and their kings were rivals of the Mexicans, and had frequent wars with them. These were idolatrous, but less cruel in their worship than the Mexicans. Their language is copious, sweet, and sonorous. Besides other nations, which settled in and near the vale of Mexico, the most renowned and the most signalized in the history of Mexico, were those vulgarly called the Nahuatlacas. They consisted of seven tribes, who settled in Anahuac after the Chachemecas. The Aztecas, or Mexicans, were the last people who settled in Anahuac. Till about the year 1160 of the vulgar era, they lived in Aztlan, a country situated to the N. of the gulf of California. They left their country, as it has been said, at the instigation of a person of great authority among them, to whose opinion they all paid great deference. He was led to this resolution by the fanciful interpretation of the chirping of a bird; but whatever was the motive of the migration of the Aztecas, they left their country at the time above-mentioned. After various delays in in the courfe of their peregrination, they at length arrived to the borders of the lake of Tezeuco, and near the fcite of Mexico. Here they fuffered various perfecutions and diftreffes; they engaged in a conflict with fome enemies, whom they vanquifhed, and, returning to the place of their refidence, they erected an altar to their tutelary god. When they fixed upon the fpot, on which they determined to erect their city, they built a temple to their god, and confecrated it by the effuffion of human blood. Around the fanctuary of their god they conftructed wretched huts of reeds and rufhes, being at that time deftitute of other materials; and they called it Mexico, which denomination, being taken from the name of its tutelar god, fignifies place of Mexitli, or Huitzilopochtli, as he had both thefe names. There are other etymologies of this name. (See MEXICO.) The foundation of this city was laid in the year 2, Calli, correfponding with the year 1325 of the vulgar era. Until the year 1352, the Mexican government was ariftocratical; the whole nation paying obedience to a certain body, compofed of perfons the moft refpectable for their nobility and wifdom; but at this time they imitated the example of their neighbours, and for greater fecurity from their enemies, formed their little ftate into a monarchy; and the election fell, by common confent, on Acamapitzin, who was one of the moft famous and prudent perfons then living amongft them. This monarch governed the city, which comprehended at that time the whole of his kingdom, in peace for thirty-feven years. In his time the population increafed, buildings of ftone were conftructed, and thofe canals, which ferved as well for the ornament of the city as for the convenience of its inhabitants, were begun. At his death the monarchy, which was elective, was transferred to his fon, Huitzilihuitl. After a reign of twenty years, he was fucceeded by his brother Chimalpopoca, whofe premature death made way for the election of Itzcoatl, brother to the two preceding kings, and natural fon of Acamapitzin by a flave. His government was conducted with prudence; he fubdued many neighbouring provinces; and he erected two temples, one to the goddefs Cihuacoatl, and fome time afterwards another to Huitzilopochtli, the chief Mexican divinity. After a profperous reign of thirteen years, he was fucceeded by one of his grandfons, Montezuma, who was elected with general applaufe, not lefs on account of his perfonal virtues, than the important fervices which he had performed for his country. As foon as he was fixed on the throne, he erected a famous temple in that part of the city which was called Huitznabuac; and in rearing this magnificent ftructure, he was affifted with materials and workmen by the neighbouring kings, with whom he was in alliance. He then profecuted the conquefts which he had commenced in the time of his predeceffor, and added to the Mexican empire feveral diftricts and villages. In the tenth year of his reign, correfponding to the year 1446 of the vulgar era, the city of Mexico was much damaged by an inundation from the adjacent lake; and, in order to prevent a fimilar calamity, he caufed to be conftructed a large dyke, nine miles in length, and eleven cubits in breadth, compofed of two parallel palifades, the fpace between which was entirely filled up with ftone and mud. The inundation was foon followed by a famine, which was owing to a failure of the harveft of maize. When the city had recovered itfelf from the effects of this calamity, Montezuma renewed his conquefts, and, after a diftinguifhed reign of twenty-nine years, the throne was vacated by his death in 1464, and Axayacatl was chofen to fucceed him. This king, having obtained a fignal victory over the inhabitants of a neighbouring province, in 1468, undertook the building of a temple, which he called Coatlan. The progrefs of his conquefts was interrupted by his death, in the 13th year of his reign, A.D. 1477. Tizoc, his elder brother and general of the army, was elected for his fucceffor; but his reign was fhort and undiftinguifhed by any confiderable military exploits. In the 5th year of his fovereignty he was poifoned by fome of his feudatory fubjects, A. D. 1482. During his time, the power and wealth of the crown had arrived to fuch a height, that he undertook to conftruct a temple to the tutelary god of the nation, which was to have furpaffed in magnificence all the temples of that country; he had prepared a vaft quantity of materials for this purpofe, and had actually begun the ftructure, when death interrupted his projects. Ahuitzotl, the brother of the two preceding kings, a general of the army, was chofen to fucceed him. The firft object to which his attention was directed was the completion of the temple, which had been defigned and begun by his predeceffor. This work was diligently profecuted for four years; and on occafion of his confecration he is faid to have facrificed, as fome fay, 72,344, and, according to others, 64,060 prifoners. This event happened in 1486. In the year 1498, this king projected to fupply the lake with water from a fountain at fome diftance; and in fpite of remonftrances from thofe who dreaded an inundation, he perfifted in the execution of his plan. The apprehended event occurred, and the city was deluged with the overflowing water. This deluge was fucceeded by a famine. The laft years of Ahuitzotl were paffed in conftant wars; till at length, in the year 1502, after a reign of about twenty years, he died. At the time of his death, the Mexicans were in poffeffion of all which they had at the arrival of the Spaniards. He was celebrated among his countrymen for magnificence and liberality. Having difcovered in the vale of Mexico a quarry of ftones, called tetzoutli, he embellifhed the city with fo many new and magnificent buildings, that it was already become the firft city of the new world. Upon the death of Ahuitzotl, Montezuma was elected as the 9th fovereign of Mexico. Befides the valour which he had difplayed in feveral battles, as general, he was likewife a prieft, and much venerated for his gravity, circumfpection, and religion. In order to obtain victims to be facrificed at his coronation, he entered into a war with fome neighbouring revolters; and the ceremonies exhibited on this occafion were fingularly fplendid and magnificent. Notwithftanding a folemn agreement concerted between the nobility and plebeians in a former reign for chufing the offices of ftate, Montezuma difplaced the latter, and required that all the fervants of his palace fhould be perfons of rank. Thefe were very numerous, and very fervile and obfequious. The women who attended him were alfo perfons of rank, and they lived immured in a kind of feraglio, where their conduct was vigilantly regarded; but of thefe the king retained thofe who pleafed him, and difpofed of the others as a recompence for the fervice of his vaffals. The forms and ceremonials introduced at court were additional indications of the defpotifm of Montezuma. The grandeur and magnificence of his palaces, houfes of pleafure, woods, and gardens, correfponded to every other circumftance that ferved to difplay the fplendour of his royal dignity. In Mexico, befides the feraglio for his wives, there was lodging for all his minifters and counfellors, and all the officers of his houfhold and court, and accommodation for all foreign lords and kings who arrived hither for bufinefs or pleafure. He had two houfes in the city appropriated to animals, one for birds that did not live by prey, and another for thofe of prey, quadrupeds, and reptiles. The care of the birds was committed to 300 men, befides their

their physicians, who administered remedies to their distempers. For the support of the birds of prey 500 turkies were killed daily; and the wild beasts were fed upon deer, rabbits, hares, &c. and the intestines of human sacrifices. Montezuma also collected for his amusement all irregularly formed men. All his palaces were surrounded with pleasant gardens, in which was every kind of beautiful flower, odoriferous herb, and medicinal plant. It had likewise woods enclosed with walls, and furnished with variety of game, in which he frequently sported. In one of the royal buildings was an armoury, filled with all kinds of offensive and defensive arms: and he employed a number of artificers in manufacturing these, and also artists, such as goldsmiths, mosaic-workmen, sculptors, painters, and others. One whole district consisted solely of dancing-masters, who were trained up to entertain him. His zeal for religion was no less conspicuous than his munificence. He built severel temples to his gods, and made frequent sacrifices to them, observing with punctuality the established rites and ceremonies. However, his mind was totally debased, by the vain fear of the auguries and pretended oracles of the false divinities to whom he dedicated temples. He was inexorable in punishing those who resisted his orders, or transgressed the laws of the kingdom; and he often put the integrity of his magistrates to the test by secret presents, and if he found them guilty, he inflicted severe penalties. He was an implacable enemy to idleness, every species of which he restrained or corrected. With many good qualities which he possessed, he blended a disposition to oppress his people by the imposition of heavy burdens, in order to support his own folly and extravagance, which disgusted them; notwithstanding the liberal donations which he bestowed on individuals, and particularly on his generals and ministers.

With the exception of the war against the republic of Tlascala, in which he was unsuccessful, he subdued several provinces, and extended the kingdom, as it is said, to the boundaries of Nicaragua. Montezuma, whose fate was decided after Cortes took possession of Mexico, reigned almost eighteen years, and died in June, 1520. He was succeeded by his brother, Cuitlahuatzin, or Guatimozin, as he is usually called, who ascended the throne in the beginning of July, 1520, and reigned about three months, when he was taken prisoner and strangled by order of Cortes, because he had planned a revolt after having sworn homage to the emperor Charles V., then king of Spain. His successor was Quauhtemotzin, who finished his reign on the 13th of August, 1521, having been made prisoner by the Spaniards just as Mexico was taken. His reign could not have lasted more than nine or ten months.

Although Juan de Grijalva, who was appointed by Velasquez to the command of a small expedition for discovery, consisting of four ships, and 240 volunteers, first landed in the territory of New Spain, on the island of Cozumel, E. of Yucatan, on the 3d of May, 1518, and gave the country this appellation, he returned to Cuba without making any considerable progress towards the reduction of it. Velasquez, however, hastened his preparations for a new expedition, and he appointed Fernando Cortes for the commander of it. Of this expedition, and the successful issue of it, in the capture of Mexico, and the subjugation of the Mexican empire, we have given an ample account under the article Cortes. We shall now avail ourselves of the information collected by Dr. Robertson, relating to the Mexicans and their empire, and at the same time introduce the occasional reflections of Clavigero, Estalla, and other writers. Little dependance can be placed on the accounts given of the policy and order established in the Mexican monarchy by Cortes and his adherents. The genius and manners of the people must be inferred from incidents, which they occasionally mention, rather than from their own deductions and remarks. The obscurity in which the ignorance of its conquerors involved the annals of Mexico, was augmented by the superstition of those who succeeded them. As the memory of past events was preserved among the Mexicans by figures painted on skins, or cotton cloth, or on the bark of trees, the early missionaries conceiving them to be monuments of idolatry, which ought to be destroyed, in order to facilitate the conversion of the Indians, committed them to the flames by order of Juan de Zummarage, the first bishop of Mexico. Thus the knowledge of remote events, which such rude monuments might furnish, was almost entirely lost, and no information remained concerning the ancient revolutions and policy of the empire, but such as was derived from tradition, or from some fragments of their historical paintings, that escaped the barbarous researches of Zummaraga. Tradition, it is well known, is a very unsatisfactory source of information with regard to events long since past; and the Mexican paintings, which are supposed to have served as annals of their empire, are few in number, and of ambiguous meaning; and are not worthy of that confidence, which some historians of Mexico, and particularly Clavigero, have reposed in them.

According to the report of the Mexicans themselves, their empire was not of long duration. Their country, as they relate, and as is evident from the details which we have already given, was originally possessed, rather than peopled, by small independent tribes, whose mode of life and manners resembled those of rude savages. However, at a period corresponding to the tenth century in the Christian era, several tribes moved in successive migrations from unknown regions towards the N. and N.W., and settled in different provinces of Anahuac, the ancient name of New Spain. Some of these, more civilized than the original inhabitants, began to form them to the arts of social life. At length, towards the commencement of the 13th century, the Mexicans, a people more polished than any of the former, advanced, as we have already stated, from the border of the Californian gulf, and took possession of the plains adjacent to a great lake near the centre of the country. After residing there about 50 years, they founded a town, since known by the name of Mexico, which afterwards became very considerable. The Mexicans, long after they were established in their new possessions, continued, like other martial tribes in America, unacquainted with regal dominion, and were governed in peace, and conducted in war, by such as were entitled to pre-eminence on account of their wisdom or valour. Among them, as in other states whose power and territories become extensive, the supreme authority at last centered in a single person; and when the Spaniards, under Cortes, invaded the country, Montezuma was the ninth monarch who had swayed the Mexican sceptre, not by hereditary right, but by election. Such is the traditional account given by the Mexicans themselves, of the origin and progress of their empire; and its duration appears to have been short. From the first migration of their parent tribe, they can reckon little more than 300 years: and from the establishment of monarchical government not above 130 years, as some say, or, according to others, 197 years, had elapsed. Allowing it a duration corresponding to the Spanish accounts of its civilization, it is difficult to conceive how, among a people who possessed the art of recording events by pictures; and who considered it as an essential part of their national education, to teach their children to repeat the historical songs which celebrated the exploits of their ancestors,

cestors, the knowledge of past transactions should be so limited. But adopting their own system with regard to the antiquity of their nation, it is no less difficult to account either for that improved state of society, or for the extensive dominion to which their empire had attained when it was first visited by the Spaniards. The recent origin of the Mexicans seems to be a strong presumption of some exaggeration in the splendid descriptions which have been given of their government and manners. In the history of the Mexicans some facts occur, says Dr. Robertson, that suggest an idea of considerable progress in civilization in the Mexican empire, and others which seem to indicate that it had advanced but little beyond the savage tribes around it. Our historian of America has stated these facts. The right of private property was perfectly understood, and established in its full extent. Real and moveable possessions, property in land and in goods, were accurately distinguished; and both might be transferred from one person to another by sale or barter; or both might descend by inheritance. Every person, who could be denominated a freeman, had property in land; which was held by various tenures. Some possessed it in full right, and it descended to their heirs; the title of others was attached to the office or dignity which they retained. These two modes of occupying land were deemed noble, and belonged to citizens of the highest class. But the tenure by which the great body of the people held was of a very different kind. In every district a certain quantity of land was measured out, in proportion to the number of families. This was cultivated by the joint labours of the whole; its produce was deposited in a common warehouse, and divided among them according to their respective exigencies. The members of the "Calpullee," or associations, could not alienate their share of the common estate; it was an indivisible permanent property, destined for the support of their families. Whilst the territory of the state was thus distributed, every man had an interest in its welfare, and the happiness of the individual was connected with the public security.

Another circumstance that deserves to be mentioned was the magnitude and number of their cities. In a rude state of society, men have no very operative inducements to crowd together. From choice, and also from necessity, they live dispersed. But when the Spaniards entered New Spain, they were astonished to find the natives assembled in towns which resembled in their extent those of Europe. Zempoalla, though a town of the second or third size, excited their admiration, and they compared it to cities of the greatest note in their own country. But when they afterwards became acquainted with Tlascala, Cholula, Tacuba, Tezeuco, and Mexico itself, their astonishment increased, and they were led to entertain ideas of their magnitude and populousness bordering on what is incredible. Cortes and his companions, little accustomed to estimate and compute the number of people in such cities, and strongly tempted to magnify, in order to exalt the merit of their own discoveries and conquests, might have been betrayed into error, and might have raised their descriptions considerably above the truth. Dr. Robertson therefore conceives, that abatements ought to be made in their calculations of the number of inhabitants in the Mexican cities, so that the standard of their population should be fixed much lower than they have done; nevertheless our author acknowledges that they are cities of such consequence as are not to be found but among people who have made some considerable progress in the arts of social life.

Another circumstance that ought to be regarded is the separation of professions, which is a symptom of improvement. The savage can form his bow, point his arrow, rear his hut, and hollow his canoe, without the assistance of any person more skilful than himself: but in proportion as refinement spreads, the distinction of professions increases, and they branch out into more numerous and minute subdivisions. Among the Mexicans, this separation of the arts had taken place to a very considerable degree. The functions of the mason, the weaver, the goldsmith, the painter, and of several other crafts, were carried on by different persons.

The distinction of ranks established in the Mexican empire is another circumstance that merits attention. The great body of the people was in a most humiliating state. Some, denominated "Mayeques," were attached, as it were, to the soil, and conveyed with the lands on which they were settled; others felt the utmost rigour of domestic servitude; and they were held in such low estimation, that a person who killed one of these slaves was not subjected to any punishment. Even those considered as freemen were treated by their haughty lords as beings of an inferior species. The nobles, possessed of ample territories, were divided into various classes, to which peculiar titles of honour belonged. Some of these titles descended with the lands from father to son in perpetual succession. Others were annexed to particular offices, or conferred, during life, as marks of personal distinction. The monarch, exalted above all, enjoyed extensive power, and supreme dignity. The respect attached to these different ranks corresponded to their gradation of dignity; and this respect, due from inferiors to superiors, was so established, that it incorporated with the language, and influenced its genius and idiom. The Mexican tongue abounded in terms of reverence and courtesy. It is only in societies, which time and the institution of regular government have moulded into form, that we find such an orderly arrangement of men into different ranks, and such nice attention paid to their various rights.

The political constitution of the Mexicans is an object deserving of consideration; more especially as it has been misunderstood and misrepresented by the Spaniards. The aspiring ambition of Montezuma introduced innovations upon the Mexican policy; and introduced a pure despotism. He disregarded the ancient laws, violated the privileges held most sacred, and reduced his subjects of every order to the condition of slaves. The chiefs or nobles of the first rank wished to shake off the yoke which he had imposed, and in hopes of recovering their rights, many of them courted the protection of Cortes, and joined a foreign power against their domestic oppressor. We must therefore look back beyond the reign of Montezuma in order to discover the form and genius of Mexican policy. The body of citizens, called nobility, formed the most respectable order in the state. They were of various ranks, and considerable with regard to number. Of this order there were 30 in the Mexican empire, each of whom had in his territories about 100,000 people; and subordinate to these, there were about 3000 nobles of a lower class. The territories belonging to the chiefs of Tezeuco and Tacuba were hardly inferior in extent to those of the Mexican monarch. Each of these possessed complete territorial jurisdiction, and levied taxes from their own vassals. But all followed the standard of Mexico in war, serving with a number of men in proportion to their domain, and most of them paid tribute to its monarch as their superior lord.

Traces of feudal policy, in its most rigid form, are discernible in the Mexican constitution, exhibiting its distinguishing characteristics, a nobility possessing almost independent authority, a people depressed into the lowest state of subjection, and a king entrusted with the executive power

of

of the ftate. But the jurifdiction of its crown was very limited, and all real and effective authority was retained by the Mexican nobles in their own hands. Without their confent the king could undertake no meafure of importance. At firft they elected the king, and afterwards the choice was committed to fix electors, of whom the chiefs of Tezeuco and Tacuba were two. Their choice was guided by a view to the activity and valour of their prince more than to the order of birth; fo that collaterals of mature age or diftinguifhed merit were often preferred to thofe who were nearer the throne in direct defcent. Thus the Mexicans fecured a fucceffion of able and warlike princes, who raifed their empire in a fhort period to that extraordinary height of power, which it had attained when Cortes landed in New Spain. The monarchs, reftrained at firft, gradually advanced in power and in the fplendour of their government, a ftriking inftance of which was prefented to the view of the Spaniards in Montezuma's court; but it was not merely in a parade of royalty that the Mexican monarchs exhibited their power; they manifefted it more beneficially in the order and regularity with which they conducted the internal adminiftration and police of their dominions. Their attention in providing for the fupport of government was no lefs fagacious than the actual adminiftration of it. Taxes were laid upon land, upon the acquifition of induftry, and upon commodities of every kind expofed to fale in the public markets; thefe taxes were equally laid, and, as the ufe of money was unknown, they were paid in kind. The internal police of the Mexican empire extended to the appointment of couriers for conveying intelligence, to the ftructure and government of the capital, to its accommodation with water by means of aqueducts, and to a variety of other circumftances refpecting the convenience and comfort of its inhabitants. The attention that was manifefted in regulations of this kind was fuch as polifhed nations have been late in acquiring and exercifing.

The progrefs of the Mexicans in various arts is alleged as a farther decifive proof of their fuperior refinement; but on this fubject fome Spanifh authors have been charged with exaggeration. The Mexican paintings which fome have extravagantly extolled are reprefented by others as uncouth delineations of common objects, or very coarfe images of the human and other forms, devoid of grace and propriety. In the armoury of the royal palace of Madrid, are fhewn fuits of armour, which are called Montezuma's; they are compofed of thin lacquered copper-plates. Dr. Robertfon fays, that, in the opinion of intelligent judges, thefe are evidently eaftern. Clavigero, with great ardour, and not without fome rudenefs of attack on the learned hiftorian, maintains that thefe are really Mexican; becaufe we are certain, from the teftimony of all the writers of Mexico, that thofe nations ufed fuch plates of copper in war, and that they covered their breafts, their arms and thighs with them, to defend themfelves from arrows; whereas we do not know that fuch were ever in ufe among the inhabitants of the Philippine ifles, to which Dr. R. refers them, or among any other people who had commerce with them. The Mexicans, fays Clavigero, could boaft of many inventions worthy of immortalizing their name, fuch as, befides thofe of cafting metals and mofaic works of feathers and fhells, the art of making paper, thofe of dyeing with indelible colours, fpinning and weaving the fineft hair of the rabbits and hares, making razors of a ftone called "itztli," which they manufactured with fuch expedition, that in an hour an artift could finifh more than 100, making beautiful looking-glaffes of this ftone fet with gold, the cutting and polifhing of gems, breeding of the cochineal, and making ufe of its colour, preparing of cement for the pavements of their houfes, &c. &c. Their potters were famous; and their carpenters wrought feveral kinds of wood with inftruments made of copper. They had alfo various manufactures of cloth, ufing cotton for wool, feathers for filk, with the hair of the rabbit and hare, for hat and hemp, icxotl, or mountain-palm, &c.

In the wooden prints or copper-plates of their paintings, that have been publifhed by various authors, every figure of men, quadrupeds, or birds, as well as every reprefentation of inanimate nature, is extremely rude and awkward. But though the Mexican paintings may be ranked low, as works of art, they may be regarded in a higher point of view, when confidered as the records of their country, as hiftorical monuments of its policy and tranfactions; and they become interefting objects of attention. Of their picture writing fome fingular fpecimens have been preferved. The moft valuable of thefe have been publifhed by Purchas in 66 plates, and divided into three parts. The firft contains the hiftory of the Mexican empire under its ten monarchs. The fecond is a tribute-roll, reprefenting what each conquered town paid into the royal treafury. The third is a code of their inftitutions, domeftic, political, and military. Another fpecimen of Mexican painting has been publifhed in 32 plates by the archbifhop of Toledo. The ftyle of painting is the fame in all; they reprefent *things* not *words*; exhibiting images to the eye, not ideas to the underftanding; and they may, therefore, be confidered as the earlieft and moft imperfect effay of men in their progrefs towards difcovering the art of writing. The plates already mentioned indicate fome approach to the plain and fimple hieroglyphic, where fome principal part or circumftance in the fubject is made to ftand for the whole; and the Mexicans feem alfo to have advanced farther towards the ufe of the more figurative and fanciful hieroglyphics. In order to defcribe a monarch, who had enlarged his dominions by force of arms, they painted a target ornamented with darts, and placed it between him and thofe towns which he fubdued. For the notation of numbers the Mexican painters had invented artificial marks, or "figns of convention;" by means of which they computed the years of the reigns of their kings, as well as the amount of tribute to be paid into the royal treafury. The figure of a circle reprefented unit, and in fmall numbers the computation was made by repeating it. Larger numbers were expreffed by a peculiar mark, and they had fuch as denoted all integral numbers, from 20 to 80,000. Though they had proceeded far, they had a long courfe farther to purfue from the delineation of real objects to the fimplicity and eafe of alphabetical writing.

Their mode of computing time may be confidered as a more decifive evidence of their progrefs in improvement. They divided their year into 18 months, each confifting of 20 days, amounting in all to 360. But as they obferved that the courfe of the fun was not completed in that time, they added five days to the year. Thefe were termed "fupernumerary" or "wafte" days; and as they did not belong to any month, no work was done, nor facred rite performed on them, but they were devoted wholly to feftivity and paftime. It appears, fays Clavigero, from the chronology of the Mexicans, that they not only counted 365 days to the year, but that they alfo knew the excefs of about fix hours in the folar above the civil year, and remedied the difference between them by means of 13 intercalary days, which they added to their century of 52 years. The names of their 18 months were taken both from the employments and feftivals which occurred in them, and alfo from the accidents of the feafon which attended them. The Mexicans, in order to reprefent a month, painted a circle or wheel, divided into 20 figures, fignifying 20 days. To reprefent a year they painted

painted another, which they divided into 18 figures of the 18 months, and frequently painted within the wheel the image of the moon. The century was reprefented by a wheel divided into 52 figures, or rather by four figures which were 13 times defigned. They ufed to paint a ferpent twifted about the wheel, which pointed out, by four twifts of its body, the four principal winds, and the beginnings of the four periods of 13 years. See figures of thefe wheels in Clavigero's Hift. of Mexico.

Such are the principal facts that indicate the progrefs of the Mexicans towards civilization. On the other hand, there are feveral circumftances which ferve to fhew that their character, and many of their inftitutions did not differ greatly from thofe of the other inhabitants of America. Their wars, like thofe of the rude tribes around them, were continual and ferocious; and even in their civil inftitutions we difcover traces of that barbarous difpofition which their fyftem of war infpired. Their funeral rites were not lefs fanguinary than thofe of the moft favage tribes; fo that upon the death of any diftinguifhed perfonage, efpecially the emperor, a number of his attendants were chofen to accompany him into the other world; and thefe unfortunate victims were put to death without mercy, and buried in the fame tomb. Their agriculture was in a very imperfect ftate, fo that they were often conftrained to live on the fpontaneous productions of the earth. The difficulty of rearing a numerous family, induced the Mexican women to keep the children at the breaft for feveral years, during which time they did not cohabit with their hufbands. Clavigero, however, afferts, that the Mexicans not only cultivated moft diligently all the lands of their empire, but by wonderful exertions of induftry, created to themfelves new territory for cultivation, by forming thofe floating fields and gardens on the water, which have been highly celebrated by Spaniards, and other foreigners, and are ftill the admiration of all who fail upon their lakes. They had not only, fays this writer, all the plants which were neceffary for food, for clothing, and medicine, but likewife the flowers and other vegetables which contributed folely to luxury and pleafure, were plenteoufly cultivated by them. Cortes, in a letter to Charles V., dated Oct. 1520, fays, "the multitude of inhabitants in thefe countries is fo great, that there is not a foot of land left uncultivated."

Although the Mexican empire was extenfive, the Spanifh hiftorians have enlarged it far beyond its true boundaries, and they have reprefented the dominion of Montezuma as ftretching over all the provinces of New Spain, from the N. to the fouthern ocean. But we have already ftated that many of the countries faid to have been included in the empire of the Mexicans did not belong to it. The Otomies were an uncivilized people, occupying a mountainous country. The Chechemecas, who occupied the provinces N. and W. of Mexico, were a mere nation of hunters. None of thefe recognized the Mexican monarch as their fuperior. Tlafcala, at the diftance of 21 leagues from the capital of the empire, was an independent and hoftile republic. Cholula, though ftill nearer, had been fubjected but a fhort time before the arrival of the Spaniards. Tepeaca, diftant 30 leagues from Mexico, was a feparate ftate, governed by its own laws. Mechoacan, the frontier of which extended within 40 leagues of Mexico, was a powerful kingdom, remarkable for its implacable enmity to the Mexican name. Thus limited in its extent, its various provinces had no confiderable mutual intercourfe. They had no roads for facilitating the communications of one diftrict with another; infomuch that when the Spaniards firft attempted to penetrate the country, they were under a neceffity of opening their way through forefts and marfhes. As a farther proof of the imperfection of their commercial intercourfe, it has been alleged that they had no money, or univerfal ftandard by which they might eftimate the value of commodities. Their trade was carried on by barter, and this affords an evidence of the infant ftate of their police. If by money be underftood a fign reprefenting the value of all merchandize, as Montefquieu defines it, it is certain, fays Clavigero, that the Mexicans, and all other nations of Anahuac, except the barbarous Chechemecas and Otomies, employed money in their commerce. The cacao had its fixed value, and was reckoned by numbers; but to fave the trouble of counting it, when the merchandize was of great value, and worth many thoufands of the nuts, they knew that every bag of a certain fize contained three xiquipilli, or 24,000 nuts. There were feveral fpecies of cacao, fome of which were ufed in their diet and beverages, but others were in conftant circulation as money, and ufed in no other way than in commerce. In the capital itfelf of Mexico, where from 18 to 20,000 crowns (pefos fuertes) are annually coined in gold and filver, the poor people ftill make ufe of the cacao to purchafe fmall articles in the market.

It has been further argued, that their cities, though extenfive and populous, feemed to have been better adapted for the habitations of men juft emerging from barbarity, than the refidence of a polifhed people. The ftructure of the houfes, even in Mexico, was for the moft part mean; nor does the fabric of their temples and other public edifices appear to have been fuch as entitled them to the high praifes beftowed upon them by many Spanifh authors. Their edifices in general appear to have been meanly built with turf and ftone, and thatched with reeds; nor have we any fatisfactory evidence, notwithftanding the affertion and pretended evidence of Clavigero, that they ufed lime. The great temple of Mexico was a fquare mound of earth, 90 feet wide, partly faced with ftone, with a quadrangle of 30 feet at the bafe, on which was a fhrine of the deity, probably of wood. The ftairs were made of large ftones, and confifted of 114 fteps, each a foot high; and at the eaftern extremity were raifed two towers to the height of 56 feet. Cortes affirms, that within the enclofure of the wall which encompaffed the temple, a town of 500 houfes might have ftood. Although their architecture, fays Clavigero, is not to be compared with that of the Europeans, it was certainly greatly fuperior to that of moft of the people of Afia or Africa. Who would form a comparifon between the houfes, palaces, temples, baftions, aqueducts, and roads of the ancient Mexicans, and the miferable huts of the Tartars, Siberians, Arabs, and other wretched nations which live between the Cape de Verd, and the Cape of Good Hope; or the buildings of Ethiopia, of a great part of India, and the Afiatic and African ifles, except thofe of Japan? The houfes of the emperor and thofe of the principal nobilty, it has been faid, exhibited fome elegance of defign, and a commodious arrangement of the apartments into which they were diftributed. But on the other hand it is obferved, that no remains of them are vifible, nor are there any ruins, which can juftly be confidered as monuments of their ancient magnificence. Eftalla, cited by Pinkerton, obferves, that thofe great palaces, gardens, and temples, thofe immenfe and populous cities fubject to Mexico, and whofe kings were tributary to Montezuma; that high and vaft wall which divided the Mexican empire from the republic of Tlafcala, and the other wonders related by hiftorians, fhould at leaft have left fome few ruins in teftimony of their exiftence, even granting that the Spaniards entertained the extravagant wifh of deftroying all, in order that they might

be

be obliged to construct, with great labour and expence, other edifices far inferior.

The chief remaining antiquities of the Mexicans appear to be earthen ware, in which the Indians of Guadalaxara and Mechoacan excel to this day; as the Tarascas of the Peribanes, in that of japanning, the black colour lasting as long as the wood itself, while the figures equal those of the Chinese artists, and the gilding in gold and silver is of great lustre and permanency. Dr. Robertson concludes upon the whole, that though the state of society in Mexico was considerably advanced beyond that of savage tribes, yet with respect to many particulars, the Spanish accounts of their progress in civilization and refinement appear to be highly embellished. At the same time it is allowed, that the accounts given by the Spanish writers of the Mexican power, policy, and law ought not to be rejected, or censured, as the fictions of men who wished to deceive, or who delighted in the marvellous.

With regard to religion, the Mexicans have probably been represented as more barbarous than they really were. Their religious tenets, and the rites of their worship, have been described as wild and cruel in an extreme degree. Religion, among the Mexicans, was formed into a regular system, with its complete train of priests, temples, victims, and festivals. From the genius of the Mexican religion we may form a just conclusion with respect to its influence upon the character of the people. The aspect of superstition in Mexico was gloomy and atrocious. The divinities were clothed with terror, and delighted in vengeance. The figures of serpents, tygers, and other destructive animals, decorated their temples. Fear was the only principle that inspired their votaries. Fasts, mortifications, and penance, all rigid, and many of them excruciating to an extreme degree, were the means employed to appease the wrath of their gods, and the Mexicans never approached their altars without sprinkling them with blood drawn from their own bodies. But of all offerings, human sacrifices were deemed the most acceptable. As their religious belief was blended with the implacable spirit of vengeance, and added new force to it, every captive taken in war was brought to the temple, devoted as a victim to the deity, and sacrificed with rites no less solemn than cruel. The heart and head were the portion of the gods; while the body was resigned to the captor, who, with his friends, feasted upon it. Under the impression, thus produced, the spirit of the Mexicans was unfeeling, and the genius of their religion counterbalancing the influence of policy and arts, their manners, instead of being softened, became more fierce. Although the Mexicans had some confused idea of a supreme, independent being, to whom fear and adoration were due, they represented him under no external form, because they believed him to be invisible, and they named him by the common appellation of God, in their language denominated "Teotl;" and they applied to him certain epithets expressive of grandeur and power. They called him "Ipalnemoani," *i. e.* he by whom we live, and "Tloque Nahuaque," *i. e.* he who has all in himself. But their principal worship seems to have been directed to an evil spirit, the enemy of all mankind, called "Tlacatecolototl," or, rational Owl, and they said that he often appears to men for the purpose of terrifying them or doing them an injury. They considered the human soul as immortal, allowing immortality also to the souls of brutes. They believed in a kind of transmigration, and thought that the souls of soldiers who died in battle or in captivity among their enemies, and those of women who died in labour, went to the house of the sun, to lead a life of delight; but they supposed that after four years of this glorious life, they animated birds of beautiful feathers and of sweet song, with liberty to rise again to heaven, or to descend upon the earth. The souls of inferior persons were supposed to pass into weazels, beetles, and such other meaner animals. The souls of those that were drowned, or struck by lightning, of those who died by dropsy or other diseases, went, along with the souls of children, to a cool and delightful place, the residence of "Tlalocan," where they enjoyed the most delicious repast. The abode of those who suffered any other kind of death was the "Mictlan," or hell, which they conceived to be a place of utter darkness. The Mexicans are said to have had a clear tradition, somewhat corrupted by fable, of the creation of the world, of the universal deluge, of the confusion of tongues, and of the dispersion of the people; and these events were actually represented in their pictures.

Among all the deities worshipped by the Mexicans, which were very numerous, there were 13 principal or greater gods, in honour of whom they consecrated that number. The greatest god, after the invisible god or supreme being, was "Tezcatlipoca," the god of providence, the god of the world, the creator of heaven and earth, and the maker of all things. He was always young, so that no length of years diminished his power, and to him it belonged to confer benefits on the just, and to punish the wicked with diseases and other afflictions. Among their greater gods were also the sun and moon, the god of the air, "Tlaloc," the god of water, to whom they ascribed the fertility of the earth and the protection of their temporal goods; to him they consecrated a temple, and in honour of him celebrated festivals every year; the god of fire, who was greatly revered in the Mexican empire; "Centeotl," or goddess of the earth and of corn, who had five temples in Mexico and three annual festivals; the god of hell, and his female companion, much honoured by the Mexicans; the god of night, to whom they recommended their children, that they might sleep; and "Mexitli," the god of war, most honoured by the Mexicans and regarded as their chief protector. There were other gods of commerce, fishing, hunting, &c. They had also 260 gods, to whom they consecrated as many days. The number of images by which the gods were represented and worshipped in the temples, the houses, the streets, and the woods, were almost infinite. These images were generally made of clay, and certain kinds of wood and stone; but sometimes of gold and other metals, and some of gems. The most extraordinary idol of the Mexicans was that of "Huitzilopochtli," which was formed of certain seeds pasted together by human blood. The divinity of these false gods was acknowledged by prayers, kneeling, and prostrations, with vows, fasts, sacrifices, and various rites. In their prayers they turned their faces towards the east, and their sanctuaries were constructed with their doors to the west. Annexed to the great temple, which we have already mentioned, were various other buildings; and the temples in the whole city of Mexico have been reckoned to amount to 2000, and that of the towns to 360. Each temple had its own lands and possessions, appropriated to its support. The number of the priests corresponded with that of the gods and temples; among these there were several orders and degrees, the chief of whom were two high priests, who were consulted in all affairs of moment, to whom it belonged to anoint the king after his election, and to open the breasts and take out the hearts of the human victims, at the most solemn sacrifices. The high priests of Mexico were distinguished by a tuft of cotton, hanging from their breasts, and at the principal feasts they were dressed in splendid habits, on which were represented the insignia of the god whose feast they celebrated. All the offices of religion were divided

divided among the priests; four times a day they offered incense to the idols. The dress of the Mexican priests consisted of a black cotton mantle, which they wore in form of a veil over their heads. They never shaved themselves, so that the hair of many of them reached to their legs, and it was twisted with thick cotton cords, and bedaubed with ink. The austerities and voluntary wounds of the priests, their filthy and poisonous ointments, and their other abominable rites, as they are related by Clavigero, form a system of religion, if we may thus profane the name of religion, the most execrable that ever appeared, no less dishonourable to God than pernicious to man; and it unquestionably does not warrant our entertaining any very exalted notions of their refinement and civilization. The human victims sacrificed at the consecration of two temples were 12,210!

This system is, as Pinkerton very justly observes, so totally unlike any that was ever practised in any part of Asia, that it affords a kind of presumption, either that the people were indigenal, or proceeded from Africa, in which alone (as among the Giagas) such cruelties may be traced. The Asiatic religions seem to be universally mild, and even gay, as natural in the worship of a being who is benevolence itself; while in Africa the preponderance of the evil spirit seems to have been acknowledged by many nations. It should be recollected, however, that the Manichean system was not restricted to Africa; and that the devil, or wicked demon, has had his votaries and worshippers in Asia, as well as Africa; and that the emigrants from thence might have brought the worst part of their system of worship along with them. We merely suggest, that this circumstance affords no convincing evidence with regard to the original peopling of this part of the world, or the remote origin of their ancestors. We must allow, that the Spaniards never sacrificed more victims than the Mexicans themselves devoted; and "the clamours of pretended philosophy will often be found in opposition to the real cause of humanity, which it aspires to defend. Could a change of manners have been effected without the use of the sword, it would have been highly desirable; but the design might have been as fruitless as a sermon to a tiger or a rattlesnake. The cruelties of the Spaniards must, by candour, be partly imputed to the profusion of torture and human blood, which every where met their eyes in this unhappy country; as such scenes change the very nature of man, and inflame him like the carnage of a battle." Pinkerton. It should be recollected, however, that the Spaniards had known a religion, and ought to have imbibed its spirit, which was most justly characterised by its divine founder, as "peace on earth and good will towards men."

The Mexicans performed various superstitious rites upon the birth of children, at their marriages, and at their funerals. The child was bathed, and then the diviners were consulted as to its future fortune. He was then named; the name of boys being taken from the sign of the day on which they were born, or from some circumstances attending the birth. Men had often the names of animals, and women those of flowers. The surname was acquired from their future actions. The religious ceremony of bathing was followed by a feast, when drinking was often indulged to excess. Superstition had a great share in the Mexican marriages; but nothing occurred that was inconsistent with decency or honour. Marriage between persons in the first degree of consanguinity was forbidden, unless it was between cousins. The parents were the persons who settled all marriages, and none were ever executed without their consent. The male was thought fit to form the marriage contract at the age of 20 to 22, and the female from 16 to 18 years; and before the union was concluded, the diviners were consulted, who decided on the happiness or infelicity of the proposed match. If their sentence was unpropitious, the young female was abandoned, and another sought. If the sentence was favourable, the young woman was demanded of her parents by certain women, who were held in respect and esteem. These women went at midnight to the house of the parents with a present, and demanded the damsel in a humble and respectful style. After a few days, these women repeated their visit, stating the rank and fortune of the youth, and gaining information what was her fortune. The parents then sounded the inclinations of their daughter; and in due time a decisive answer was returned. On the day appointed for the nuptials, the parents, after exhorting their daughter to a suitable conduct, led her, with a numerous company and music, to the house of her father-in-law; if noble, she was carried on a litter. The bridegroom, and her parents, received her at the gates of the house, with four torches borne by four women. At meeting, the bride and bridegroom offered incense to each other; and the bride was led by him to the hall or chamber prepared for the nuptials. They were then seated on a mat, and a priest tied a point of the gown of the bride to the mantle of the bridegroom, and in this ceremony the matrimonial contract chiefly consisted. They then offered copal to their gods, and exchanged presents with each other. This ceremony was followed with a repast, at which the bride and bridegroom gave some food to each other, and to their guests; and after the exhilaration occasioned by drinking, a dance took place; and the married pair remained in the chamber, and continued there four days; which were passed in prayer and fasting, being dressed in new habits, and adorned with certain ensigns of the gods of their nation. The marriage bed was adjusted by the priest, and the consummation of the marriage did not take place till the fourth night. On the ensuing morning they bathed and put on new dresses, and those who had been invited adorned their heads with white, and their hands and feet with red feathers. The ceremony was concluded with making presents of dresses to the guests; and on that day the mats, canes, &c. were carried to the temple. In the Mexican empire, polygamy was allowed.

The funeral rites were more superstitious than any others, and certain persons of advanced years were appointed for the conducting of them. Having clothed the body of the deceased in a habit appropriate to his former profession or business, they gave him a jug of water, and pieces of paper with instructions, adapted to his journey into the other world. They also killed a domestic quadruped, which was to be his companion. This they buried or burned together with the body of his master. The ashes were collected and deposited in a pot, together with a valuable gem: the earthen pot was deposited in a ditch, and at the interval of fourscore days, they made oblations of bread and wine over it. At the death of kings, lords, or persons of high rank, other ceremonies were practised, for the detail of which we must refer to Clavigero; merely observing, that the bodies of the deceased were generally burned, and that the ashes of kings and lords were usually deposited in the towers of the temples.

To the education of their youth, the Mexicans paid particular attention; they are habituated from their earliest age to industry, virtue, and the forms of religion; truth was inculcated by express precepts, and the violation of it severely punished, and reverence for their parents and aged persons was sedulously inculcated. Besides their domestic education, children were sent to public schools, situated near the temples, and there they were instructed for three years in religion and good customs. Adultery among the Mexi-

cans

cans was always punifhed with death; nor was any divorce allowed without the permiffion of the judges. Thofe who were guilty of inceft or unnatural crimes were hanged; and incontinence was feverely punifhed; but for fimple fornication no punifhment was prefcribed. The penalty annexed to theft in flighter cafes was mere reftitution, but in concerns of greater value, flavery. A perfon who robbed in the market place was there baftinadoed to death. Hanging was the punifhment of tutors and guardians who did not give a good account of the eftates of their pupils, and alfo of thofe who fquandered away their patrimony in vices. Drunkennefs in youth was a capital crime, and in advanced years it was punifhed with feverity; and in cafe of a nobleman, it incurred forfeiture of office and rank, and entailed infamy. The prifoners of war were generally facrificed to their gods; and flaves were allowed to poffefs fome property, nor was flavery entailed upon their defcendants. Neceffitous parents might procure relief by the fale of their children, and any freeman might fell himfelf for the fame purpofe.

The higheft military dignity among the Mexicans, was that of a general of the army; and in order to encourage a military fpirit, they rewarded the fervices of warriors with one of the three orders, called by names which denoted princes, eagles, and tigers. When they went to war, different perfons from the king to thofe of inferior rank were diftinguifhed by peculiar badges. The defenfive arms were fhields of different forms; breaft-plates of cotton, arrow-proof, and other armour for the defence of other parts of their bodies; the officers and nobles had a beautiful plume of feathers on their heads; but the common foldiers were entirely naked, except a girdle round the middle. The offenfive arms of the Mexicans, were arrows, flings, clubs, fpears, pikes, fwords and darts. They had alfo ftandards and mufical inftruments proper for war. Previoufly to a declaration of war, the alleged caufe of it was fubmitted to the judgment of the fupreme council, and before it commenced, the enemy was apprized of it. The king, or the general, gave the fignal for action by the beat of a drum; and the firft onfet was furious; but their great aim was not to kill, but to make prifoners for facrifices when the battle was terminated. The victors celebrated their conqueft with great rejoicings, and rewarded the officers and foldiers who had taken prifoners. Before any fiege was begun, the citizens removed their children, women, and fick perfons to a place of fecurity in the mountains. For the defence of their cities, they ufed various kinds of fortification, fuch as walls and ramparts, breaft-works, palifadoes, ditches, and entrenchments; but the moft fingular fortifications of Mexico in particular were its temples, and efpecially the greater temple, which refembled a citadel. The Mexicans, though fond of war, are faid to have addicted themfelves to the arts of peace, and particularly to the cultivation of the earth. Although they had no ploughs nor oxen, nor any other animals proper to be employed in agriculture, they fupplied the want of them by labour and induftry. In the operations of the field, the men were affifted by the women; the former being employed in occupations that required the greateft exertion, and the latter in the lighter and more eafy employments. In their farm-yards they had threfhing floors and granaries; and of the latter fome were fo large as to contain 5 or 6000, or fometimes more, fanegas of maize. The Mexicans were alfo well fkilled in the cultivation of gardens, both for ufe and for pleafure. They were likewife attentive to the prefervation of their woods, which ferved for fuel, for building, and for the diverfion of their king, in the purfuit of game. They alfo paid particular attention to the breeding of animals. Fifhing, hunting, agriculture, and the arts, furnifhed the Mexicans with feveral branches of commerce. Merchandizes were fold in their fairs and markets by number and meafure; but they are faid not to have ufed weights. Their markets were fubject to various regulations for the prevention of frauds, and for fecuring to the king his revenue. For the convenience of merchants, Clavigero fays, that they had public roads, bridges for croffing their rivers, and houfes of accommodation in the mountains and uninhabited places. Their failing veffels were guided merely by oars, and were of various fizes; and many of them were made of a fingle trunk of a tree. Some ancient hiftorians, probably inclined to exaggerate, fay, that the number of thofe which continually traverfed the Mexican lake exceeded 50,000. They had alfo for the convenience of navigating their lakes and rivers, platforms or floats of folid canes, which were tied firmly on large, hard, and empty gourds. The maritime commerce of the Mexicans was very inconfiderable. The commerce of the Mexicans, it is faid, was little embarraffed or impeded by the variety of languages which were fpoken in thofe countries; for the Mexican tongue was the moft prevalent, and was every where underftood. This language, fays Clavigero, is entirely deftitute of the confonants B, D, F, G, R, and S, and abounds with L, X, T, Z, T *l*, and T z; but although the letter L is fo familiar to this language, there is not a fingle word that begins with this confonant; nor is there a word of an acute termination, except fome vocatives. Almoft all the words have the penult fyllable long. Its afpirates are moderate and foft, and no occafion occurs for making the leaft nafal found in pronunciation. This language, notwithftanding its want of the abovementioned confonants, is faid to be very copious, tolerably polifhed, and remarkably expreffive. The Mexican language, like the Hebrew and French, wants the fuperlative term, and like the Hebrew, and fome other living languages of Europe, the comparative term, which are fupplied by certain particles equivalent to thofe which are ufed in other fuch languages. It abounds in diminutives and augmentatives; and alfo in verbal and abftract terms; for there is hardly a verb from which there are not many verbals formed, and fcarcely a fubftantive or adjective from which there are not fome abftracts formed. It is not lefs copious in verbs than in nouns; as from every fingle verb others are derived of different fignifications. The Mexicans, like the Greeks, have the advantage of making compounds of two, three, or four fimple words. The arts of poetry and oratory were much exercifed by the Mexicans. Dramatic, as well as Lyric, poetry was held in high eftimation among thefe people, and they had theatres in which thefe kinds of compofitions were rehearfed. Their mufic was more imperfect than their poetry; and it is faid, that they had no ftringed inftruments. But imperfect as was their mufic, their dances, to which they were much addicted from their youth, were eminently graceful. Their dances, which were of various kinds, were almoft always accompanied with finging, which, like their dances, was always adjufted by pulfatile inftruments. The amufements of the Mexicans were not confined to the theatre and dancing; they had various games, not only for public occafions, but for the relaxation and diverfion of private individuals. The Mexican paintings have been already mentioned; and they were very numerous, and applied to various purpofes. Their colours were brilliant, though their defigns were coarfe and uncouth. We fhall here add to what has been already faid, that the Mexicans were fkilled in fculpture; and the ufual materials of their ftatues were ftone and wood. They alfo valued themfelves on the works which they executed by the casting of metals, and on those Mosaic works which were made of the most delicate and beautiful feathers of birds. The state of medicine among the Mexicans, Clavigero has described much in detail; as he has also their surgery and their baths. Their food and drink consisted of preparations of maize, cacao, chia, and the French bean. Of animal food they partook more sparingly. They had different sorts of wine made of the magnai or Mexican aloe, the palm, and maize. Their dress was simple, consisting of a girdle about the loins, a square mantle, and a piece of square cloth with which the women wrapped themselves from their waists down to the middle of the leg. Besides this they had a little under vest, or waistcoat, without sleeves. Persons of superior station added to their dress a variety of ornaments. Besides feathers and jewels, with which they adorned their clothes, they wore ear-rings, pendants at the under lip, and many at their noses, necklaces, bracelets, and rings like collars round their legs. The ear-rings and pendants of the poor were shells, pieces of crystal, amber, or some other shining little stone; but the rich wore pearls, emeralds, amethysts, and other gems set in gold. Their houshold furniture was mean and coarse. Their beds consisted of two coarse mats of rushes, to which the rich added fine palm mats and shirts of cotton: and the lords, linen woven with feathers. The pillow of the poor was a stone or piece of wood; that of the rich was probably of cotton. Their drinking vessels were made of a fruit similar to gourds. They made no use of candlesticks, or wax, or tallow candles, or of oil to give light. They kindled fire by the friction of two pieces of wood; and generally made use of the achiote, or rocou of the French. It is added, that they also struck fire from flint. After dinner, the lords used to compose themselves to sleep with the smoke of tobacco; the leaves of which they put with the gum of liquid amber, or some other warm odorous herbs, into a little pipe of wood, or reed, or other more valuable substance; they then received the smoke by sucking the pipe and stopping the nostrils with the fingers, so that it might pass more easily to the lungs. The deficiency of soap they supplied by a fruit and a root. As to the population of the whole Mexican empire, Estalla says that it could not have surpassed three or four millions, even including the people of Tlascala, and other towns, not subject to Montezuma.

Having given an extended account of ancient Mexico, we shall now close the article with a brief description of Mexico in its more modern state. The viceroyalty of Mexico may be regarded as the chief in Spanish America, and is extended over a territory equal to an European empire. But there are several inferior governors, named by the Spanish sovereign. A considerable part of his power consists in the patronage of all the churches. His salary was formerly 40,000 ducats, afterwards 60,000, and lastly 84,000, exclusively of the disposal of lucrative offices, monopolies, connivances, presents, &c. which sometimes rise to an enormous amount. His court is formed on the regal model, with horse and foot guards, a grand houshold, and numerous attendants. In their vice-royalty there are three grand tribunals, called Royal Audiences, *viz.* that at Guatemala, that of Mexico, and that of Guadalaxara. There are also several inferior tribunals. The population of all the Spanish provinces in North America has been estimated at little more than seven millions; of whom the natives, called Indians, are supposed to amount to four millions; and the Spaniards and inhabitants of mixed races, are computed at three millions, of which the Spaniards may constitute one-third. It is probable, however, that the whole population of Spanish North America does not exceed six millions. They have suffered much from the small-pox, and a disease called the black vomit, which occasionally ravages like a pestilence. And besides, the number of priests, monks, and nuns is injurious to population. Estalla observes, that though he has not been able to acquire exact information concerning the population of New Spain, yet by the most intelligent computations, there are in the Intendancy of Mexico 1,200,000 souls, including 140,000 for the city: and by the proportion between this province and the others, as well as by the best founded calculations, it may be supposed there are in all the kingdom, three millions and a half of inhabitants. The troops in New Spain are estimated at 43,191, including 5982 regulars, 31,523 militia, &c. and 5686 for garrisons, &c.; so that it may well be doubted whether the whole grand vice-royalty of New Spain could send into the field 15,000 effective men. The revenue which Mexico yields to the Spanish crown has been shewn by Dr. Robertson to amount to above a million sterling, but it is subject to great expences. Dr. Robertson shews, from Campomanes, that the whole produce of the American mines is 7,425,000*l.* of which the king's fifth, if regularly paid, would be 1,485,000*l.*; and it is probable that the mines of New Spain or Mexico, prior to the opulent discoveries in the N.W. provinces, did not yield above one-half of the whole amount. From Estalla we learn, that a very great augmentation has taken place in all the branches of the royal treasury in this vice-royalty; so that the sums paid into the royal treasury have been tripled, and amount annually to 19 millions of dollars, and even more. Allowing the expences of administration, salaries, &c. to amount to 4,800,000 dollars, there will be an overplus of 14,200,000 dollars; that is, more than 1,800,000*l.* sterling. These revenues increase according to the progress of agriculture, the mines, commerce, industry, and population. There are some branches of the revenue which are considerable in their amount; such are the tributes, the products of the coinage, of quicksilver, gunpowder, cards, duties on goods sold, the drink called "pulque," bulls of indulgence, tobacco, lotteries, letters, all which are under the management of the minister of state. Other branches are administered in the royal coffers by their respective superintendants; such as the duties on gold, silver-plate, the assays, tythes, ninths, various ecclesiastic concessions, titles of Castille, vendible offices, compositions and confirmations of land, cock-fighting, snow and ice, stamps, fines, &c. the product of the mines, copper, lead, tin, alum, and others. From this statement there will appear to result a clear sum of 7,800,000 pesos, or about 1,170,000*l.* sterling; and if the peso fuerte be used, one-third must be added.

The ecclesiastical revenue is also very considerable. The archbishopric of Mexico is extremely opulent; and yet deemed inferior to the bishopric of Puebla de los Angelos. The ecclesiastical courts are numerous; and the holy tribunal of the faith, or the Inquisition, is very vigilant and severe. The chapter of the cathedral comprehends 26 ecclesiastics. While the revenue of the archbishop is computed at 100,000 dollars, the dean has more than 10,000; the canons from 7 to 9000, the lesser canons from 2 to 4000; some curacies are worth many thousand ducats; and one in the archbishopric of Mexico is valued at 14,000 ducats a year; while many of the curates, in their career of ambition, become prebendaries and bishops. There are two archbishoprics, those of Mexico and Guatemala, with eight bishops, Puebla de los Angelos, Oaxaca, Durango, Mechoacan, Antequera, Guadalaxara, Yucatan, and Chiapa. The curacies are computed at 235.

The chief city of New Spain is *Mexico*, which see; and there are many other flourishing cities in this wide empire. The

The most interesting in a commercial view are the two chief ports, Acapulco on the Pacific ocean, and Vera Cruz on the Atlantic: to these we may add, Puebla de los Angelos, Cordova, Xalapa, Queretaro, Guadalaxara, and Guatemala, &c. &c. which see respectively.

The manufactures of New Spain are not of any great importance. Coarse cottons form the universal dress of the Indians. There are many tanneries, but the leather is far from being equal to the Spanish; and the same observation is applicable to the glass and earthen ware, though the materials be excellent. The commerce of New Spain is extensive and important, and has recently undergone material improvements; so that since the year 1778, when greater freedom began to be introduced, the commerce has greatly increased. Two advantages have arisen from the liberty of commerce; industrious individuals and the general mass of the people have been enriched; while the great capitals of the former monopolists returned to support agriculture and the mines. The number of shops has been greatly augmented. The imports also have been increased, so that at Vera Cruz alone they amounted, in 1792, to 14,23,000,889 dollars. See VERA CRUZ.

The climate of this country is singularly diversified, between the tropical seasons and rains, and the temperature of the southern and even middle countries of Europe. The maritime districts of Mexico are hot and unhealthy, so as to occasion much perspiration even in January; the inland mountains, on the other hand, present snow and ice in the dog-days. In other inland provinces, however, the climate is mild and benign, with some snow of short duration in winter; but no artificial warmth is necessary, and animals sleep all the year under the open sky. From April to September there are plentiful rains, generally after noon; hail-storms are not unknown: thunder is frequent; and earthquakes and volcanoes occasionally occur. The climate of the capital, in lat. 19° 25′, differs much from that of the parts of Asia and Africa under the same parallel; which difference seems to arise chiefly from the superior height of the ground. Humboldt found, that the vale of Mexico is about 6960 feet above the level of the sea, and that even the inland plains are generally as high as mount Vesuvius, or about 3600 feet. This superior elevation tempers the climate with a greater degree of cold. Upon the whole, the climate cannot be regarded as unhealthy, as the aborigines sometimes attain a great age; and the appearances of decay are not perceived till a late period of life. But though they are exempted from paying tribute after the age of sixty, yet they can rarely count the years of their existence, and they cannot always be traced in the parish registers. It appears from such facts, that the prejudices of some philosophers against the climate and productions of America are unfounded. If there be any where a marked difference in every respect, of climate, men, animals, and vegetables, it is in Africa, a most ancient part of the ancient world, that it must be sought. (See on this subject Clavigero, *ubi supra*.) The face of this interesting country is diversified by grand ridges of mountains, numerous volcanoes, some of which are covered with perpetual snow, cataracts worthy of the pencil of Rosa, delicious vales, fertile plains, picturesque lakes and rivers, romantic cities and villages, an union of the trees and vegetables of Europe and America. The soil is often a deep clay, surprisingly fertile and requiring no manure except irrigation. The progress of agriculture in this country may be partly inferred from the state of the tythes, which, in the archbishopric of Mexico, for ten years, from 1769 to 1779, amounted to 4,132,630 pesos; while, for the ten years from 1779 to 1789, they advanced to 7,820,879 pesos. A similar difference appears in the bishoprics of Puebla, Oaxaca, Guadalaxara, and Durango, which, with Valladolid, comprehend the whole vice-royalty of Mexico; Guatemala being considered as a distinct kingdom. The product of cotton might be increased: of indigo there are annually exported 1500 arobas, and 8000 quintals of pimento: the cultivation of sugar is increased: tobacco has become an important branch: vineyards afford a favourable prospect; and the annual exports of cochineal are computed by Estalla at 23,600 arobas; but by another computation, the quantity of cochineal exported to Spain is 460,000 pounds, costing in New Spain about 12*s. per* pound, and yielding at Cadiz about 13 or 14*s*. The people employed in this culture are estimated at between 25 and 30,000. It has been observed, by the author often cited in this article, that the produce of many articles has been tripled within these few years, such as indigo, cotton, pimento of Talasco, and, above all, the precious cochineal; while tillage, and the rearing of herds and flocks, have been far more universally diffused.

The principal rivers of this country are Rio Bravo, the Medina, Magdalena, or river of Guadalupe, that of Flores, the Arighitas, Chicowansh, Mexicano, Colorado, Gila, Hiaqui, Nasus, Barneja or Esquitlan, Panuco, Zacatula, Yopez, Alvarado, Grijalva, Balleze, Yare, St. Juan, and Chagre. The chief chain of mountains in Spanish North America is Topia or Sierra Madre, to which we may add the grand ridge of Tamalipa, the great chain of Apanaca, Canatagna, and Urraca. The composition of the mountains of New Spain is not accurately ascertained, but it is supposed by Humboldt and Pinkerton to be mostly of argillaceous schistus, which is a substance generally prolific of metals. The volcanoes in New Spain have been reckoned 21 from that of Soconusco in the north to that of Varu in the south. These are all on the south-western coast, and after a considerable interval they again emerge towards the eastern coast, in the vicinity of Mexico. The volcano of Orizava is considered as the most majestic in the viceroyalty. The richest silver mines of New Spain were formerly supposed to be those of Zacatecas, about 200 miles N.W. of Mexico; but at present the grand mines are at Guanajuato, between 21° 30′ and 22° 30′ N. lat. and 103° and 105° W. long., extending from N. to S. 75 miles, from E. to W. 85 miles. Humboldt estimates the population of the administration at 517,300, and of the capital, in N. lat. 21°. W. long. 103°, about 41,000, See GUANAJUATO.

During 11 years from 1766 to 1778, Mr. Pinkerton states, that there were coined at Mexico 203,882,948 pesos, seven reals; but, during another 11 years, from 1779 to 1791, there were coined 252,042,419 pesos, and half a real; the difference being more than 48,000,000. Before the freedom of commerce, the coinage never exceeded 20,000,000 of pesos; and in 1792, 1793, it annually surpassed 24,000,000. In the viceroyalty are found many other metals besides gold and silver. Not far from the capital are mines of tin; this metal is also found in New Mexico. Clavigero says, that the Mexicans used thin pieces of tin and bits of copper for money. Copper is obtained from the rich mines of Guanajuato and also in mines W. of Pasquaro, the capital of Mechoacan. Lead is among the products of New Leon. New Spain also furnishes amber and asphalt, and a few diamonds; the mountains also produce jasper, marble, alabaster, magnet, steatite, jade and talc. The "Tetzontli," red and porous, was used in building, being perhaps, as Pinkerton suggests, a kind of tufa; and the "Itzli," mentioned in a preceding part of this article, as used for mirrors and razors, is called "pietra del Galinazzo" in South America, and is the obsidian or volcanic glass of modern mineralogy. In this country

try have been found, among the fossils, the bones of elephants; bones of this kind were found in digging the foundations of the convent of Guadalupe near Mexico; and they have been found in other places. They are the same with those of the mammoth of Siberia and North America, and belonged to an animal now extinct. Pinkerton's Geography, vol. iii.

Mexico *Proper*, a district or territory of the domain or viceroyalty of Mexico, forming part of the ancient Mexican empire, already amply described in the preceding article.

Mexico, signifying according to Clavigero the place of *Mexitli*, or Huitzilopochtli, *i. e.* the Mars of the Mexicans, on account of the sanctuary there erected to him, the chief city not only of Mexico or New Spain, but of old Spanish America. It is situated, in a beautiful vale, on fenny ground near the banks of the lake of Tezcuco, and crossed by numerous canals, the houses being all founded on piles. Hence it would seem that the waters of the lake have diminished, so as to leave a fenny morass on the west; and it is not improbable that this might happen after the inundation of 1629, when a wide canal was led through a mountain to drain the lake. The scite of the modern Mexico is the same with that of the ancient city; the viceroy residing on the spot of Montezuma's palace, in a large mansion built by Cortes, and still rented at 4000 ducats from the marquises de Valle, his descendants. The ancient city is said to have been situated upon a small island in the forementioned lake; and N. of its junction with that of Chalco, and on the W. side of the lake of Tezcuco, accessible on the W. side by three large causeways of earth and stone, but on the E. side there was no communication otherwise than with canoes or boats. The circumference of the city, exclusive of the suburbs, measured more than 10 miles, and the number of houses was at least 60,000. The city was divided into four quarters, and each quarter into several districts, bearing Indian canoes. The four quarters were divided by four broad roads, which led from the four gates of the area of the greater temple. To the four parts into which the city was divided from the first foundation A.D. 1325, the city of Tlatalolco was added as a fifth, situated towards the N.W. having been united after the conquest of king Axajacatl to Tenochtitlan, and both together formed Mexico. Around the city there were many dykes and reservoirs for collecting water, and within it many canals, so that there was hardly a district that could not be approached by boats. Among the various buildings of the city, besides temples and magnificent royal palaces, there were other palaces in which the feudatory lords resided when they attended the business of the court. All the houses, it is said, those of the poor excepted, had balconies and parapets, and some of them battlements and towers, much smaller than those of the temples; and serving for the defence of the inhabitants in their streets and houses as well as their temples. Besides the large and famous square of Tlateloco, where the principal market was held, there were other smaller markets distributed through the city, where ordinary provisions were sold; and in different places there were fountains and fish-ponds, particularly near the temples, and many gardens, some of which were laid out on the natural level of the earth, and others raised on high terraces. Of the modern city, Chappe d'Auteroche, cited by Pinkerton, gives the following account. The streets are wide and straight, but very dirty: and the houses, resembling those of Spain, are tolerably built. The chief edifice is the viceroy's palace, which stands near the cathedral in a central square, and it is rather solid than elegant. Behind the palace is the mint, in which more than 100 workmen are employed, as the owners of the mines here exchange their bullion for coin. The other chief buildings are the churches, chapels, and convents, which are very numerous and richly ornamented. The outside of the cathedral is unfinished, as they doubt the foundations; but the rail round the high altar is of solid silver, and there is a silver lamp so capacious that three men may go into it to clean it; and it is also enriched with lions' heads, and other ornaments, in pure gold. The images of the Virgin, and other saints, are either solid silver, or covered with gold and precious stones. Besides the great central square, there are two others, each of which has a fountain in the middle. To the N. of the town, near the suburbs, is the public walk, or "Alameda." A rivulet runs round it, and forms a pretty large square, with a bason and jet d'eau in the middle. Eight walks, each of which has two rows of trees, terminate at this bason like a star. There are also some other promenades; although the country about Mexico is swampy ground, and full of canals. Facing the "Alameda" is the "Quemadero," where they burn the Jews, and the unhappy victims of the Inquisition. It is an inclosure between four walls, and filled with ovens, into which are thrown, over the walls, the wretches that are condemned to be burnt alive; condemned, as the author says, by judges professing a religion whose first precept is charity. The Spanish inhabitants are commonly clothed in silk, their hats being adorned with belts of gold and roses of diamonds; for even the slaves have bracelets and necklaces of gold, silver, pearls, and gems. The ladies are of distinguished gallantry.

Mexico, though inland, is a place of immense commerce between Vera Cruz on the E., and Acapulco on the S.; and the shops display a profusion of gold, silver, and jewels. In magnificent regularity it yields to few cities on the ancient continent. Gage says, that, in his time, A.D. 1640, there were supposed to be 15,000 coaches, some of them adorned with gold and gems; the people being so rich, that it was imagined one-half of the families kept carriages. From the work of Estalla, published in 1799, and quoted by Pinkerton, we derive some further information concerning this famous city.

The lake, it is said, has retired a Spanish league from the city, which circumstance is supposed to render the air less salubrious. The winter frost is gentle, and is thought severe when the ice exceeds the thickness of paper. The summer heats are tempered by the regular showers which fall in the evenings. Water-spouts often occur, but they always fall in the lake; however, they have sometimes ruined mining stations. The yearly cold at Mexico, though just within the tropic of Cancer, appears by observations on the thermometer to exceed the heat. The rainy season extends from the middle of May to the middle of September.

The plain of Mexico is, as we have already said, surrounded with mountains, covered with cedars, rare shrubs, and medicinal plants, and containing minerals and precious stones. On these mountains are romantic cottages and farms, watered by clear rivulets. In the middle of this delicious plain are the lakes Tezcuco and Chalco. The city has received no augmentation since the year 1712. The streets are well opened, running in right lines from E. to W. and from N. to S. Great improvements have lately taken place by the cleanliness and good police of the place: the city is lighted, and the streets paved, and sewers and water-courses have been opened, so that Mexico has become the largest, most beautiful, and most sumptuous of the whole Spanish monarchy. The cathedral is a magnificent edifice, the work of 94 years; it has two images of the Virgin, one of gold, which weighs 6984 castellanos, the castellano being the 50th part of a mark, and a mark being $\frac{2}{3}$ds of a pound or eight

eight ounces. For 14 parishes, there are more than 100 other churches, most of which are neat and richly decorated. The religious houses are very numerous, and the nunneries amount to 20. Among the numerous courts and offices of justice, established in this city, are the royal audience and chancery of New Spain; the court for strangers, and those who die intestate; the royal tribunal of registers; the royal coffers; the royal mint; the tribunal of the inquisition; the house of the missions of California; the mount of piety, erected by the charity of the count de Regla, who gave no less than 315,000 pesos; the royal tribunal of mines; that of the descendants of Cortes; the illustrious chapter, justice and government of the noble and imperial city itself, to which the ancient arms were confirmed by Charles V., being a castle with three towers, an eagle on a tree with a snake in its beak, at the foot of the tree is the lake; the whole surmounted with an imperial crown, and supported by two lions. Philip V. granted to Mexico, in 1728, all the privileges and distinctions of a grandee of Spain; and Charles III., in 1773, indulged the chapter, or magistrates, with the use of uniforms laced with gold, declaring their precedence over all tribunals and bodies, except the royal audience and tribunal of accompts. The patroness of the city is St. Mary of Guadalupe, solemnly chosen in 1737, and whose worship has extended over all Spanish America. The general character of the natives, who have a considerable disposition for the arts and boast of their eminent painters, is that of a liberal, courteous, affable, and charitable people. The city has thirteen hospitals, and other charitable establishments. The viceroy is commander in chief, and president of the economical and political government. He resides in the royal palace. He is also president of the tribunal of accompts, which inspects all those of the royal revenue. The city council consists of a corregidor or mayor, twelve regidores, or aldermen, and other officers. The common alcalds judge criminal and civil cases in the first instance subject to an appeal to the royal audience.

The city of Mexico is amply supplied with grain, fruit, and vegetables, from the environs, which are very fertile; those on the east side of the lake of Tezcuco excepted, where vegetation is impeded by the saline exhalations of the lake. The more populous parts of the city extend from north to south four English miles, and from east to west three English miles. The city is surrounded merely by a trench or ditch, without walls or other defence. There are six principal gates; and by the gate of Guadalupe all the pulque enters, which, being the general drink of the inhabitants, yields a revenue of about a million of dollars to the king. The streets are well paved. The manufactory of cigars, employing more than 5000 persons, is a modern and magnificent edifice. The consumption of cigars is very great; for all the Mexican ladies smoke tobacco; and they take their paper cigars from a case of gold or silver, hanging by a chain or ribbon, while on the other side they wear little pincers of the same metal. As soon as one cigar is exhausted, another is lighted: they smoke even at the theatre, and only cease to smoke when they eat or sleep. The tribunal of "La Acordada" was one of the most terrible in the viceroyalty; the judge, who is called captain of the holy brotherhood, being also inspector of prohibited liquors: but Charles III. ordered that the viceroy, with two or three judges, should revise the sentences. The judge of the "Acordada" has from eight to ten thousand men, dispersed through the viceroyalty, under the names of lieutenants, corporals, &c. This holy brotherhood maintains, by its vigilant police, the public tranquillity of the city and viceroyalty, performing their rounds day and night, and speedily punishing every excess. Capital criminals are hanged in a field, called "Exido de Concha," from the name of a captain of this brotherhood; and the tribunal has become more useful, since the viceroy has obtained the privilege of reviewing sentences of death. The market for trifling and second-hand commodities is a square of shops, and the theatre is small but handsome.

Mexico is supplied with water by two aqueducts. The most splendid festivals of the Mexicans are the procession of Corpus Christi, and the entrance of a new viceroy. There are other festivals, such as the anniversary of the conquest, and the publication of the bulls of indulgence.

Although the climate of Mexico is in general salubrious, yet there are some prevalent, and even epidemic diseases. The ravages of the small-pox, however, are likely to be restrained by the Jennerian antidote, which is not unknown even in Mexico; and the black vomit, or yellow fever, is scarcely known in this city. Agues are frequent; pulmonary consumptions, apoplexies and epileptic diseases, spotted fevers and pleurisies, are not uncommon: but the most universal disease of men and women is that called "flado," or the wind, which presents singular and almost incredible symptoms; the patients appearing as if they were demoniac or frantic, sometimes excessively hot and cold by very sudden changes, laughing and weeping, and agitated by convulsions, as if they were possessed. This disease seems to proceed from the hot and unhealthy regimen, and from the abuse of tobacco, destructive alike of the nerves and stomach.

Some individual artizans are very rich, but of late property is more generally diffused: there are, however, many entailed estates, founded by the conquerors, from ten to sixty thousand dollars a-year; but the chief that remain are the products of commerce and of the mines. Within the last twenty or thirty years, the number of houses that sell "pulque" is greatly increased: they are open, by regulation of the police, only from ten in the morning till four in the afternoon, and during this interval they occasion quarrels, and sometimes murders. Estalla computes the population of Mexico at 140,000 souls; but it is probably more considerable. As there is no money of bullion at Mexico, the shop-keepers issue tokens of copper, iron, or wood, which pass in the neighbourhood; and even grains of cacao pass as small coin. The city has several useful regulations for guarding against fires, and any consequent tumults. The water-pipes have been enlarged, and ten public fountains have been constructed, with cocks instead of cisterns, which are found more convenient. The price of bread is regulated every four months, according to the price of grain. The foot-paths are guarded with little pillars; the pavement is kept in good repair, and there is a covered sewer in the middle of the streets, and the city is well lighted by large lamps of the reflecting kind. Watchmen clean and supply the lamps, and guard the houses and passengers; and the municipal troops perform their nightly rounds. In this celebrated capital great quantities of rum are distilled from the refuse of the numerous sugar-mills.

The university of Mexico, founded in 1551, is styled royal and pontifical; and the cloister is composed of two hundred and fifty-one doctors, of all faculties. It is governed by a rector, annually elected by the lesser cloister, composed of the former rector and eight counsellors, chosen by lot from the doctors and bachelors. The office of chancellor is annexed to the dignity of schoolmaster of the metropolis;

tropolis; his office being to preside at conferring some degrees, while on other occasions he holds the second rank. The professors of this university are named by a junta, consisting of the archbishop, the regent of the royal audience, the dean of the cathedral, the oldest inquisitor, the rector of the university, the master of the metropolitan schools, the professor of the first class of theology, and the dean of the faculty. The public library of the university was founded about forty years ago, and is well furnished with old books of divinity, but is miserably deficient in new editions of the classics, or new works of science and philosophy. This library is open to the public at certain hours, except on Sundays and holidays. The college of St. Mary-of-all-Saints is the only one of the first rank in the Spanish American possessions: it has a public library. The seminary was founded by an archbishop of Mexico in 1682; and at present it has thirteen professors. The students amount to four hundred, and a new building was erected in 1750. The Jesuits had formerly five colleges, two of which only remain: they are directed by the viceroy, or a junta, of which he is president. The buildings are magnificent; the chapel and grand hall being the most beautiful in the vice-royalty. The college of St. John of Lateran is the most ancient of any in New Spain, having been founded in the reign of Charles V., for the instruction of those descended from Spanish and Indian parents. It has been improved in 1764, and again in 1789. The college of St. Jago is without the walls of Mexico, in a house of the Franciscans; but it is now merely a boarding-school for children. Other religious orders have also public schools. A college of mines has lately been erected, in which young persons are not only instructed in that science, but in other important parts of education. The royal academy of the three noble arts is a valuable institution: it is provided with good professors in architecture, painting, sculpture, and engraving; and there is also a professor of mathematics. There are also particular houses in Mexico where Latin grammar is taught by preceptors approved by the government and university.

The environs of Mexico are richly cultivated with flax, hemp, cotton, tobacco, indigo, sugar, and magneys; and furnish the city with ample supplies of meat, poultry, vegetables, and fruits. The most celebrated sanctuary in the vicinity of the city is that of our lady of Guadalupe, which has a college, a church, &c. Another sanctuary, or house of pilgrimage, is that of our lady de los Remedios, erected on the spot whither Cortes retired when he was repulsed from Mexico. Without the barrier of Santiago is the sanctuary of our lady of the Angels, formerly the residence of a hermit. At the distance of five leagues from Mexico is the desert of the Carmelites, in an enclosure about a league in circuit; the retreat of the most austere monks there being in solitary cells. The aqueduct of Chapultepec adorns the immediate environs; and on the hill so called was a palace of Montezuma. Traspana is another place of resort, where are several good houses; and many settle there, as the air is esteemed very healthy. On the side of San Lazaro, about half a league from Mexico, is the rock of the baths, which are warm, but the quality is not ascertained. N. lat. 19° 54′. W. long. 99° 51′. Pinkerton's Geog. vol. iii.

Mexico, *New*, a large territory of the Spanish dominions in North America, sometimes called a kingdom, but properly a single province, lying eastward of California, and divided by the gulf from that peninsula. Northwards it is bounded by high mountains and an unknown country, on the east by Louisiana, on the west by the Californian lake and Rio Colorado, and on the south by some of the provinces of New Spain, or Mexico proper. This province was discovered by a missionary in 1581, but scarcely subdued till 1644; nor were many missions established till after the year 1660; and the capital, Santa Fé, was founded in 1682. It is a fertile and delightful province, producing maize, wheat, and excellent fruits. The mines are said to be all of tin; and the animals and plants are of singular variety. In the map of Alzate, the northern limit is marked at 38°, and the southern at 30° 30′; the medial breadth, on both sides of the Rio Bravo, being only 2°, or 120 geographical miles. Pinkerton.

Mexico, a town of America, in Oneida county, New York, at midway between Oneida lake and Oswego, 20 miles from each. The township is extensive, comprehending a number of houses.

Mexico, *Gulf of*, a large bay or gulf of the Atlantic, extending north to south, from the coast of Florida to the coast of Tabasco and Yucatan, about 600 miles, and east to west, from Cuba to the coast of Mexico, about 700. This gulf lies in a favourable climate, and presents at its entrance the grand archipelago of North American islands, called the West Indies. See Gulf *Stream*.

MEXIMIEUX, a town of France, in the department of the Ain, and chief place of a canton, in the district of Trevoux; 17 miles N.E. of Lyons. The place contains 1691, and the canton 8372 inhabitants, on a territory of 230 kiliometres, in 14 communes.

MEYAPONTE, a river of Brasil, which runs into the Parana.

MEYENBERG, a town of Switzerland, in the Free Bailiwicks, once an independent lordship; 10 miles N. of Lucerne.

MEYENBURG, a town of Brandenburgh, in the mark of Pregnitz; 60 miles N.N.W. of Berlin. N. lat. 53° 18′. E. long. 12° 15′.

MEYENFELD, a town of the Grisons, and principal place of a jurisdiction. It is said to have been the first place in which the reformation was encouraged. This town was a kind of staple for goods that passed to and from Germany and Italy; 52 miles E. of Lucerne. N. lat. 46° 57′. E. long. 9° 38′.

MEYER, James, in *Biography*, an historian, was born in Flanders in the year 1491. He studied in the university of Paris, and entered into holy orders. For several years he taught school at Ypres and Bruges, and in the latter city had a benefice, in the church of St. Donatian. He died at Blankenberg, in the year 1552. He was on terms of intimacy with Erasmus, and other learned men; and wrote several works, of which the principal are, 1. "Flandricarum Rerum Decus," being an account of the origin, antiquity, nobility, and genealogy, of the counts of Flanders; and, 2. "Annales Rerum Flandricarum," which begin with the year 445, and come down to 1477. They are written in a pure and easy style, and have been reprinted in the collection of Belgic historians. Moreri.

MEYERA, in *Botany*, a genus of Schreber's, named, we presume, in honour of Dr. Frederic Albert Anthony Meyer, a physician at Göttingen who died in 1795, and who was the author of various tracts on Natural History. Willdenow has not adopted the genus, nor do we find any notice of it under *Sclerocarpus*, although its author says they are nearly allied, but belonging to different orders of the class *Syngenesia*. It must however be recollected that these orders are not always permanently distinct in nature. *Meyera* rests solely on the authority of Schreber, not having been taken up by any other author, so that we can only translate

translate his own generic character. If its habitat had been published, possibly a more clear and satisfactory reference might have been made of the plant in question. Schreb. 570.—Class and order, *Syngenesia Polygamia Superflua.* Nat. Ord. *Discoideæ*, Linn. *Corymbiferæ*, Juss.

Gen. Ch. *Common Calyx* of four, large, broad, heart-shaped, concave, veined leaves, spreading at the top, rather acute, shorter than the disk, the two inner ones opposite. *Cor.* compound, tubular, convex; florets in the disk numerous, perfect, funnel-shaped, five-cleft, somewhat erect; those of the radius several, ligulate, lanceolate, entire. *Stam.* (in the perfect florets) Filaments five, capillary; anthers cylindrical, tubular, five-toothed. *Pist.* (in the same) Germen oblong; style thread-shaped, longer than the stamens; stigmas two, revolute. In the female ones the style is longer than the florets. *Peric.* none, except the permanent calyx. *Seed* in both kinds of florets solitary, oblong, transversely compressed, crescent-shaped, striated, scaly; down none. *Recept.* convex, small; scales cartilaginous, imbricated, triangular, incurved, furrowed at the back, downy towards the top externally, oblique at the extremity, each enveloping a single seed, the outer ones a little broader.

MEYNIAC, in *Geography*, a town of France, in the department of the Correze, and chief place of a canton, in the district of Ussel. The place contains 2978, and the canton 7726 inhabitants, on a territory of 322½ kiliometres, in 11 communes.

MEYNTHAL, or VAL DI MAGGIA. See MAGGIA.

MEYO, in *Commerce*, a measure for corn, salt, and other dry commodities, in Portugal; it contains 15 fanegas; each fanega being = 4 alquieres = 8 meyos = 16 quartos = 32 outavas = 64 mequias. The alquiere is = 675 French = 817 English cubic inches; so that 21 alquieres = 1 English quarter, nearly, or, more exactly, 50 alquieres = 19 English bushels. In the common course of business 4 alquieres of Oporto are reckoned equal to 5 alquieres of Lisbon, and 2 alquieres of Oporto, or 2½ of Lisbon, are computed to be equal to an English bushel.

MEYRINGEN, in *Geography*, a large and neat village of Switzerland, the capital burgh of Hasliland, a district in the canton of Berne, which enjoys peculiar privileges. The people are governed by their own magistrates, and only take oaths of fidelity to the sovereign council. The authority, which the bailiffs in the other cantons enjoy, is possessed in a great measure by the landamman, who resides at Meyringen. The place is situated near the Aar, in a romantic vale, surrounded by meadows of a luxuriant verdure, and sprinkled with cottages, which are occasionally separated by huge stones and deep channels, the vestiges of storms and floods; 28 miles S.E. of Thun.

MEYRUEIS, a town of France, in the department of the Lozere, and chief place of a canton, in the district of Florac; 22 miles S. of Mende. The place contains 2890, and the canton 5235 inhabitants, on a territory of 345 kiliometres, in seven communes. N. lat. 44° 11'. E. long. 3° 31'.

MEYSSAC, a town of France, in the department of the Correze, and chief place of a canton, in the district of Brives. The place contains 2072, and the canton 10,466 inhabitants, on a territory of 160 kiliometres, in 14 communes.

MEYWAR. See OUDIPOUR.

MEYZIEU, a town of France, in the department of the Isere, and chief place of a canton, in the district of Vienne. The place contains 1045, and the canton 9547 inhabitants, on a territory of 212½ kiliometres, in 16 communes.

MEZA, a river of Russia, in the government of Polotsk, which runs into the Dwina; 16 miles N.E. of Veliz.

MEZAIR. See MES-AIR.

MEZALANA, in *Geography*, a town of Italy, in the department of the Mincio; four miles S. of Mantua.

MEZANA, a town of Liamone, in the island of Corsica, and chief place of a canton, in the district of Ajaccio: the canton contains 1751 inhabitants.—Also, a town of Italy; five miles S. of Padua.

MEZANA, *La*, a town of Naples, in Basilicata; 17 miles S.S.W. of Tursi.

MEZANINE, or MEZZANINE, a term used by some architects, to signify an attic, or little story, contrived occasionally over the first story, for the conveniency of a wardrobe, or the like.

The word is borrowed from the Italians, who call *mezzanini* those little windows, less in height than breadth, which serve to illuminate an attic, or entresole.

MEZDA, in *Geography*, a town of Africa; 60 miles S. of Tripoli.

MEZDAGA, a town of Fez, in the province of Chaus, at the foot of mount Atlas.

MEZE, a town of France, in the department of the Herault, and chief place of a canton, in the district of Montpellier; 15 miles S.W. of Montpellier. The place contains 2800, and the canton 8729 inhabitants, on a territory of 135 kiliometres, in seven communes. N. lat. 43° 25'. E. long. 3° 42'.

MEZELIEMEINA, a town of Africa, in Tunis, on the lake Bizerta; 28 miles N. of Tunis.

MEZEMNA, a sea-port of Algiers, in the kingdom of Fez, on the coast of the Mediterranean; 80 miles E. of Tetuan. N. lat. 35° 22'. W. long. 4° 5'.

MEZEN, a sea-port town of Russia, in the government of Archangel, near the White sea, at the mouth of a river of the same name; 128 miles N.N.E. of Archangel. N. lat. 66° 30'. E. long. 43° 34'. The river rises in the government of Archangel, N. lat. 64° 15'. E. long. 49° 14', and runs in a S.W. direction to the town of Poslanskoi, when, changing its course, it runs N. westerly to N. lat. 66° 30'. E. long. 48° 34', where it flows into the Frozen ocean.

MEZEN, a mountain of France, which gives name to a district, in the department of the Ardéche; 27 miles W. of Valence.

MEZERAI, FRANCIS EUDES DE, in *Biography*, a celebrated French historian, was born in 1610, at Ry, in Lower Normandy. After studying at Caen he came to Paris, and obtained the post of an officer of the artillery, in which capacity he served two campaigns. He then quitted the army, and retired to the college of St. Barbe, where he applied with great ardour to study, having projected a history of France, of which, under the patronage of cardinal Richelieu, he published the first volume, folio, in the year 1643. The two others appeared in 1646 and 1651. On account of this, the court recompensed his labours by a pension of 4000 livres, with the title of historiographer. This success engaged him to compose an abridgment of it under the title of "Abregè Chronologique de l'Histoire de France," in three vols. 4to.; it was reprinted in Holland, in 6 vols. 12mo. In this work he published an account of the origin of all the public imposts, with some very free reflections, which gave so much offence to the minister Colbert, that he remonstrated with the author, who promised

mised to make the requisite corrections in the second edition. This he performed, but, at the same time, informed the readers that he was compelled to do so; and his corrections, moreover, were only palliations, he was therefore punished by withdrawing half his pension. On his making a complaint, the other half was also suppressed, upon which he declared, that he would not continue his history. On the death of Conrart, in 1675, he was elected to the vacant place of perpetual secretary to the French academy; in this situation he prepared a sketch of the projected dictionary of the academy. Mezerai died in 1683. Besides the works already mentioned, he wrote "Traité de l'Origine des François;" "L'Histoire des Turcs, depuis 1612 jusqu'en 1649." A translation of John of Salisbury, "De Nugis Curialium," and of Grotius, "De veritate Relig. Christ." Mezerai was a man of great singularities in his temper and habits. He was fond of low company, and so squalid in his dress, that he was once taken up by the police for a beggar. He never wrote but by candle-light, even in the day-time, and in the midst of the summer, and he had always a bottle on the table. He affected to be a sceptic in his religion, but in his last illness his early impressions recurred, and he entreated his friends to forget his impieties, and to recollect "that Mezerai dying was more to be believed than Mezerai in health." Moreri.

MEZEREON, in *Botany*, seems by Bauhin's *Pinax* 462, and Lobel's *Adversaria* 157, to be a word of Arabian origin. In the book last mentioned it is said to belong properly to the *Cneorum tricoccum* of Linnæus, which however is not known to grow in Arabia, but in Spain and the south of France. The name is now transferred to the *Daphne Mezereon*, or *Laureola Mezereon Germanica* of the older writers, and is become the familiar English appellation of that charming shrub. See Cneorum and Daphne.

MEZIDON, in *Geography*, a town of France, in the department of the Calvados, and chief place of a canton, in the district of Lisieux; 11 miles W.S.W. of Lisieux. The place contains 528, and the canton 9089 inhabitants, on a territory of 160 kiliometres, in 34 communes.

MEZIERES, a town of France, and principal place of a district, in the department of the Ardennes, situated on an island formed by the Meuse, over which it has two bridges, with a citadel; two miles S. of Charleville. The place contains 7400, and the canton 11,567 inhabitants, on a territory of $137\frac{1}{2}$ kiliometres, in 12 communes. N. lat. 49° 46'. E. long. 4° 47'.—Also, a town of France, in the department of the Indre, and chief place of a canton, in the district of Le Blanc. The place contains 1338, and the canton 7084 inhabitants, on a territory of 390 kiliometres, in nine communes.—Also, a town of France, in the department of the Upper Vienne, and chief place of a canton, in the district of Bellac. The place contains 1313, and the canton 9107 inhabitants, on a territory of $307\frac{1}{2}$ kiliometres, in eight communes.

MEZIN, a town of France, in the department of the Lot and Garonne, and chief place of a canton, in the district of Nerac; six miles S.S.W. of Nerac. The place contains 2860, and the canton 10,136 inhabitants, on a territory of 280 kiliometres, in 16 communes. N. lat. 44 3'. E. long. 0° 20'.

MEZIRIAC, Claude-Gaspard Bachet, in *Biography*, was born in 1581, of a noble family at Bourg-en-Bresse. He entered among the Jesuits, and at the age of twenty was professor of rhetoric at their house in Milan. A bad state of health induced him to quit the society, and he passed much of his time at Paris and Rome in literary pursuits. His reputation was so great, that he was mentioned as a fit person to be preceptor to Lewis XIII., but the dread of such an office induced him to quit Paris and retire to his native place. He died in 1638, leaving behind him many works that bore witness to his great erudition. He wrote verses in French, Latin, and Italian, and was a profound Greek scholar, an excellent grammarian and critic, a philosopher, theologian, and mathematician. His principal works are as follow: "Problemes plaisans et delectables que se font par les Nombres:" "Diophanti Alexandrini Arithmeticorum Lib. vi. et de Numeris multangulis Lib. i." translated from the Greek with commentaries: "La Vie d'Esope;" "Epistolæ et Poemata varia."

MEZOUR, in *Geography*, a town of Asia, in Candahar; 63 miles N.E. of Candahar.

MEZTITLAN, a town of Mexico; 25 miles N. of Mexico.

MEZUZOTH, in the *Jewish Customs*, certain pieces of parchment, which the Jews fix to the door-posts of their houses, taking that literally which Moses commands them, saying, "Thou shalt never forget the laws of thy God, but thou shalt write them upon the posts of thy house, and on thy gates." This expression means nothing else, but that thou shalt always remember them, whether thou comest into thy house, or goest out. But the Hebrew doctors imagined, that the law-giver meant something more than this. They pretended that, to avoid making themselves ridiculous, by writing the commandments of God without their doors, or rather to avoid exposing themselves to the profanation of the wicked, they ought, at least, to write them on a parchment, and to enclose it in something. Therefore they wrote these words upon a square piece of parchment, prepared on purpose with a particular ink, and a square kind of character. (Deut. vi. 4, 5, 6, 7, 8, 9.) "Hear O Israel the Lord our God is one Lord, &c." Then they left a little space, and afterwards went on, (Deut. xi. 13.) "And it shall come to pass, if thou shalt hearken diligently to my commandments, &c.," as far as, "Thou shalt write them upon the door-posts of thy house, &c." After this they rolled up the parchment, and put it into a case of reeds, or other matter; they wrote on the end of the case the word "Shadai," which is one of the names of God; and they put it at the doors of their houses, chambers, and all places most frequented; they fixed it to the knockers of the door, on the right side; and as often as they entered in, or went out, they touched it in this place with the end of their finger, which they afterwards kissed out of devotion. The Hebrew word *mezuza* properly signifies the door-posts of a house; but it is also given to this roll of parchment now mentioned. Leo of Modena may be here consulted.

MEZZA Pausa, in the *Italian Music*, *half a pause*, intimates that the part wherein it is found must be still the time of a semibreve in common time. See Pause.

Mezza *Tirata*. See Tirata.

MEZZAROLA, in *Commerce*, a liquid measure of Genoa, containing for wine two barrili, or 100 pinte, and reckoned at 18 rubbi, or 450lbs. peso sottile; the mezzarola is = about 39 English gallons.

MEZZEREB, in *Geography*, an island in the Red sea. N. lat. 27° 43'.

MEZZO, an Italian adjective, which means half; as *mezzo forte*, *mezzo piano*, *mezza voce*, which imply nearly the same thing, *i. e.* a middle degree of piano, or soft. *Mezzo soprano*, a pitch of voice between the *soprano* or treble, and counter-tenor. See Clefs, and Compass *of Voices*.

MEZZO-

MEZZO-TINTO, in *Sculpture*, a particular manner of engraving figures on copper.

Mezzo-tinto is said to have been first invented by prince Rupert, about the year 1649; and Mr. Evelyn, in his History of Chalcography, gives us a head, performed by that prince, in his way: though Mr. Le Blon is said to have introduced it into practice with the greatest success.

The prince laid his grounds on the plate with a channelled roller; but one Sherwin, about the same time, laid his ground with a half-round file, which was pressed down with a heavy piece of lead. Both these grounding tools have been laid aside for many years; and a hand-tool, resembling a shoemaker's cutting-board-knife, with a fine crenelling on the edge, was introduced by one Edial, a smith by trade, who afterwards became a mezzo-tinto painter.

It is very different from the common way of engraving. To perform it, they rake, hatch, or punch the surface of the plate all over with a knife, or instrument made for the purpose, first one way, then the other, across, &c., till the face of the plate be thus entirely furrowed with lines or furrows, close and as it were contiguous to each other; so that if an impression was thus taken from it, it would be one uniform blot, or smut.

This done, the design is drawn, or marked on the same face; after which, they proceed with burnishers, scrapers, &c. to expunge or take out the dents or furrows, in all the parts where the lights of the piece are to be; and that more or less, as the lights are to be stronger or fainter: leaving those parts black, which are to represent the shadows, or deepenings of the draught.

As it is much easier to scrape or burnish away parts of a dark ground, corresponding with the outline of any design sketched upon it, than to form shades upon a light ground, by an infinite number of hatches, strokes, and points, which must all terminate with exactness on the outline, as well as differ in their force and manner, the method of scraping, as it is called in mezzo-tinto, consequently becomes much more easy and expeditious, than any other method of engraving. The instruments used in this kind of engravings are cradles, scrapers, and burnishers.

In this engraving, the plate must be prepared and polished in the same manner as for other engraving (see Copper-*plates*); and afterwards divided equally by lines, parallel to each other, and traced out with very soft chalk. The distance of these lines should be about one-third of the length of the face of the cradle which is to be used, and these lines should be marked with capital letters, or strokes of the chalk. The cradle is then to be placed exactly betwixt the two first lines, and passed forwards in the same direction; being kept as steady as possible, and pressed upon with a moderate force. The same operation must be repeated with respect to all the other lines; till the instrument has thus passed over the whole surface of the plate. Other lines must be drawn then from the extremities of the other two sides, in the same manner; which intersecting the first at right angles, will with them form squares; and the same operation must be repeated with the cradle, as in the case of the first. New lines must then be drawn diagonally, and the cradle passed betwixt them as before; and when the first diagonal operation is performed, the lines must be crossed at right angles as the former, and the cradles passed betwixt them in the same manner. The plate having undergone the action of the cradle, according to the disposition of the first order of lines, a second set must be formed, having the same distances from each other as the first. But they must be so placed as to divide those already made into spaces one-third less than the whole extent; *i. e.* every one after the first on each side will take in one-third of that before it, *e. g.* beginning at A, of which the first third must be left out; the third of B will consequently be taken in; and so of the rest. These lines of the second order must be marked with small letters, or lesser strokes, to distinguish them from the first; and the same treatment of the plate must be pursued, with respect to them, as was practised from the others. When this second operation is finished, a third order of lines must be made, the first of which, *e. g.* in A, must omit two-thirds of it, and consequently take in two-thirds of B, &c. By these means the original spaces will be exactly divided into equal thirds; and the cradle must be again employed betwixt these lines as before. When the whole of this operation is finished, it is called *one turn;* but in order to produce a very dark and uniform ground, the plate must undergo the repetition of all these several operations, for above twenty times; beginning to pass the cradle again betwixt the first lines, and proceeding in the same manner through all the rest. When the plate is prepared with a proper ground, the sketch must be calked on it, by rubbing the paper on the backside with chalk. It is also proper to overtrace it afterwards with black-lead or Indian ink. The scraping is then performed, by parting or cutting away the grain of the ground in various degrees; so that none of it is left in the original state, except in the touches of the strongest shade. The general manner of proceeding is the same as drawing with white upon black paper. The masses of light are first begun with; and those parts, which go off into light in their upper part, but are brown below: the reflections are then entered upon; after which the plate is blackened with a printer's blacking-ball made of felt, in order to discover the effect; and then the work is proceeded with; observing always to begin every part in the places where the strongest lights are to be.

But the present mode of this engraving is rendered still more expeditious and easy to the artist, not only in laying the ground, but in scraping the plate. Instead of using the cradle or grounding tool three times, it is now found to produce a better grain by only repeating it twice, or *double ways*, as it is called by artists. In laying the ground, the copper is ruled as formerly, and instead of taking up a third of the way already executed, it now only takes up one-half, by which means the grain of the ground, or texture, is more dotty, and has a more solid look, and consequently is less liable to the appearance of cuts or lines, which was too much the character of the former process. Fifteen ways in this manner worked close, will be sufficient to fill the ground, and give it a velvet-like tint. The former mode of making an outline from the painting, is now found to be wholly unnecessary, and the most ready and masterly method is to square the painting in any number of given squares, and the same number on the plate, agreeable to the size of it, and with a black-lead pencil draw backwards the picture (which with a little practice becomes familiar) on the ground, and the scraping is then performed by the original method. The art of mezzo-tinto engraving was considered formerly as only adapted to broad subjects, and where high minute finishing was required, it was thought vain to attempt it; but the great advances made in that art since the time of prince Rupert, have convinced every amateur to the contrary, and the successful works of Eadom, especially his masterly flower-pieces, are admirable specimens of its power, as also the ever grateful productions of Hodges, Dixon, and many rising artists of the present time. In engraving portraits, it is decidedly most appropriate for resembling both the touch and effect. This is the most usual way of performing this operation.

The art of scraping mezzo-tintos has been applied to the printing with a variety of colours, in order to produce the resemblance of paintings. The inventor of the method of doing this was J. C. Le Blon, a native of Francfort, and pupil of Carlo Marata, between the years 1720 and 1730. It was established by the inventor on this principle, that there are three primitive colours, of which all the rest may be composed, by mixing them in various proportions: that any two of these colours being mixed together, preserve their original power, and only produce a third colour, such as their compound must necessarily give; but if transparent colours be mixed, and three primitive kinds compounded together, they destroy each other, and produce black, or a tendency to it, in proportion to the equality or inequality of the mixture; and that, if, therefore, these three colours be laid, either separately, or upon each other, by three plates, engraved correspondently, on these principles, to the colouring of the design, the whole variety of teints necessary may be produced. The requisites, therefore, to the execution of any design in this method of printing, are as follow. 1. To settle a plan of the colouring to be imitated; shewing where the presence of each of the three simple colours is necessary, either in its pure state, or combined with some other, to produce the effect required; and to reduce this plan to a painted sketch of each, in which not only the proper outlines, but the degree of strength should be expressed. 2. To engrave three plates according to this plan, which may print each of the colours exactly, in the places where, and proportion in which, they are wanted. 3. To find three transparent substances, proper for printing with these three primitive colours. The manner in which Mr. Le Blon prepared the plates was as follows: the three plates of copper were first well fitted with respect to size and figure to each other, and grounded in the same manner as those designed for mezzo-tinto prints: and the exact place and boundary of each of the three primitive colours, conformably to the design, were sketched out on three papers, answering in dimensions to the plate. These sketches were then calked on the plates; and all the parts of each plate, that were not to convey the colour, to which it was appropriated, to the print, were entirely scraped away, as in forming the light of mezzo-tinto prints. The parts that were to convey the colour were then worked upon; and where the most light or diluted teints of the colour were to be, the grain in the ground was proportionably taken off; but where the full colour was required, it was left entire. In this regard was had, not only to the effects of the colour in its simple state, but to its combined operation, either in producing orange-colour, green, or purple, by its admixture with one alone; and likewise to its forming brown grey, and shade of different degree; by its co-operation with both the others. But though the greatest part of the engraving was performed in the mezzo-tinto manner, yet the graver was employed occasionally for strengthening the shades; and for correcting the outline, where it required great accuracy and steadiness. It was found necessary sometimes to have two separate plates for printing the same colour, in order to produce a stronger effect: but the second plate, which was used to print upon the first, was intended only to glaze and soften the colours in particular parts that might require it. With respect to the black and brown teints, which could not be so conveniently produced in a due degree, by the mixture of the colours, umber and black were likewise used.

With respect to the order in which the plates are to be applied, it may be proper to observe, that the colour which is least apparent in the picture should be laid on first; that which is betwixt the most and least apparent, next; and that which predominates, last; except where there may be occasion for two plates, for the same colour, as was before mentioned; or where there is any required for adding browns and shades.

Mr. Le Blon applied this art to portraits, and shewed, by the specimens he produced, the possibility of its being brought, by farther improvements, to afford imitations of painting, which might have some value. It is nevertheless much better adapted to the simpler subjects, where there are fewer intermixtures of colours; and where the accuracy of the reflections, and demi-teints are not so essentially necessary to the truth of the design, from the greater latitude of form, and disposition of the colour, as in plants, anatomical figures, and some subjects of architecture. But perhaps plates engraved, or rather finished, with the tool, particularly with respect to the outline, would be better accommodated in some of these cases, than those prepared only by scraping.

Mr. Cochin remarks, at the end of an account he has given of Mr. Le Blon's manner, that though this ingenious artist confined this method principally to the use of three colours; yet should this invention be again taken up and cultivated, there would be more probability of success in using a greater variety: and that several different kinds might be printed by one plate; provided they were laid on in their respectively proper places, by printing balls, which should be used for that colour only. His hint might, however, be very greatly improved, by the further assistance of pencils, accommodated to the plates, for laying on the colours in the proper parts.—Handmaid to the Arts, vol. ii. p. 182, &c. Encyclopedie, Art. GRAVEUR *en Couleurs*, &c.

For the method of taking off mezzo-tinto prints in glass, see BACK-*painting*.

MEZZOVO, in *Geography*, a ridge of mountains in European Turkey, which divides Thessaly from Albania.

MGLIN, a town of Russia, in the government of Novgorod Sieverskoi, on the Iput. N. lat. 53° 12′. E. long. 32° 34′.

MHARAS, a mountain of Arabia, in the province of Yemen; 16 miles W. of Kataba.

MI, a river of China, which rises in the province of Chantong, and runs into the Chinese sea, N. lat. 37° 12′. E. long. 129° 14′.

MI, in *Music*, the third sound in the ascending scale of Guido's hexachords. See SOLMISATION, and HEXACHORD.

MIA, in *Geography*, a town of Japan, in the island of Niphon; 85 miles E. of Meaco.

MIACO. See MEACO.

MIADWZNA, a town of Poland, in the palatinate of Kiev; 36 miles S.S.E. of Bialacerkiev.

MIALNANAEN, a mountain of Scotland, in the county of Perth; 10 miles E.N.E. of George's Town.

MIAM, in *Commerce*, a weight for gold at Malacca, 320 miams being = 20 buncalls = a catty = 29oz. 17dwt. 16gr. English troy; and a money of account at Siam, 16 miams being = 4 ticals = a tale, and 20 tales = a catty; and as 10 miams are accounted = 1 Chinese tale, 5 tales of Siam = 8 Chinese tales.

MIAMAJA, in *Geography*, a town of Japan, on the N. coast of Niphon. N. lat. 41° 10′. E. long. 141°.

MIAMI, or MAWMEE, *Great*, a river of America, in the state of Ohio, forming the western boundary of the state, and dividing it from Indiana territory. It enters the Ohio, 333 miles below Marietta, according to the winding of the river. At its mouth it is 300 yards wide; but at the Pickawee towns, above 70 miles higher, it is not above 30 yards wide, though it is passable for loaded boats 50 miles higher. Its stream is rapid, without cataracts. This river has several boatable branches, one of which extends towards the Sandusky, with an an intermediate portage of six or eight miles, and another opens a communication with Au Glaze by a short portage. The channel of the river is stony; hence it is sometimes called Assereniet, or Rocky river. Its waters are very clear and transparent. One of the principal branches of the Miami river is called "Mad river," or "Pickawee fork." This is a pleasant stream, and passes through an agreeable level country of the greatest fertility.

MIAMI, *Little*, discharges itself, after a south-western course, into the Ohio, about 300 miles below Marietta. It is 70 miles in length, and at its mouth 70 miles wide. Its depth of water does not allow the passage of loaded boats. On its borders the land is good, and its banks are so high that it is seldom overflowed.

MIAMI *of the Lake*, sometimes called "Omee" and "Manmick," is a considerable stream, navigable with canoes to the portages which lead to the head of the Wabash, and through Au Glaze, one of its branches towards the head of Loromie's creek, a head water of the Great Miami. Its portage is three miles. This river falls into lake Erie, at the S.W. corner of the lake. On this river there is a village called Miami, near Miami fort.

MIAMIS, an Indian nation, which inhabit the vicinity of the Miami river, and the southern side of lake Michigan. These people can raise about 300 warriors. In consequence of lands ceded to the United States by the treaty of Greenville, Aug. 3d, 1795, government paid them a sum in hand, and engaged to pay them annually, for ever, to the value of 1000 dollars in goods.

MIANA, a town of Persia, in the province of Adirbeitzan, where M. Thevenot the traveller died on his return from Ispahan; 45 miles S. of Ardebil. N. lat. 37° 12'. E. long. 47° 22'.—Also, a town of Italy, in the Bellunese; 24 miles W.N.W. of Belluno.

MIAO-TSE' MOUNTAINEERS, a general name under which are comprehended several tribes, who differ from one another only by some particular customs. This half-barbarous people are dispersed throughout the Chinese provinces of Se-tchuen, Koei-tcheou, Hou-quang, Quang-si, and on the frontiers of the province of Quang-tong. They often come down from their mountains, and make incursions into the flat, open country, although the Chinese, in order to restrain them, have built castles and fortresses in several places, in which numerous garrisons are maintained. The Miao-tsé are under the government of princes, who have no less authority over their subjects than those of the "Lo-los" have over theirs; they maintain houshold officers and a regular militia; they have under them several petty feudatory lords, who, although sovereigns, are obliged to levy troops for them whenever they receive orders. The usual arms of the Miao-tsé are bows and half-pikes. Their horses are much esteemed by the Chinese, on account of the agility with which they climb the mountains. The Miao-tsé, who inhabit the province of Koei-tcheou towards Liping-fou, have houses built of brick, containing only one story; in the lower part of which they keep their horses, oxen, cows, sheep, and hogs, which render their habitations very filthy and disgusting; and therefore the Tartar princes prefer lodging in the wretched barracks of the soldiers than in these houses. These Miao-tsé are collected in villages, and live in great harmony with one another. They cultivate the earth, make cloth, and manufacture a kind of carpets, which serve to cover them during the night. Their cloth is only a coarse sort of muslin of little value; but their carpets are good, and well woven. The timber of their forests is purchased by the Chinese, and floated down the river that traverses their country; and the price consists of a certain number of cows, oxen, and buffaloes. The skins of these animals are used by the Miao-tsé for breast plates, which they cover with thin lamina of steel or copper. The ordinary dress of these Miao-tsé consists of a pair of drawers, and a kind of jacket which laps over their breast. Those of the Miao-tsé tribe, who are dispersed in that part of Hou-quang which is nearest to the provinces of Quang-tong and Quang-si, are equally independent, though they seem to acknowledge the jurisdiction of the Chinese mandarins. They climb their rocks and run among their mountains barefooted, with great speed. The head-dress of their women is singular, as they place transversely upon their heads a board about a foot long, and five or six inches broad, over which they spread their hair, fixing it to the wood by means of wax. The greater part of the Miao-tsé is composed of independent people; but some of them are subject to the Chinese government. Such are those who live towards the middle, and southern part of the province of Koei-tcheou, and who are under two distinct governments. Some of these are subject to the mandarins of the province, and form a part of the Chinese people, whose customs they have adopted. The rest are subject to hereditary mandarins, who are considered as naturalized, although Chinese by extraction. These petty princes judge, in the first instance, the causes of their vassals, and have a right of punishing them, but not capitally. The Chinese entertain a sovereign contempt for the whole Miao-tsé nation. Their account of them is very unfavourable; but the missionaries assure us, that they found them an active, laborious, and obliging people, and remarkably honest and punctual in restoring the baggage, and other effects which they had entrusted to their care. These mountaineers, on their part, no less detest the Chinese, whom they consider as harsh and severe masters, who, unable to subdue them, and reduce them to a state of slavery, keep them blocked up in their country, and cut off from all communication with their neighbours. In the year 1776 these mountaineers were driven into their inmost retreats, and totally subdued by Akoui, a Chinese general. Grosier's China, vol. i.

MIASMA (from μιαίνω, the most direct interpretation of which is *to daub*) may be applied to any kind of impurity. Among medical writers, however, to whom the word is now chiefly confined, it relates principally to impurities in the air, and is sometimes used indiscriminately with *Contagion* or *Infection*; which see. Under the former article we felt disposed to adopt Dr. Wilson's distinction between contagion and infection, *viz.* that the first should express a morbid poison, the application of which *may* excite disease, and the latter the condition of the subject after the morbid poison *has* induced such an effect.

This definition has the advantage of being consistent with the etymology of the two words, particularly of the latter, the allusion of which is to dyeing or staining: for as a colouring substance may come into contact with another, under such circumstances as to leave no stain, so a subject may be sometimes exposed to a contagion without being infected.

The variety of effects induced by different impurities of the air, renders it absolutely necessary to discriminate them with as much accuracy as possible. We shall, therefore, confine the term *miasma* to its original meaning, as used by Hippocrates, and, as all the rest have appropriate terms, we shall defer them to the articles in their order, namely, MORBID *Poisons*, PLAGUE, QUARANTINE, and TYPHUS.

The father of physic remarks, that there are three great causes of disease, food, drink, and air. The latter, he continues, is by far the most important, because we eat and drink only at certain times, and can even subsist for a few days without

without either, but are perpetually breathing, and cannot exist without air but for a few seconds. His dissertation on this subject relates principally to the temperature of the atmosphere, the aspect of places, according to the neighbouring mountains and seas, the various seasons of the year, climates, and manners of the inhabitants. Consequently but little information can be derived from him, concerning those most deleterious properties in some particular districts, which never could be visited but through the enterprising spirit of modern navigators. As this subject is now become particularly interesting, not only on account of our commercial connections, but from the importance of preserving the lives of our army and fleet, we shall not scruple to dwell upon it with some minuteness.

Though miasmata may be of different kinds, yet as they are only known by their effects on the human body, and the sources from which they are derived, we cannot venture to offer any other distinction. This distinction will be principally in degree, for, as Dr. Cullen remarks, the source seems to be universally from marshes, or moist ground acted on by heat. The properties of marshy soils in England is pretty generally understood, and their effects on the human body. We shall, therefore, only in general remark, that the ague induced by them is for the most part milder in spring than in autumn, and that for some time before and after the solstices, these places may be visited even by strangers with impunity. That all new comers are more certainly, and for the most part with more violence, affected than the constant residents; and that, from causes hitherto unknown, the disease is more general, more severe, and more fatal in some years than in others.

All these, however, like other pathological facts, must be admitted with certain limitations. The vernal agues, though so generally mild as to be formerly considered wholesome visitations to the constitution at that season, are sometimes severe; and the autumnal have in some seasons been found mild. There are constitutions which can never be inured to this kind of air, but are constantly and severely affected on each returning autumn; and there are new comers who remain with impunity till a severe season affects *them*, and probably many of the natives. At these times the season has been known to be protracted from the vernal almost to the autumnal period, and not to cease till winter has set in.

In England the intermittent fever is no longer an object of terror, since the introduction of the bark, and the safe use of some most powerful remedies; but most of all in proportion as the sources of the miasma have been diminished by the draining and improved cultivation of the soil. In Sydenham's time ague was among the epidemics of the metropolis, and the bills of mortality of those days shew how frequently it proved fatal. When London is now visited by ague, it is for the most part only sporadic, and in many instances, where it is least suspected, will be found to have been contracted by a residence in the country; for we shall presently have occasion to shew that miasma, received into the constitution, shews its effects at very uncertain, and sometimes very distant periods. There are, however, seasons when ague attacks those who have never left the town, probably by the air wafted from the marshes, in which cases the miasma is so diluted as to affect those only who are particularly susceptible. The years 1765, 1766, as well as 1782, are particularly marked as ague years in London, and even in 1808, the disease very often shewed itself. During each of these seasons a long prevalence of easterly winds was remarked. This, however, is too common an event during the summer and autumn to be considered a sufficient cause of itself. The truth is, the season was particularly sickly to the inhabitants of the low lands on the eastern side of the metropolis: and so powerful was the effect of the miasma at its source, that instead of the usual mild and regular intermittent, remittent and even continued fevers were very frequent and very fatal.

In the Netherlands the dreadful effects of this miasma have been too recently experienced to require, at this time, any considerable commentary. One might suppose such events would never be entirely forgotten, were it not that so many records are preserved, which appear to have been overlooked before the last unfortunate expedition to Walcheren. Not to mention the account given by sir John Pringle, whose medical character and long practice in the army have rendered him an oracle in these enquiries, we shall transcribe part of Dr. Wind's observations, who with his father had practised at Middleburgh for nearly 30 years.

"Towards the end of August, or beginning of September," says he, "is a continual burning fever, attended with a vomiting of bile, which is called the gall-sickness.—Foreigners in indigent circumstances, who are garrisoned in the adjacent places, are apt, after these fevers, to become dropsical, and many die." Dr. Lind, to whom we are indebted for the above extracts, further remarks, "the Scotch regiment in the Dutch service at Sluys has been known to bury their whole number in three years." Lind on Climates.

The insalubrity of the lower parts of Hungary, and still more of the Campania of Rome, are too well known to require our particular notice. We cannot, however, omit the history preserved by Lancisius, physician to pope Clement XI. "Thirty Romans of distinction of both sexes, having made an excursion upon a party of pleasure towards the mouth of the Tyber, the wind suddenly shifted and blew from the south over the putrid marshes, when twenty-nine were seized with tertian fever, only one escaping."

Though Africa has something terrific in its sound, yet it seems probable, that the northern coast, and for a considerable way inward, if we except the Lower Egypt, is as healthy as any part of the world. But the southern coasts, and particularly as we advance inward along the rivers, are so destructive to European constitutions, that probably neither our love of novelty, nor enterprising temper, will ever be sufficient to overcome these difficulties, so as to form a permanent settlement. In all these places the first rains are found so certainly deleterious, even to the natives, that they endeavour at these times to confine themselves to their houses, and to shut out as much as possible the external air. After a time, though the rain continues, the miasma is less pestilential, but soon after its cessation, as the surface of the ground becomes drier from its exposure to an almost vertical sun, the exhalations are pregnant with the exciting causes of all the tropical diseases.

In the countries leading from Africa to Asia, particularly Bassora, and other parts about Arabia, the English find the climate healthy, excepting at certain well-marked seasons.

Of the four presidentships in the East Indies, that of Bencoolen, in the island of Sumatra, is found the most unhealthy. Bengal, however, at certain seasons, is scarcely less fatal to the British, and often even to the Asiatic inhabitants. In the year 1762, it was well ascertained that 30,000 blacks and 800 Europeans died of the fevers of that country during the sickly season. Bombay has been rendered more healthy since an embankment, by which the overflowing of the sea has been prevented; and Madras has generally been considered a station not unfavourable to British constitutions.

Of

Of all the unhealthy ſpots in Aſia, Batavia is pretty generally allowed to be the worſt. The fatal miſtake, too common among Europeans, of attempting to aſſimilate the cuſtoms of a new country to their own, is ſaid very much to have increaſed the inſalubrity of that ſettlement. It ſeems hardly conſiſtent with common underſtanding, that the Dutch, after the experience of ſo many years, ſhould ſtill perſevere in preſerving their dykes, to leſſen the expence of carriage at the charge of human life. Yet ſuch we are aſſured is the caſe. Among the many inſtances of mortality, for which that colony is ſo well known, we ſhall mention only two. In the year 1763, the Falmouth, a ſhip of 50 guns, was at Batavia for about ſix months, during which time ſhe buried 75 of her crew, and 100 ſoldiers of the 79th, who had embarked on board her; every ſoul on board having been ſeized with fever, excepting only the captain. In the year 1764, the Panther, during a very ſhort ſtay, buried 25 of her men, among whom was the commander, captain Matthewſon. Nor was the ſickneſs confined to the ſhip's company. The whole city exhibited no other ſcene but diſeaſe and death. Streets crowded with funerals, bells tolling from morning till night, and horſes jaded with dragging hearſes to the burial places.

Though we have remarked above the great probability that the nature of this miaſma is every where the ſame, as its ſources are evidently ſimilar, yet it is right to obſerve that its effects on the human body are ſomewhat diverſified in different quarters of the globe. Throughout the whole of Hindooſtan, and northward, as far as the Britiſh have formed any ſettlements, the liver ſeems to be principally affected, and the principal danger to ariſe from the too high action of its veſſels, and even the entire diſorganization of that important viſcus.

On the ſouthern coaſt of Africa, and along the margins of its extenſive rivers, the liver is the organ principally affected, and rarely, if ever, recovers its due functions, where the injury has been conſiderable. The liver ſuffers in the tropical regions of the Weſt, though not with the ſame uniformity. In the ſouthern parts of the N. weſtern hemiſphere, and in all the Weſt India iſlands, the liver is often affected, but in many inſtances of the moſt violent fevers in this part of the world, it may be doubted whether the ſtomach is not primarily affected, and the liver only ſympathetically, the black vomit being now pretty generally admitted to be derived from the ſtomach, and the yellow colour of the ſkin not making an eſſential character of the fever known by that name. It is not improbable that the Zealand diſeaſe, though diſtinguiſhed by the name of the gall-ſickneſs, may only affect the liver in common with the other viſcera. It is certain that the brain ſuffers much in this diſeaſe, and not uncommonly thoſe who eſcape with life remain for months, and ſometimes years, with impaired memory and even deranged intellect.

In England, the enlargement of the ſpleen is the moſt common effect; the conſequences of which are very rarely conſiderable, if the diſeaſe is not ſuffered to remain long without relief.

The moſt important conſideration, and the moſt to our preſent purpoſe, is the means of preventing the exiſtence of miaſma, or, where that cannot be done, of avoiding its effects. The firſt, it is evident, can only be accompliſhed by draining the low grounds. This may always be attained where the ſurface is above the level of the ſea, or ſtill eaſier, if above the level of a neighbouring river. What has been done in this way in our iſland is hardly credible. The attempts to drain the Pontine marſhes are not leſs honourable to human induſtry; and if we can believe the preſent accounts, it would appear that ſuch attempts are now perſevered in with more ſteadineſs than ever. The vaſt embankments made by cardinal Richelieu on the coaſt of Rochelle, in the bay of Biſcay, are well known, and muſt for ever live in the writings of Voltaire. When, as is often the caſe, a town has been conſtructed on a hill by the banks of a river, if the population, after ſpreading along the ſide of the river, ſhould gradually extend itſelf over the back of the hill, at right angles with the river of the ſea-coaſt, there will always be danger of water ſtagnating in the valley behind. The force of the miaſma from this cauſe will be greatly increaſed by the illuvies from the cottages which uſually are the firſt erections at theſe extremities. To this London at one time owed, if not its agues, at leaſt its vernal and autumnal fevers, as deſcribed by Sydenham. The great fire proved the means of forming a proper level as far as that formidable, though fortunate event extended; but it was not till within theſe laſt thirty years, that the northern part of the city, or rather its ſuburbs, has been drained by a ſewer, which, if ever London ſhould ſhare the fate of Carthage, will immortalize the well-directed induſtry and enterprize of its inhabitants. This ſewer, which is cylindrical, not leſs than ſix feet in diameter, and in ſome parts more than twenty feet below the ſurface, was carried through ſome of the narroweſt ſtreets, conſiderably below the foundations of the houſes; to protect which, ſuch a quantity of timber and planks was buried as would form almoſt an impaſſable grove if it were all to appear above ground. The ſudden growth of the cities in North America has produced the moſt fatal effects in proportion as the heat of the ſolſtitial and autumnal ſun is greater, and as the increaſe of their towns has outrun moſt others in every part of the world. This is now ſo well underſtood, that the more prudent inhabitants of the large towns are attending much more to ſecuring themſelves from yellow fever by draining, than by the enforcement of quarantines.

In our own country it is incredible to what extent the ſpirit of draining has extended; beſides thoſe large undertakings which can only be brought about by the union of whole counties. Sometimes aſſiſted, or at leaſt empowered, by parliamentary authority, every enterpriſing farmer, whoſe lands are of any extent, has his *underground drain* wherever it is neceſſary, and can be accompliſhed.

We are not, however, to conſider all the danger as removed when an old moraſs is drained: for even if ſuch land is ſecured from being overflowed under the moſt unfavourable ſeaſons, which is rarely the caſe, yet whenever it is firſt converted from paſture to arable, fevers are in ſome places excited much more formidable than the common intermittent. This leads us to the ſecond conſideration, that of avoiding the effects of miaſma where the cauſe cannot be entirely removed.

The firſt part of the inquiry here muſt be, whether the diſeaſe is infectious? If we reaſon from cauſe to effect, we ſhould conceive that a diſeaſe derived from exhalations from the earth could only be excited by a ſimilar cauſe, and, conſequently, that a ſick perſon removed from the ſource could convey no contagion to others. But we ſhould recollect that he may arrive with his clothes ſo impregnated with the effluvia of ſuch miaſma, as to be dangerous to thoſe who firſt receive him, as we find perſons often carry with them the ſmell of their particular occupation or habits. To determine, therefore, that a diſeaſe is contagious, it will be neceſſary to prove that others have been infected who have been expoſed to the ſick only, and neither to the ſeat of the miaſma

miasma itself, nor to such substances as may contain what is called the fomes.

At the source of the disease we shall find the greatest difficulty in determining the question; for where one general cause affects several, it will often be difficult to say whether an attendant on the sick has taken the disease from them, or from the same common cause that has affected the whole neighbourhood. This difficulty we shall see is much increased when we come to the article TYPHUS. At present, we shall only make two general remarks:

First, that wherever a number of persons are collected, if sickness of any kind prevails among them, a kind of infectious air is generated, which is the source of typhus fever.

Secondly; that during the prevalence of any epidemic, those who are affected with any other disease are generally the earliest seized with the epidemic, their reduced state of health rendering them less able to resist the force of the miasma; and as two diseases cannot occupy the same constitution at the same time, the consequence must often be, that their former complaint gives way to the reigning disease.

It may seem remarkable that this chain of events should be more accurately attended to by the ancient historians than by modern physicians; but the terms in which they explain themselves may shew the cause of this difference. Thucydides makes no mention of contagion till the advanced period of the plague in Athens; and Livy expressly says, that at first the men became sick from the badness of the season, and the unhealthiness of the place, and that afterwards the attendance on the sick rendered disease more common. By this evidently marking, that the accumulation of the sick had induced the hospital, in addition to the endemic, fever. See CONTAGION.

We have been obliged to anticipate this part of a succeeding article, because it involves a question of the highest importance, in avoiding the *effects* of miasmata where the *cause* cannot be entirely removed. If the disease induced by such a cause had a contagious property similar to small-pox and measles (see Dr. Cleghorn on the Diseases of Minorca), the probability is, that it would not cease till it has invaded all who are exposed to it; and that should any leave the country with the disease, or its fomes, the consequences would be equally general in every place to which the sick should be carried. In this case the only remedy would be to confine the sick and healthy to the spot, and not suffer them to escape till the disease has entirely ceased; after which there should be an universal ablution and purification before any general intercourse should take place. But if the disease is known to arise only from the season and the nature of the country; if from experience it should be ascertained that with a change of season the disease will cease; if it is further found by experience that no infection can be traced till the number and accumulation of the sick has produced a hospital or camp fever; if all this can be ascertained, surely the first step should be to encourage all the inhabitants instantly to quit so fatal a spot, and not to return to it till a change of season has produced a change in the properties of the atmosphere. It is much to be regretted that this discrimination has been so little attended to in the late controversies concerning the yellow fever in the West Indies, as well as the epidemics, which have visited Gibraltar and the various cities in the south of Spain. In America the question seems to be unfolding itself; and, as we before remarked, the terror of contagion is gradually giving way to a more rational precaution.

Where a country has been drained, after the ploughing of which the exhalations are found deleterious, no remedy remains but to confine this branch of husbandry to the solstices, afterwards leaving the broken ground to the effects of air and rain. This caution should be extended to the opening of new land wherever the surface is formed of an accumulation of autumnal leaves impeding the current of rain, and annually putrifying for a considerable number of years.

When vessels are cruising, or moored in the neighbourhood of swamps or thick woods, particularly in tropical regions and at dangerous seasons, the sailors should never be allowed to sleep on deck, and as few as possible should remain there after sun-set. If it is necessary to wood or water, every endeavour should be used to employ for this purpose the aborigines of the place, or negroes, whose constitutions are seldom affected by such miasmata, and when they are, the effect rarely exceeds that of the common tertian, which readily gives way to the usual remedies. If it is absolutely necessary to send the crew on shore, they should always return before sun-set and sleep on board.

When, as is often the case, it is found necessary to conduct a siege on one of these unwholesome spots, the first consideration should be to commence the operations at the least dangerous season. At this time the greatest attention should be paid to raising batteries as high as possible, consistently with the safety of the besieged, the miasma being always found to be most powerful the nearer to the soil. At the same time the level of the ground should be examined, to see how far it will admit of draining without turning up too much of the surface. When the sickly season arrives, as few men as the service will permit should be left on the ground during night, who, on the succeeding morning, and for several days after, should be carefully examined by the medical officer, that the first approaches of disease may be instantly met. Such men as are found best to withstand the effects of the miasma should be oftenest on duty. Above all, the hospitals should be prepared before they are wanted, and in a situation as remote as possible from the source of disease. Where the situation of the place will admit, it would be best to use floating hospitals, or hospital-ships, which in fair weather might make frequent cruises with their port-holes and scutcheons open, and with as many of the men on deck as can be moved thither. The attendants should be selected among the convalescents.

By attention to these rules, many expeditions might be much more successful, and much less wasteful of human life: many lands might be cultivated by those who would enjoy the benefit of their bold and enterprising undertaking, and many lives rendered comfortable which at this time are dragged on with misery and resigned without regret. See EPIDEMIC; FEVER, *Causes of*; HEALTH, &c.

MIATA, in *Geography*, one of the Society islands in the S. Pacific ocean. S. lat. 7° 52′. W. long. 148° 6′.

MIA-TAU, a cluster of small islands in the Chinese sea, near the coast of Chang-tong; extending from six to 36 miles N. of Tong-tcheou.

MIATHIR, a town of Morocco, in the province of Duquella, near a mountain of the same name.

MIAU-SHEHR, a town of Persia, in the province of Ghilan; 50 miles N.W. of Reshd.

MICA, *Glimmer*, Wern.; *Mica*, Haüy.

The usual colour of this mineral is grey, which occurs yellowish, greenish, smoke, and ash-grey; the yellowish-grey passes into yellowish and greenish-white, and into silvery, and also into wax-yellow, brass and gold-yellow, reddish, pinchbeck,

pinchbeck, and blackiſh-brown; the greeniſh-grey paſſes into mountain and aſparagus-green, alſo into leek-green and blackiſh-green; the aſh-grey is found of various ſhades, and paſſes into perfect black. Sometimes ſeveral colours occur together in the ſame piece. Upon the whole the colour is found conſiderably to vary, according to the different degrees of tranſparency of the ſpecimen. The black variety appears brown, when placed between the eye and the light. The colour of the powder is always greyiſh-white.

Mica is found principally diſſeminated and in thin layers alternating with other foſſils, ſuch as quartz and feldſpar, in gneiſs, &c.; but it alſo frequently occurs in maſs and cryſtallized.

Its primitive form is the ſhort, ſtraight, rhomboidal priſm of 120° and 60°. Integrant molecule the ſame.

The principal cryſtallizations are; 1. The ſhort ſtraight four-ſided priſm with rhomboidal planes; being the primitive form (Mica *primitif*, Haüy, pl. 60, fig. 205.) Theſe priſms are generally ſo low, that they may be conſidered as four-ſided tables. They are eaſily and diſtinctly divided in a direction parallel to the baſes; the cleavage in the other direction is generally indiſtinct.

2. The regular ſix-ſided priſm, generally very low, ſo as to appear tabular. (Mica *priſmatique*, Haüy, ib. fig. 207.)

3. The lengthened rectangular table (Mica *binaire*, Haüy, ib. fig. 208.)

4. The low regular ſix-ſided priſm with truncated terminal edges. (Mica *annulaire*, Haüy, ib. 206.)

The cryſtals are ſometimes large, but generally middle-ſized and ſmall; they are ſometimes found ſeparate, but oftener grown together; they are now and then ſeen faſcicularly aggregated and in roſes. The lateral planes of the cryſtals are ſmooth and ſplendent; the terminal planes ſhining. Internally ſpecular ſplendent; luſtre ſometimes reſinous, ſometimes pearly, often ſemi-metallic and metallic; in the uncryſtallized mica, the luſtre of the planes of fracture is generally leſs intenſe.

Fracture partly ſtraight, oftener curved, or undulatingly foliated. The foliated fracture ſometimes paſſes into the broad and narrow radiated, which is partly parallel, partly faſcicularly or ſtellularly diverging. The fractural ſurface, particularly that of the broad radiated variety, is ſometimes marked with feather-like ſtreaks. Fragments tabular. The maſſive ſhews coarſe, large and ſmall-grained diſtinct concretions; the radiated is compoſed of cuneiform columnar concretions.

The common maſſive varieties of mica are opaque, or only tranſlucent on the edges; the detached folia are moſtly tranſlucent and even tranſparent. Some cryſtallized varieties are perfectly tranſparent in all directions. The ſeparation of the folia from each other, though not obſervable to the eye, is generally the cauſe of the loſs of tranſparency.

It is ſemi-hard, approaching to ſoft; eaſily diviſible in the direction of the folia, and may be eaſily cut with a knife; it feels ſmooth, not unctuous, and is elaſtic flexible. Specific gravity 2.654—2.634, Haüy; 2.726, Karſt; 2.767, Kirw.; 2.866, Reuſs; 2.934, Blumenb.

Before the blowpipe, the dark coloured varieties (according to Wiedenmann) take a pinchbeck or braſs-yellow hue, but they are nearly as difficultly fuſible into enamel as the colourleſs varieties. The enamel of black coloured mica affects the magnetic needle.

The analyſes which we poſſeſs of this ſubſtance vary conſiderably, at leaſt with reſpect to the relative quantity of the conſtituent parts of the ſeveral varieties.

	Muſcovy Glaſs.	Common.	From Zinnwald.	Muſcovy Glaſs.	Black Siber
Silica	40	50.	47.	48.	42.50
Argil	46	35.	20.	34.25	11.50
Magneſia	5	1.35			9.
Oxyd of iron	9	7.0	15.50	4.50	22.
Mangancſe			1.75	0.50	2.
Lime		1.33			
Potaſh			13.50	8.75	10.
Loſs		5.32	2.25	4.	3.
	100	100	100	100	100
	Bergm.	Vauq.	Vauq.	Klapr.	Klapr.

This very common but remarkable foſſil, forms a principal ingredient of ſome of thoſe rocks which belong to the primitive ſlate formation of Werner, particularly granite, gneiſs, and mica ſlate: it is alſo found in primitive limeſtone, and in grau-wacke. Nor is it wanting in the trapp-formation, as in ſienite, porphyry, greenſtone, baſalt, wacke; though in the laſt mentioned rocks it is probably derived from primitive rocks by diſintegration. In ſome caſes it is known to form entire beds, like thoſe at Zinnwald. It rarely occurs in veins, ſuch as thoſe belonging to the tin-ſtone formation in Bohemia and Saxony.

The localities of mica being thoſe of the widely extended primitive rocks above-mentioned, need not to be particulariſed. The mica in large plates, called Muſcovy glaſs, from the uſe to which it is applied, occurs in granite in ſeveral parts of Siberia, and on the ſhores of the Caſpian, at Uda, on the borders of the Upper Tunguſka, the lake Jeneſey, Baikal, in Georgia, &c.

By far the greateſt part of the large foliated mica is employed in the Ruſſian empire, eſpecially in Siberia, where it is generally uſed inſtead of glaſs for windows. The poorer claſſes employ the ſmall plates, which they ſow together. It is ſaid to have been a ſubſtitute for glaſs in the windows of Ruſſian men of war, as being leſs liable to be broken by the concuſſion of the air during the diſcharge of heavy artillery; but to this uſe mica is no longer applied. We find that in the year 1781, upwards of 200 pud of this variety of mica were exported from Peterſburg to Lubeck, and 2721 pud to Great Britain. Beckmann, who makes mention of this exportation, is at a loſs to gueſs the uſe in which theſe 116,800 pounds of Muſcovy glaſs may have been employed.

According to Ellis's account, the ſame kind of mica occurs in large plates in Hudſon's bay; and Kalm found it in Pennſylvania, in leaves of half a yard in diameter, and of equal tranſparency with the Siberian variety. Indeed the Swedes, who from 1630 to 1655 had colonies in New Jerſey and Pennſylvania, employed it, as the Ruſſians do, inſtead of glaſs in the windows.

The tenuity of the laminæ of the large foliated varieties is ſuch, that, according to Haüy's calculation, a piece $\frac{4}{9}$ths of a line in thickneſs, may be divided into 23,255 ſeparate laminæ. This property, and the facility with which it is cut, render the Muſcovy glaſs peculiarly proper for incloſing minute objects to be viewed by the microſcope.

MICA-*ſlate, Glimmer-ſchiefer*, Werner; *Micaceous ſhiſtus*, Kirwan; *Schiſte micacé*, Broch.

This primitive rock is eſſentially compoſed of mica and quartz, diſpoſed in layers, which are more diſtinct than thoſe of gneiſs, into which it is frequently ſeen to form a tranſition. The colour of the mica, which generally forms the

 predominant

predominant part, is usually of a grey colour, mixed with greenish; the quartz is almost always white.

This rock, which is of great importance to the miner, as being particularly rich in ores, contains also frequently other minerals, particularly common and noble garnets, which may even be considered as forming an essential component part of mica slate; shorl, both the common and tourmaline (such as that of Dunkeld and Blair-in-Athol in Scotland), kyanite (which has been found in the varieties from Mainland, one of the Shetland islands, and near Banchory in Aberdeenshire), rutile (that of Salzburg, Hungary, &c.), feldspar, but only in single grains.

Besides the common mica slate, which is straight, and rather thick slaty, the Wernerian geognosians distinguish three other varieties, *viz.* the undulated mica slate, which has not been found to include other substances; the talcky mica slate, which is straight slaty, composed of green mica, and traversed by thick layers of quartz; and lastly, the fine slaty variety, which forms a transition into clay slate, which rests on it; it is generally of a greyish-yellow colour, and almost entirely unmixed with quartz.

As mica slate passes on one side into clay slate, (the next rock in succession,) in the same manner it forms a very distinct transition into gneiss, on which it rests; the outgoings of its strata being lower than those of the latter, and higher than those of the clay slate, which usually cover them. It surrounds the older rocks in mantle-shaped stratification.

The mica slate mountains, which are generally much less craggy and bold than those of gneiss, contain far more foreign beds than both granite and gneiss mountains; the most remarkable beds observed in them are those of granular limestone, of hornblende slate, hornblende rock, and actinote; as likewise galena, copper and iron pyrites, magnetic iron-stone, and other ores. The greatest part of the metalliferous mines of Sweden and Norway, and several of those of Hungary and Saxony, are situated in this rock.

Mica slate constitutes considerable mountains in most parts of Europe, and also, according to Humboldt, in South America. In Scotland, it occurs abundantly in the valley between Dunkeld and Blair-in-Athol, on the mountain of Schehallion, in the island of Arran, the island of Jura and Isla, &c. Jameson.

It is often employed for constructing or lining furnaces, whence it has been called *Gestellstein*, or *Saxum fornacum*; names which are, however, given to several other fossil rocks applied to the same purpose.

MICABA, in *Geography*, a town of Japan, in the island of Niphon; 100 miles N.N.E. of Meaco.

MICAH, in *Scripture History*, the seventh in order of the twelve minor prophets. He is called the "Morasthite," or of "Moresa," a village near the city of Eleutheropolis, in the south of Judah. He was nearly contemporary with Isaiah, and has some expressions in common with him: compare Isaiah, ii. 12. with Micah, iv. 1; and Isaiah, xii. 15. with Micah, iv. 13. St. Jerom says, that Micah was buried at Morasthi, and Sozomen says, that his tomb was discovered to Zebennus, bishop of Eleutheropolis, in the reign of Theodosius the Great. Some have confounded Micah with Micaiah, son of Imlah, who was of Ephraim, and who prophesied in the time of king Ahab. Micah prophesied under Jotham, Ahaz, and Hezekiah for about 56 years, from the beginning of the reign of Jotham, or 754 B.C., to the last year of Hezekiah 698 B.C. His prophecy contains seven chapters; in which the first foretells the calamities of Samaria; afterwards he prophesies against Judah, and having exclaimed against the iniquities of Samaria, he foretells the captivity of the 10 tribes, and their return. After a pathetic invective against the princes of the house of Jacob, and the judges of the house of Israel, he speaks of the birth and reign of the Messiah. The two last chapters contain an invective against the iniquities of Samaria; after which he predicts the fall of Babylon, the re-establishment of Israel, their happiness, &c. in such lofty terms, as chiefly agree with the state of the Christian church. The style of Micah is for the most part close, forcible, pointed, and concise; sometimes approaching the obscurity of Hosea; in many parts animated and sublime, and in general truly poetical.

MICARELLE, in *Mineralogy*. See PINITE.

MICE, in *Gardening*, a sort of vermin which are highly destructive to several sorts of garden crops, such as peas, beans, &c. in the early spring, and lettuces, melons, and cucumbers in frames in the winter season. When discovered they should of course be immediately destroyed, either by traps or some other means. See VERMIN.

The author of "Phytologia" has suggested, that "the destruction of grain after it is sown by field-mice, which mine their way very quickly under newly ploughed lands near the surface, is supposed by Mr. Wagstaff, in the papers of the Bath Society, to be effected in some seasons to a very great extent. And that the tussocks of wheat, seen to arise in many fields, are owing to the granaries of these diminutive animals, which he has found to contain nearly a hatful of corn, which grows into a tuft, if the owner becomes accidentally destroyed. It is also further asserted, that they feed much on the young plants, as they arise from the seed, and multiply at that time very fast. He detects their habitations by small mounds of earth being thrown up, on or near the apertures of their dwellings, or of the passages which lead to their nests or granaries; and by following the course of these passages, he found and destroyed the parents and the progeny." He likewise "recommends the taking up and dividing the tussocks of wheat, thus sown in the autumn by the field-mice, and transplanting them in the spring; and also to thin other parts of a young crop, as they appear too thickly sown, which he esteems an advantageous practice."

And it is found, that "acorns when sown, as well as garden beans, and peas, are liable to be dug up or devoured by these voracious little animals, which may be destroyed by traps baited with cheese; or best of all, by the encouragement of the breed of owls, so active in the pursuit of nocturnal vermin, and thence so useful to the gardener and farmer, who still permit their servants and children to destroy both their eggs and callow young."

These little plunderers may be readily destroyed by the use of the poisonous substance, usually known by the title of *nux vomica*, which should be finely rasped down, and mixed with some sort of meal or other similar material, of which they are fond.

MICELLA, in *Geography*, one of the smaller Molucca islands.

MICHAEL I., in *Biography*, surnamed *Rhangabe*, emperor of the East, was son of Theophylact, governor of the isles, and married Procopia, daughter of the emperor Nicephorus I., by whom he was raised to the office of great master of the palace. He was present at the battle against the Bulgarians, in which Nicephorus was slain A.D. 811. Stauracius, the son of the emperor, had received a severe wound in the battle, and was, besides, universally hated. The empire was therefore offered to Michael, who at first hesitated to accept it, but finding that Stauracius designed to put out his eyes, he obliged him to retire to a convent, where

where he ſoon after died. Michael was poſſeſſed of private virtues, but wanted vigour to controul the ſpirit of his wife, who excited the indignation of the ſoldiers, by appearing at the head of the army, and it was generally acknowledged that he was deficient in the military talents requiſite at ſuch a criſis. He marched againſt the Bulgarians, ventured upon an engagement, in which he was defeated, and returned with diſgrace to Conſtantinople, leaving a diſcontented army under the command of diſaffected generals. By their intrigues the ſoldiery proceeded to the depoſition of Michael, and offered the imperial crown to Leo the Armenian. The ſenate, the clergy, and the people of the capital ſtill adhered to Michael, but he declared that not a drop of blood ſhould be ſhed on his account, and reſigning the enſigns of ſovereignty retired with his family to a monaſtery, having filled the throne leſs than two years. He was permitted to live in peace, and in a religious retreat, during thirty-two years, which he ſurvived his abdication. Gibbon. Univer. Hiſt.

Michael II., ſurnamed the *Stammerer*, a native of Phrygia, was educated among the Jews and heretical Chriſtians, and during the early period of his life, he adopted opinions that probably rendered him obnoxious among thoſe who ſtyled themſelves of the orthodox faith. When he attained to years of diſcretion he was appointed an officer under Nicephorus, and was a principal inſtrument in raiſing to the throne Leo the Armenian. During the reign of this emperor he was employed in high offices, but having incurred the ſuſpicion of conſpiring againſt his ſovereign, he was arreſted and brought to trial. At that period, conviction and accuſation followed each other of courſe, and Michael was condemned to the cruel death of being burnt in the furnace of the private baths. The execution of this ſentence, which had been fixed for Chriſtmas-day, was ſuſpended through devout ſcruples of the empreſs, and in the mean time Michael informed his friends of his danger, and threatened them with detection, unleſs they effected his deliverance. The hope of ſelf-preſervation excited them to exertion, and in conſequence of it, Leo was dethroned and murdered, but Michael with fetters on his legs was ſeated on the imperial throne in December 820. One of his firſt acts was to reverſe the late ſovereign's decrees, by recalling a number of biſhops and other eccleſiaſtics who had been baniſhed, for refuſing to comply with the late emperor's edict againſt the worſhip of images. Notwithſtanding this conduct, Michael himſelf was by no means friendly to this kind of worſhip, and tolerated it only without the precincts of the capital. He is therefore reckoned among the enemies of the Catholic church, and the calamities of his reign have been imputed to his hereſy. A revolt in the Aſiatic provinces was the commencement of a civil war, which nearly ſubverted the throne. One Thomas, at the head of a vaſt army of barbarians, over-ran Leſſer Aſia and Syria, defeated the troops ſent againſt him, and laid ſiege to Conſtantinople. At length, however, he was unſucceſsful in his efforts againſt the eſtabliſhed power, and falling into the emperor's hand, he was put to a cruel death. During theſe internal commotions, the Saracens landed in Crete, and formed a ſettlement in that iſland, from which Michael in vain attempted to expel them. During the ſixth year of his reign he married, from a convent, Euphroſyne, the daughter of Conſtantine VI., which has been imputed to him as a moſt irreligious act; it ſufficed likewiſe as an example to one of his officers, Euphemius, to gratify a licentious paſſion, by forcibly taking a nun from her convent in Sicily, which was the cauſe of the loſs of that iſland. Euphemius, in order to avoid puniſhment, fled to the Saracens in Africa, and returning with a large body of troops of that nation, endeavoured to gain poſſeſſion of Syracuſe. He loſt his life in the attempt; but the Saracens, thus introduced into Sicily, by degrees made themſelves maſters of it, as well as of the neighbouring provinces of Italy. Michael, after an unfortunate reign of nearly nine years, died in 829, and was ſucceeded by his ſon Theophilus.

Michael III., grandſon of the preceding, was born in 836, and ſucceeded his father Theophilus in 842, when he was only ſix years of age. He had been educated in habits of piety and virtue by his mother Theodora, but as he grew up, he abandoned all the early impreſſions of his childiſh years, became famous for the diſſolute courſe of his life, and deſervedly obtained a place among the moſt unworthy emperors. He did not aſſume the reins of government till he was in his twentieth year, when Theodora and her daughters were obliged to quit the court and enter a monaſtery, where ſhe ſoon died of a broken heart. Michael ſeemed to rejoice in the event: while his virtuous mother was alive, her conduct was probably ſome reſtraint to his paſſions, but as ſoon as death had levelled her with the duſt, her worthleſs ſon was anxious to ſurpaſs even a Nero in his profligacy and buffoonery. In imitation of that prince, whoſe name and memory are devoted to infamy, he purſued the ſports of the circus, and took into his favour and confidence thoſe who were deemed the moſt ſkilful charioteers. He was perpetually guilty of exceſs in wine, and, in the hours of his brutal intoxication, iſſued the moſt ſanguinary commands, which his ſervants, more humane than their maſter, frequently ventured to diſobey. It was one of his amuſements to profane with mock ſolemnities the moſt ſacred ordinances of religion. Amidſt theſe follies he undertook an expedition to the Euphrates againſt the Saracens, who put him and his army to flight. He was long under the influence of Bardas, whom he raiſed to the dignity of Cæſar, and by whoſe advice the patriarch Ignatius was depoſed and impriſoned, and the learned Photius placed in his chair. In 806, Michael was induced by Bardas to undertake an expedition into Crete, to oppoſe the ravages of the Saracens, who from that iſland had made a deſcent into Thrace. This advice proved fatal to the favourite and miniſter, for having excited the jealouſy of the emperor, he ordered him to be ſtabbed in the tent of audience. This cruel and treacherous deed excited the indignation of the ſoldiers, and Michael returned privately to Conſtantinople, where he ſoon after raiſed Baſil the Macedonian, who had been the inſtrument in the aſſaſſination of Bardas, to a partnerſhip with him in the throne, and devolved upon him all the buſineſs of the ſtate. Baſil, who it is ſaid, had juſt ideas of the imperial character and duties, endeavoured by remonſtrances to reclaim Michael from his abandoned courſe of conduct. But his habits were too deeply rooted to admit of a change, and it was determined to ruin the monitor. Baſil was fortunately apprized of his danger, and reſolved to ſtrike the firſt blow, and with the aid of accomplices murdered him while aſleep, and in a ſtate of intoxication, in the year 867, in the thirty-firſt year of his age. Univer. Hiſt. Gibbon.

Michael IV., a native of Paphlagonia, of obſcure birth, was brought up to the trade of a money-changer, but being introduced at the court of Romanus III., his perſonal beauty caught the eye of the licentious empreſs Zoe, who made him her chamberlain, and exacted from him attentions inconſiſtent with the homage which he owed to his ſovereign. At length the empreſs, advancing from one degree of guilt to another, poiſoned her huſband, celebrated her nuptials with Michael, and raiſed him to a partnerſhip in the throne.

This event was accomplished in the year 1034. The empress was disappointed in the expectations which her passions had excited, as well on account of the ill state of health which her husband fell into, as on account of the torture which he experienced from a consciousness of the crimes in which he had participated. All authority soon devolved into the hands of his brother John, an eunuch, who had originally introduced him to court, and who quickly reduced Zoe to a state of insignificance, surrounded with spies, and made a prisoner in her own palace. Michael began now to endeavour to atone for his guilt by liberality to the poor, and by the endowment of churches and hospitals. A revolt of the Bulgarians roused him to exertion; he headed his army, and though in his first expedition he was obliged to retreat with disgrace, in a second encounter he was more successful, and returned in triumph to Constantinople. Warned with the approach of death, he retired to a monastery, which he had himself founded, and in which he died, in the year 1041: having first nominated as a successor his sister's son,

MICHAEL V., surnamed *Calaphates*, from his father's occupation of a caulker of ships. He was proclaimed emperor immediately on the death of his uncle, but his reign was of very short duration. His first sovereign decrees were the banishment of his uncle John, the eunuch, and the confinement of Zoe to a monastery. The people, who generally take part with the oppressed, revolted at these acts of tyranny, recalled Zoe and her sister Theodora, and proclaimed them joint sovereigns. Michael was now glad to take refuge in a monastery, and assumed the religious habit, hoping to escape farther injury, but at the instance of Theodora he was deprived of his sight, an usual though horrible punishment at that period, and, with all his relations and adherents, was sent into banishment, having occupied the throne only four months. Gibbon. Univer. Hist.

MICHAEL VI., surnamed *Stratioticus*, was appointed by the empress Theodora as her successor on the throne, which he ascended in the year 1056. He was already advanced in years, and enjoyed a reputation for military talents, but was wholly unacquainted with the art of government, its nature and principles. He gave himself up to the dominion of his eunuchs, who made an ill use of their influence, so that a conspiracy was excited, and Isaac Comnenus was elevated to the imperial dignity. The new emperor assembled an army in the eastern provinces, with which he proceeded towards the capital. In the neighbourhood of Nice he was met by the forces of Michael, and an engagement ensued, in which the latter were completely overthrown. Michael now saw that he had in vain exacted an oath from the citizens of Constantinople never to acknowledge Comnenus for emperor. At the approach of the conqueror, a decree was unanimously passed, investing him with the imperial title and authority, and a deputation of bishops was sent to Michael, commanding him formally to renounce the sovereignty. "What," said the fallen prince, "will you give me in exchange for the empire?" "The kingdom of heaven," they replied. He submitted and retired to a monastery, after a reign of about a year. Gibbon. Univer. Hist.

MICHAEL VII., surnamed *Parapinaces*, the son of Constantine XI., was proclaimed emperor in the year 1071, on the defeat and capture, by the Turks, of Romanus Diogenes. He had been well educated, and had studied philosophy and rhetoric, but was unfit for the cares of the empire, which devolved upon his uncle. He was charged with diminishing the measure of corn for his own emolument, during a scarcity, which fixed upon him his reproachful surname. An invasion of the Turks, and a revolt among his own people, forced him to resign his crown, and retire to a monastery, after a reign of six years and a half. He died at Ephesus, having been consecrated bishop of that see. Univer. Hist.

MICHAEL VIII., of the noble family of Palæologi, was brought up to the military service, and obtained popularity and distinction by the graces of his person and manners. In his youth he was commander of the French mercenaries in the employ of the empire. During the reign of John Vataces he was accused of ambitious designs, but cleared himself so well of the charge, that he was not only honourably acquitted, but made governor of Nice. In the year 1255, new charges were brought against him, and he privately withdrew to the Turkish sultan of Iconium, by whom he was honourably received, and placed at the head of a body of Greeks in Turkish pay, with whom he distinguished himself against the Tartars. After this he was recalled by the emperor Theodore, and at his death, in 1259, he recommended him as the guardian and protector of his son John, who was then a minor. He now assumed the title of grand-duke, and the office of regent of the empire was delegated to him. His ambition began to display itself, and he employed every art to give splendour to his administration, and impress the people with the idea of his fitness for the throne. The news of a victory over the despot of Epirus was the signal for the people in Michael's interest to salute him with the title of emperor, and it was agreed that he and the young prince John should wear the purple conjointly. The patriarch, with great reluctance, was induced to place the imperial crown upon the head of Michael alone, while John walked in his train, distinguished only by a diadem of very inferior worth. This was in 1260, and in the following year Michael received the welcome intelligence of the recovery of Constantinople, to which city he and his court removed from Nice. He shewed that he was capable of acting on the most liberal principles: he restored the city to its ancient splendour, and encouraged the continued residence of the Genoese, Venetian, and Pisan merchants; but having attained to a good share of popularity, he felt himself sufficiently strong to commence a new era by reigning sole emperor. To remove his competitor from the chance of opposing his projects, he caused his sight to be destroyed. For this infamous act of barbarity, the patriarch Arsenius pronounced a sentence of excommunication against him, which he refused to recal, unless he would exhibit signs of repentance by abdicating his throne. The emperor, trusting to his own strength, deposed and banished the patriarch, but he had attached to his cause so large a party among the clergy, that a schism in the Greek church was the consequence, which continued a number of years. Michael, as a warrior and politician, was successful in many of his projects; he recovered several of the finest islands in the Archipelago, as well as part of the Morea, from the Franks; but on the other hand, the despot of Epirus, and the king of Bulgaria, made incursions into Thrace, and laid waste the country with fire and sword. These and many other troubles induced him to seek the favour of the Roman see, by proposing an union between the Greek and Latin churches, with an acknowledgment of the supremacy of Rome. This was effected at the general council of Lyons, under pope Gregory X., in 1274, an act which extremely disgusted his own subjects, and he was obliged to institute a violent persecution against the schismatic Greeks, in order to preserve the semblance of an union. This so irritated his own family, and the inhabitants of Constantinople, that he was eventually excommunicated by pope Martin IV., for the share which it was known he had in the massacre of the French in Sicily, known

by

by the name of the Sicilian vespers. He died in 1283, at the age of 58, and in the 24th year of his reign. His son Andronicus, whom he had associated with himself in the empire, instantly dissolved the union of the churches, and refused his father Christian burial. Gibbon. Univer. Hist.

Michael, Feodorovitch, czar of Russia, was son of Theodore Nikiliz Romanof, an archbishop of Rostock. After the dethronement of the czar Zuski, in 1610, a party of Russian nobles offered the crown to Ladislaus, prince of Poland, and a Polish garrison had been admitted into Moscow, which was the occasion of much bloodshed. It was after some time expelled by a more numerous party of Russians, who elected Michael, the subject of this article, then a youth of seventeen, as new czar. He was distinguished by his descent from a daughter of Ivan Vasilevitch, and rendered dear to the nation by the virtues of his father. At the time of the election he was in a monastery with his mother, while his father was a prisoner in Poland; and when the proposal was made to raise him to the throne, the unhappy fate of some of the late czars filled his mother with such apprehensions, that she did every thing in her power to get him excused the intended honour. The senate, however, persisted in their choice, and Michael was solemnly elected in 1613. He was immediately involved in a war with the generals of Gustavus Adolphus, king of Sweden, which was concluded in 1617, and in the following year a truce was made with the Poles, who had supported, by force of arms, the prior election of their prince Ladislaus, and had actually ravaged the country as far as Moscow. In 1625, the young czar married Eudocia, the daughter of a poor gentleman of no fortune, but of great beauty and accomplishments. The interval of peace he employed in promoting the internal prosperity of Russia, and formed a commercial connection with the states of the United Provinces. War was renewed with Poland in 1632, but was terminated in about two years, and from this period the czar preserved his country in a state of tranquillity, respected by neighbouring sovereigns for his equity and good faith, and greatly beloved by his subjects, on account of the mildness and beneficence of his government. He died in 1645, in the thirty-third year of his reign, leaving his crown to his son Alexis. Coxe's Travels.

Michael Cerularius, patriarch of Constantinople, was raised to that dignity in the year 1043. He was a person of vast ambition, and a determined enemy to the church of Rome and the papal claims, and in 1053 he revived the famous contest between the Greek and Latin churches, which had been suspended for a considerable time. He pleaded in his justification a sacred regard to truth and the interests of religion, but the true and genuine causes were the arrogance and ambition of the Grecian patriarch and Roman pontiff. Among the measures to which they mutually had recourse, in order to sap the foundations of each other's authority and influence with the people, were accusations of holding corrupt doctrines. Cerularius struck the first blow, by a letter written in his own name, and in the name of Leo, bishop of Acrida, in which he publicly accused the Latins of various errors. To this letter pope Leo IX. wrote a very imperious reply; assembled a council at Rome, and excommunicated the Greek churches. Bitter and very violent measures succeeded on both sides till the year 1057, when a struggle took place between Stratioticus and Isaac Comnenus for the imperial crown: the patriarch embraced the interests of the latter, and was a chief instrument in raising him to that dignity. In the following year, the emperor being compelled by the exhausted state of the public treasury to impose heavy taxes upon the people, drew from the monasteries a part of their great wealth, with which they had been enriched by his predecessors. This the patriarch resented, and threatened to pull him from the throne to which he had raised him, unless he restored what he had taken from the religious houses. The emperor, without hesitation, arrested, deposed, and banished the patriarch, and in a state of exile he soon died. Some of this patriarch's letters remain, and are referred to by Cave, Dupin, and Mosheim.

Michael, *St.*, in *Geography*, a town of Italy, in the duchy of Mantua, on the Tartaro; 20 miles E. of Mantua.—Also, a town of Italy; 12 miles S.W. of Mantua.—Also, a small island in the English channel, off East Looe, in Cornwall. N. lat. 50° 18'. W. long 4° 32'.—Also, a town of the duchy of Holstein; 6 miles S. of Meldorp.—Also, a town of England, in the county of Cornwall, which, though a small place without a market, sends two members to parliament; 8 miles N.E. of Truro, and 249 W.S.W. of London. N. lat. 52° 22'. W. long. 4° 52'.—Also, a town of Canada, in the river St. Lawrence; 15 miles N.E. of Quebec.—Also, a river of Maryland, which runs into the Chesapeak, N. lat. 38° 50'. W. long. 76° 22'.—Also, a town of Sweden, in the province of Savolax; 10 miles N.N.E. of Christiana.—Also, a town of America, in the state of Maryland, and county of Talbot; 21 miles S.E. of Annapolis.—Also, a town on the S. peninsula of St. Domingo island, called "Fond des Nagra;" 10 leagues N.E. of St. Louis.—Also, an island in the Atlantic, called "San Miguel," the largest of the Azores, discovered by Gonsalvo Velho Cabral in the year 1444. It is about sixty miles in circumference, and has several towns and villages, which carry on a great trade in corn, wine, and cattle, though none of its harbours are good or safe. Its chief towns are Punta del Gada, and Villa Franca. The former is rendered important by its commerce, by its strong castle, in which the Portuguese keep a garrison, and by its being the residence of the primate of the Azores. The number of inhabitants in this island is variously estimated, from 25,000 to 50,000. The town of Punta del Gada is situated in N. lat. 37° 47'. W. long. 25° 42'.

Michael, *St.*, *in Lungau*, a town of the archbishopric of Salzburg; 14 miles S.S.E. of Radstadt.

Michael's *Bay*, *St.*, a bay on the W. coast of the island of Curaçoa.—Also, a bay of Nova Scotia, on the W. coast of the bay of Fundy.—Also, a bay on the E. coast of Labrador. N. lat. 52° 55'. W. long. 55° 40'.

Michael's *Point*, *St.*, a cape on the N.W. coast of Prince's island, in the Atlantic. N. lat. 1° 55'. E. long. 7° 1'.

Michael, *St.*, *Gulf of*, a bay on the coast of South America, in the S.E. part of the gulf of Panama, formed by the mouths of the rivers Congo, Santa Maria, and some others. In it are several islands, which shelter good ridings for ships, and the gulf is sufficiently capacious for a large fleet. The sides are surrounded with mangroves, growing in wet and swampy land.

Michael, *Order of St.*, in *Heraldry*, was instituted by Lewis XI., king of France, in the year 1469, but declined under the reigns of Charles IX. and Henry III. In the year 1661, Lewis XIV. regulated this order, and lessened the number of knights; thus restoring its reputation, so that it rose into high esteem in France. The mantle of the order was of white damask, bordered all round with embroidery in gold and colours, representing the collar of the order, and lined with ermine; the chaperon was of crimson velvet, embroidered like the mantle, under which the knights wear a short coat of crimson velvet. The badge of the order

der is a medallion of gold, representing St. Michael trampling on a dragon, enamelled in proper colours, and worn pendent to a collar, composed of escallop-shells, and chains of gold interwoven like knots. The knights usually wear this badge pendent to a broad black watered ribbon.

MICHAEL, *Order of the Wing of St.*, an order in Portugal, instituted in 1172 by Alphonso, king of Portugal, in commemoration of a signal victory which he gained over Albarac, king of Seville, in consequence, as he imagined, of his having ardently invoked the aid of St. Michael the archangel. The habit of the order was of white silk, on the left breast of which was embroidered a wing purple, within a circle of rays gold. The badge was a cross fleury, fitchy gules, cantoned in base with two fleurs-de-lis; over the cross, on an escroll, this motto, "QUIS UT DEUS."

MICHAELIS, JOHN DAVID, in *Biography*, a celebrated biblical critic, and professor of divinity and the Oriental languages, was born at Halle, in Lower Saxony, in the year 1717. He received a private education, but the Greek language made no part of it till within half a year of its completion, a circumstance which he never ceased to regret. In 1729 he was sent to the public school of the orphan-house, and at the same time he occasionally attended his father's lectures on the Hebrew language. Here he received lessons in divinity from Baumgærtner, but the chief benefit which he received from that professor was in the philosophical course. During the latter part of his time at school, he acquired a great facility in speaking Latin, and in thinking systematically, from the practice of disputation, in which one of the masters frequently exercised him. By his Latin master he was taught to write Latin verses, but as he advanced in life he renounced that study, considering it to be a pedantic misemployment of time. In the year 1733, Michaelis entered into the university of his native place, in order to qualify himself either for the clerical profession, or for the chair of oriental literature, in which his father hoped to see him one day his successor. Here he applied himself with all diligence to the study of mathematics, metaphysics, theology, and the oriental languages. He also prepared himself for pulpit services, and preached with great approbation at Halle and other places. In the year 1739 he took a degree in philosophy, and about the same time he was the subject of a temporary melancholy, which threatened to prove a serious injury to his health, and which was owing to religious impressions, originating in certain misconceptions of some of the scriptural precepts, to which he affixed literal interpretations. Upon his recovery, he was appointed assistant lecturer under his father, having shewn how well qualified he was for that situation, by publishing a small treatise, "De Antiquitate Punctorum Vocalium." In 1741 he left his own country with a view of visiting England, and passing through Holland, became acquainted with the celebrated Schultens, from whom he received many marks of the most friendly attention. Upon his arrival in England, he engaged to officiate for the German chaplain to the court, who was at that time in an infirm state of health, and continued to preach at the palace-chapel nearly a year and a half. During this period he visited the university of Oxford, greatly increased his knowledge of the oriental languages, and formed an intimacy with some of the first literary characters of that age, particularly with Dr. Lowth, afterwards bishop of London, on some of whose lectures "De Sacra Poesi Hebræorum" he attended. Upon the return of Michaelis to Halle, he resumed his labours in the professional chair, as assistant to his father, and delivered lectures on the historical books of the Old Testament, the Syriac and Chaldee languages, and also upon natural history, and the Roman classics; by the exercise of his talents on these subjects he maintained and increased the fame which he had already acquired, but without having the prospect of any immediate good establishment. He therefore resolved to quit Halle, and in 1745 he went to Gottingen, in the capacity of private tutor. In the following year he was made professor extraordinary of philosophy in the university of Gottingen, and, in 1750, professor in ordinary in the same faculty. In 1751 he was appointed secretary to the newly instituted Royal Society of Gottingen, of which he afterwards became director, and about the same time was made aulic counsellor by the court of Hanover. During the year 1750, he gained the prize in the Royal Academy of Berlin, by a memoir "On the Influence of Opinions on Language, and Language on Opinions." While the seven years' war lasted, in which the university of Gottingen was particularly distinguished, Michaelis met with but little interruption in his studies, being exempted, in common with the other professors, from military employment; and when the new regulations introduced by the French in the year 1760, deprived them of that privilege, by the command of marshal Broglio, it was particularly extended to M. Michaelis. For this mark of his favour he was indebted to the good offices of his friend Thierry, who was in great esteem with the minister. Soon after this, he obtained from Paris, by means of the marquis de Lostange, the manuscript of Abulfeda's Geography, from which he afterwards edited his account of the Egyptians. From this time that nobleman was Michaelis's firm friend, and had no little share in procuring him the honour of being chosen correspondent of the "Academy of Inscriptions at Paris," in 1764, and of being elected one of the eight foreign members of that institution. In the year 1760, the professor gave great offence to those of the clergy who styled themselves orthodox, by publishing his "Compendium of dogmatic Theology," consisting of doctrinal lectures which he had delivered by special licence from the government. Shortly after this, Michaelis shewed his zeal for the interests of science and literature, by the part which he took in the project of sending a mission of learned men into Egypt and Arabia, for the purpose of obtaining such information concerning the actual state of those countries, as might serve to throw light on geography, natural history, philology, and biblical learning. He first conceived the idea of such a mission, which he communicated by letter to the privy counsellor Bernstorf, who laid it before his sovereign Frederic V. king of Denmark. That sovereign was so well satisfied of the benefits which might result from the undertaking, that he determined to support the expence of it, and he even committed to Michaelis the management of the design, together with the nomination of proper travellers, and the care of drawing up their instructions. Upon the death of Gesner in 1761, Michaelis succeeded in the office of librarian to the Royal Society, which he held about a year, and was then nominated to the place of director, with the salary for life of the post, which he then resigned. Two years afterwards he was invited by the king of Prussia to remove to Berlin, but his attachment to Gottingen led him to decline the advantages which were held out to him as resulting from the change. In 1766 he was visited at Gottingen by sir John Pringle, whom he had known in England, and Dr. Franklin. With the first he afterwards corresponded on the subject of the leprosy, spoken of in the books of Moses, and on that of Daniel's prophecy of the seventy weeks. The latter subject was discussed in the letters which passed between them during the year 1771, and was particularly examined by the professor. This correspondence was printed by sir John Pringle in 1773, under the title of "Joan. Dav. Michaelis de Epistolæ, &c. LXX. Hebdomalibus

domalibus Danielis, ad D. Joan Pringle, Baronettum; primo privatim missæ, nunc vero utriusque Consensu publice editæ." In the year 1770, some differences having arisen between Michaelis and his colleagues in the Royal Society, he resigned his directorship. In 1775 his well-established reputation had so far removed the prejudices which had formerly been conceived against him in Sweden, that the count Höpkin, who some years before had prohibited the use of his writings at Upsal, now prevailed upon the king to confer upon him the order of the Polar star. He was accordingly decorated with the ensignia of that order, on which occasion he chose as a motto to his arms "libera veritas." In 1782 his health began to decline, which he never completely recovered; in 1786 he was raised to the rank of privy counsellor of justice by the court of Hanover; in the following year the Academy of Inscriptions at Paris elected him a foreign member of that body; and in 1788 he received his last literary honour by being elected a member of the Royal Society of London. He continued his exertions almost to the very close of life, and a few weeks before his death, he shewed a friend several sheets, in MS., of annotations which he had lately written on the New Testament. He died on the 22d of August, 1791, in the seventy-fifth year of his age. He was a man of very extensive and profound erudition, as well as of extraordinary talents, which were not less brilliant than solid, as is evident from the honours which were paid to his merits, and the testimony of his acquaintance and contemporaries. His application and industry were unwearied, and his perseverance in such pursuits as he conceived would prove useful to the world, terminated only with the declension of his powers. His writings are distinguished not only by various and solid learning, but by a profusion of ideas, extent of knowledge, brilliancy of expression, and a frequent vein of pleasantry. In the latter part of his life he was regarded not only as a literary character, but as a man of business, and was employed in affairs of considerable importance by the courts of England, Denmark, and Prussia. His works, as an author, were exceedingly numerous, of which a very long list is given in the General Biography. Of those with which the English scholar has been brought acquainted, the most important is the "Introduction to the New Testament," translated into English from the first edition, and published in 1761, in a quarto volume. In 1788, the fourth edition was published in two volumes quarto. The object of this work, which is purely critical and historical, is to explain the Greek testament, with the same impartiality, and the same unbiassed love of truth, with which a critic in profane literature would examine the writings of Homer, Virgil, &c. The first volume contains an examination of the authenticity, inspiration, and language of the New Testament. The second volume contains a particular introduction to each individual book of the New Testament. An English translation of it has been published by the Rev. Herbert Marsh, in six volumes, royal octavo. Gent. Magazine, March 1792. See also the prefaces by Mr. Marsh.

Michaelis, John-Henry, a learned German divine and orientalist, the son of a citizen of Elrich, was born at Kettenburg, in the county of Hohenstein, in the year 1668. He was intended for trade, but discovering a stronger inclination for study than business, he was allowed to follow the bias of his mind, and obtained admission into the school of St. Martin in the city of Brunswick. Here he was appointed to instruct some of the younger scholars, in which employment he acquitted himself greatly to the satisfaction of the rector of the school. After this he was entered of the university of Leipsic, where he went through courses of philosophy and divinity, and also studied the oriental languages and rabbinical Hebrew. In 1694 he quitted Leipsic for the university of Halle, where he taught the Greek, Hebrew, and Chaldee with great reputation. Here he published, with the assistance of professor Francke, a work entitled "Conamina brevioris Manuductionis ad Doctrinam de Accentibus Hebræorum Prosaicis." In 1696 he published another piece, entitled "Epicrisis philologica de reverendi Michaelis Beckii, Ulmensis, Disquisitionibus philologicis, cum responsionibus ad Examen XIV. Dictor. Gen." He was now thoroughly conversant, not only with the Greek, Hebrew, and Chaldee, but likewise with the Syriac, Samaritan, Arabic, and rabbinical Hebrew, and having formed an acquaintance with Job Ludolf, he accompanied him to Frankfort, for the purpose of learning the Ethiopic language under his instructions. In 1699, he succeeded Francke in the Greek professorship at Halle, and in 1707 was made keeper of the university library. He was afterwards nominated professor of divinity in ordinary, and admitted to the degree of D.D. In 1732 he was made senior of the faculty of divinity, and inspector of the theological seminary. He died in 1738, at about the age of seventy. He was author of many works besides those already mentioned, the titles of which are enumerated in Moreri.

MICHAELMAS, the feast of St. Michael the archangel, held on the 29th of September.

Michaelmas *Island*, in *Geography*, a small island at the entrance of king George III.d's Sound, on the S.W. coast of New Holland; 4 miles N.N.E. of Bald Head.

MICHAILA, St., a town of Russia, in the government of Revel; 36 miles S. of Revel.

MICHAILOV, a town of Russia, in the government of Riazan; 24 miles S.S.W. of Riazan. N. lat. 54° 20'. E. long. 38° 38'.

MICHALOWKA, a town of Poland, in Volhynia; 52 miles N. of Zytomiers.

MICHAUT, Pierre, in *Biography*, secretary to the count de Charolois, son of the duke of Burgundy, in 1466, was author of the poem, entitled "Doctrinal de la Cour, ou Danse des Aveugle;" Instructions for the Court, or Blind-man's-buff. From a beautiful copy of this satirical poem, finely illuminated, M. Laborde has given representations of all the musical instruments used in France during the 15th century in the hands of the performers. Essai sur la Mus.

MICHAUXIA, in *Botany*, named by M. L'Heritier, in one of his monographs, in honour of his friend Andrew Michaux, botanist to the late king of France, Louis XVI., and well known by his botanical expeditions to Syria (where he gathered this plant), Persia, North America, and New Holland. The *Flora Boreali-Americana*, often quoted by us, the fruit of his six years' labours in America, was published by his son. We have already offered some remarks on the name of the present genus. (See Medium.) As to its botanical stability, none who consider the variety of shapes in the corollas of reputed *Campanulæ*, can feel quite sure on the subject; but the author of this genus had contemplated the question with singular attention, and with all his wonted sagacity. He declares *Michauxia* to differ from *Campanula*, as *Chlora* from *Gentiana*, the number of the parts being as eight to five, and the corolla that of a *Phyteuma*, but in eight divisions. It is at least a good artificial genus, and now generally adopted, except that Jussieu adheres to one of its ancient names. (See Mindium.) L'Herit. Monogr. 3. Schreb. 840. Willd. Sp. Pl. v. 2. 342. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 353. Lamarck Dict. v. 4. 134. Illustr. t. 295. (Mindium; Juss. 164.)—Class and

and order, *Octandria Monogynia*. Nat. Ord. *Campanaceæ*, Linn. Juss.

Gen. Ch. *Cal.* Perianth superior, of one leaf, in sixteen lanceolate unequal segments, every other one reversed. *Cor.* of one petal, wheel-shaped, much larger than the calyx, in eight very deep, widely spreading, linear-lanceolate, equal segments, revolute at their points. Nectary of eight valves, bearing the stamens. *Stam.* Filaments eight, awl-shaped, permanent; anthers vertical, linear, very long, pressed close to the style. *Pist.* Germen inferior, turbinate; style columnar, permanent; stigma in eight awl-shaped, revolute segments. *Peric.* Capsule turbinate, abrupt, of eight angular cells, without valves, opening by pores at the base. *Seeds* very numerous, oblong, small, affixed to the proper receptacle of each cell, which unites with the central column.

Eff. Ch. Calyx in sixteen deep segments, alternately reflexed. Corolla in eight deep segments. Nectary of eight valves, bearing the stamens. Capsule of eight cells, opening by pores at the base. Seeds numerous.

Obs. It must be allowed that the number of cells in the fruit being equal to that of the parts of the flower, is very different from *Campanula* and *Phyteuma*, and also that there is no botanical analogy between eight and five or three; so that as far as number can be allowed to guide us, no genus can be better defined.

1. M. *campanuloides*. Rough-leaved Michauxia. L'Herit. Monogr. t. 1, 2. Curt. Mag. t. 219. (Μηδιον; Diosc. book 4. chap. 18. Medium Dioscoridis, or Mindium Rhazis; Rauwolf. It. 284. f. 284. Dalech. Hist. append. 33. Bauh. Hist. v. 2. 805. Campanula peregrina maxima, laciniatis foliis; Moris. sect. 5. t. 3. f. 31.)—Gathered by Rauwolf in Syria, near Tripoli; and by Michaux, above 200 years afterwards, in the same country. Labillardiere is also said to have found it on mount Lebanon. It was raised from seed at Paris; and was communicated to Kew garden by L'Heritier in 1787, but being a greenhouse biennial plant, and rarely ripening seeds in England, is now not to be met with. The *root* is spindle-shaped, whitish, milky, like the rest of the plant. *Stem* from two to six feet high, erect, round, leafy, rough, more or less branched, many-flowered. *Leaves* scattered, lanceolate, acute, jagged, very rough, wrinkled, dark green, sessile, clasping the stem; the lower ones stalked; the radical ones heart-shaped, soon disappearing. *Flowers* ranged along the sides, and solitary at the ends of the branches, sessile, drooping, two inches in diameter, very handsome and singular, not unaptly compared by Curtis to some distant resemblance of a Passion-flower. *Corolla* white, with a tinge of purple at the outside. *Stamens* and *style* green, the upper half of the latter loaded with pollen, lodged by the *anthers* among the hairs which invest it, before they retire and curl themselves together.

L'Heritier's two plates, of this plant and its fructification, are the finest possible, scarcely wanting the assistance of colour to give a complete idea of the objects, and even vieing, in that respect, with the prints of the Houghton Van Huysums. The rude cuts of Rauwolf, Daclechamp, and Bauhin are expressive enough. Morison's engraving, copied and perverted as usual, from them, is very bad. Curtis's plate is necessarily a fragment, but faithful. Tournefort and Linnæus were unaccountably deceived concerning this fine plant. The former confounded it with his own *Campanula foliis profundè incisis, fructu duro;* Tourn. Cor. 3, which is *C. lyrata;* Lamarck Dict. v. 1. 588. Hence Lamarck was led into the same error, which he corrected in his v. 4. 134, as above quoted; and hence Mr. Salisbury, in his Prodromus 127, calls our *Michauxia, Campanula lyræfolia*, citing Lamarck by mistake, and asserting that its fruit is "exactly that of a *Campanula*." Linnæus confounded our plant with *C. laciniata*, Sp. Pl. 237, figured in Tournefort's Voyage, v. 1. t. 99, than which few things, at all akin, can be more distinct. He also, by the specific name of *Medium*, applied to another kind of *Campanula*, very common in gardens, seemed to consider that as the μηδιον of Dioscorides, which we apprehend to be no less a mistake. Dr. Sibthorp suspected *C. laciniata* might be the true μηδιον, being probably unacquainted with the *Michauxia*. The latter surely answers best to the original description, such as it is, of which we here subjoin a translation. "Medium grows in shady stony situations. Its leaves are like succory (σερις). Stem three cubits high. Flowers purple, large, and circular. Fruit (or seed) small, like that of *Cnicus*. Root a span long, as thick as a walking-stick." The colour of the flowers probably varies, from different shades of purple, to white.

Michauxia, in *Gardening*, comprehends a plant of the herbaceous flowering, exotic kind, of which the species cultivated is the rough-leaved michauxia (M. campanuloides.)

Method of Culture.—It may be raised from seed procured from its native situation, and sown in the early spring season in pots, and plunged in a hot-bed, or simply on a moderate hot-bed. When the plants have attained a little growth, they should be removed into separate pots, and be replunged in the hot-bed. This must afterwards be managed as tender green-house plants.

Plants of this sort afford variety in collections of this nature.

MICHAW, in *Geography*, a town of Prussia, in Pomerelia; 22 miles W.N.W. of Dantzic.

MICHEL, St., a small island in the gulf of Venice, near Venice, where the Protestants, who trade thither, have purchased ground on which to build a church.—Also, a town of Italy, in the Veronese; 14 miles N.W. of Verona.—Also, a town of France, in the department of Mont Blanc, and chief place of a canton, in the district of St. Jean de Maurienne; 7 miles S.S.E. of St. Jean. The place contains 1450, and the canton 6244 inhabitants, on a territory of $342\frac{1}{2}$ kiliometres, in 8 communes.

Michel *di Capa, St.*, a town of Peru, in the jurisdiction of Arica, on the borders of a large forest of pimento, which is said to produce annually 300,000lbs. weight of that spice.

Michel-*Gemote*, in *History*. See Parliament.

Michel-*Synoth*. See Parliament.

MICHELAU, in *Geography*, a town of Prussia, in the territory of Culm; 36 miles E. of Culm.—Also, a town of Silesia, in the principality of Brieg; 8 miles S.S.E. of Brieg. N. lat. 50° 46'. E. long. 17° 35'.

MICHELBACH, a town of Germany, in the county of Schwarzenburg; 20 miles W. of Anspach.

MICHELI Romano, in *Biography*, a disciple of Soriano, and a famous canonist, who flourished at the latter end of the 16th century, and beginning of the next; author of a very curious and scarce work, published at Venice, 1615, entitled "Musica vaga et artificiosa continente motetti con oblighi, e canoni diversi, tanto per quelli che vorrano professare d'intendere diversi studii della Musica," folio; or, Artful and curious Music, as well for those who receive delight from the performance of it, as for others who make music their peculiar study. Hist. vol. iii. p. 519.

Micheli, James-Bartholomew, an able mathematician, was born of an ancient family at Geneva, in 1692. He entered into the French military service, and became a captain. In 1738, he retired to his native country, where he applied chiefly to mathematical and philosophical studies. He constructed a number of charts, invented a new thermometer,

mometer, and composed several memoirs, printed at Basle. These are on meteorology and the temperature of the globe; light; the comet of 1680; the universal deluge; &c. He surveyed the Glaciers of Switzerland, of which he took several views, which have been engraved. In the troubles which agitated his country he was a sharer, and was imprisoned a long time by order of the government of Berne. He died in 1766.

MICHELI, PETER ANTHONY, an Italian botanist of great celebrity, particularly in what is now called the cryptogamic department, was born at Florence, December 11, 1679. His parents were indigent, and took but little care of his education. He is said, nevertheless, to have been destined to the occupation of a bookseller, but an insatiable thirst after natural knowledge over-ruled all other objects. Content in the humblest poverty, he resigned himself to his favourite pursuit, trusting to that, even for his means of livelihood. Nor was he disappointed. His good character, and distinguished ardour, soon procured him the notice and favour of the marquis Cosmo da Castiglione, in whose family a taste for Botany has been almost hereditary, and for whom Micheli in his early youth made a collection of Umbelliferous plants, which even then proved his accuracy and discernment. This gentleman introduced him to the celebrated count LAWRENCE MAGALOTTI, (see that article,) by whom he was presented to his sovereign, the grand duke Cosmo III. The *Institutiones Rei Herbariæ* of Tournefort had just appeared at Paris; and the first pledge of the grand duke's favour, was a present of that book, which to Micheli, who had hitherto found the want of some systematic guide, was a most important and welcome acquisition. He speedily adopted the tone of his leader, with respect to generic distinctions and definitions, and improved upon him in a more frequent adaptation of original specific ones.

In the autumn of 1706, the care of the public garden at Florence, founded by Cosmo I., was confided to Micheli, he being appointed botanist to the grand duke. He was commissioned to travel, not only in Italy, but in various distant countries, to collect plants, and to establish a correspondence, for the benefit of his trust. By the co-operation of his friends Franchi and Gualtieri, the garden was enriched from the then more flourishing one at Pisa; and a Botanical Society was instituted at Florence in 1717, which greatly promoted the interests of the science. In the summer of that year, the great William Sherard, returning from Smyrna to England, visited Florence in his way, and formed a friendship with Micheli, that continued till his own decease in 1728. A frequent correspondence, and interchange of specimens, took place between them, as amply appears by the collections preserved at Oxford, and by the writings of Micheli.

The subject of our memoir continued his scientific studies, as well as his bodily exertions in frequent journies. The fruit of the former was the publication of his great work, entitled *Nova Plantarum Genera*, a folio of 234 pages and 108 plates, in 1729. The result of his journies proved but too soon disastrous. He spent near three months, from the 4th of September to the 30th of November 1736, in an excursion to the north of Italy, visiting the famous mount Baldus, and the Venetian isles; but he caught a pleurisy, from the consequences of which he never recovered, dying at Florence, January 2, 1737, new style, in the 58th year of his age. He was buried in the church of Santa Croce, amongst the ashes of some of the greatest men of his country, and of the civilized world, where a neat marble tablet was erected to his memory by his associates. The simple and elegant inscription was probably composed by his learned friend Antony Cocchi, to whom he always confided the revision of his Latin works, before publication, and who delivered an Italian oration in his praise, in the council chamber of the Old Palace, August 7, 1737, which was soon after published. The epitaph is as follows.

PETRUS ANTONIUS MICHELIUS
vixit annos LVII dies XXII in tenui re
beatus omnis historiæ naturalis
peritissimus magnorum etruriæ
ducum herbarius inventis et scriptis
ubique notus ac propter sapientiam
suavitatem pudorem optimis
quibusque ætatis suæ egregie carus
obiit IV nonas Januarias MDCCXXXVII
amici ære conlato titulum posuere.

It does not appear that Micheli was ever married. He is described by his contemporaries as a man of the most pleasing, modest, and liberal manners, no less ready to communicate, than eager to acquire, knowledge. His bodily constitution was good; his health uninterrupted; till his last illness, which was of so decided a nature, that he placidly yielded to his fate, not only with the Catholic ceremonies, but with the feelings of a Christian. His friend Cocchi informs us, that "he was endued with a clear and concise natural eloquence; and although the poverty of his parents deprived him of the advantages of a learned education, he had, by his own application, acquired, with wonderful felicity, a knowledge of Latin."—"The writings of the most eminent botanists were so familiar to him, that he had learned to express his ideas in Latin, by no means amiss, be having a very quick perception as to any barbarous expressions."

We are anxious to collect every particular of the life and character of the author of such a book as the *Nova Plantarum Genera;* a work much more extensive in its compass than the *Historia Muscorum* of Dillenius, superior in physiological merit, as well as in technical style of definition, though deficient in historical and critical disquisition, as well as in description. It is to be lamented that Micheli fell so much into the dry catalogue style of Tournefort, though he has greatly improved upon his model; because they have neither of them attained any thing like the technical synoptical terseness and precision of subsequent times. The great merit of Micheli consists in his accurate scientific illustration of some of the most difficult tribes of plants, which Tournefort had left unattempted. The order of the *Calamariæ*, and particularly the difficult genus *Carex*, first assumed an intelligible form under his hands. The seeds of the latter, and their coverings, were first resorted to, with the happiest effect, for specific discrimination. (See CAREX.) A vast number of species of the hitherto neglected genus *Lichen* were ascertained and well delineated. It is with great injustice that Dillenius, whose figures of the crustaceous and imbricated Lichens are the meanest part of his work, charges Micheli with erring on the side of luxuriance in his representations. He had indeed more favourable subjects of investigation, owing to the climate in which he lived; for in Italy the plants in question are found vastly more luxuriant and prolific than in the north of Europe; and we can aver that the figures and descriptions of Micheli are as faithful as those of Dillenius himself; they cannot be more so. (See DILLENIUS.) The parts of the flowers of Mosses, properly so called, were first displayed in the work of Micheli, though he did not understand their real uses. (See MUSCI.) He was equally successful in the collateral families, now termed *Hepaticæ*, founding the genera of *Blasia*, *Marsilea*, *Jungermannia*,

nia, Sphærocarpus, Anthoceros, Targionia, &c. In the natural order of *Fungi,* till then almoſt totally neglected, he diſplayed great accuracy and originality, and gave the firſt ſynoptical diſtribution of thoſe difficult vegetables, by which his followers have profited. Many genera of the more perfect or phænogamic plants are alſo illuſtrated or founded in this work of Micheli; but neither their diſtinctions nor their nomenclature is, in general, ſo good as the former. In ſpecific diſtinction, he was too prone to raiſe varieties to the importance of ſpecies, of which his numerous kinds of *Trifoliaſtrum* are inſtances.

Our author had extended his ſtudies to the Submarine plants, or Sea-weeds, and had numerous plates engraved, for publication in a ſecond volume, had his life been prolonged. Of theſe plates a ſet of impreſſions, procured by the late lord Bute, was bought at his lordſhip's ſale, by the Rt. Hon. ſir Joſeph Banks, and is, through his liberality, acceſſible to all. Another ſet, now in the Linnæan library, was given to its preſent poſſeſſor by Dr. Targioni Tozzetti of Florence, whoſe father purchaſed all Micheli's remains, among which are valuable manuſcripts of various kinds; eſpecially the deſcriptions of theſe plates. There are likewiſe ſome rude drawings of *Orchideæ,* the work we believe of Micheli himſelf. His pencil however was not ſufficiently excellent to enable him to be in general his own draughtſman; ſtill leſs could he, like Dillenius, engrave the plates he publiſhed. In ſtudying the above-mentioned marine productions, it is not wonderful, nor reprehenſible, that he then confounded corals and corallines with plants, and made a genus out of the preſent *Sertularia,* which he called *Dillenia.*

Micheli had prepared an alphabetical catalogue of the plants in the garden, of which he had the ſuperintendance. This was publiſhed in 1748, in folio, with ſeven botanical plates, beſides a plan of the garden, under the title of *Catalogus Plantarum Horti Cæſarei Florentini;* for the race of the Medici, and the golden age of Florence, had now paſſed away. Their imperial ſucceſſors, however, patronized ſcience, and the volume in queſtion is dedicated to the emperor Francis I., by its editor John Targioni Tozzetti, who has prefixed an excellent hiſtorical preface of his own; as well as a more oratorical Italian diſcourſe, upon natural hiſtory, by the before-mentioned Antony Cocchi.

The ſtudies of Micheli were extended to foſſils, and petrifactions, of both which numerous ſpecimens remain in his muſeum: but he publiſhed nothing reſpecting them. An account of three of his botanical tours in Italy is ſaid, by Haller, to be extant, in the ſixth volume of Travels publiſhed by Targioni Tozzetti; but of this publication we have ſeen only the firſt volume. We ought alſo to mention his firſt publication in 1723, an octavo pamphlet on *Orobanche,* in Italian, chiefly with a view to its extirpation, as a noxious weed. This is ſaid to be beſt accompliſhed by eradicating the beans or other plants, on which the *Orobanche* may be perceived to have fixed itſelf, in the month of April; by which proceedure, being an annual herb, its propagation is cut off. Works of Micheli. Smith's Tour on the Continent. Cocchi Elogio di P. A. Micheli. Haller Bibl. Bot. S.

MICHELIA, in *Botany,* ſo denominated by Linnæus, in memory of the great Florentine botaniſt Micheli. (See the laſt article.) Linn. Gen. 278. Schreb. 374. Willd. Sp. Pl. v. 2. 1260. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 3. 332. Juſſ. 280. Lamarck Dict. v. 1. 690. Illuſtr. t. 493. Gærtn. t. 137?—Claſs and order, *Polyandria Polygynia.* Nat. Ord. *Coadunatæ,* Linn. *Magnolia,* Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, coriaceous, ſplitting longitudinally, falling off as the flower expands. *Cor.* Petals numerous, lanceolate, in ſeveral rows; the outer ones largeſt. *Stam.* Filaments numerous, ſhort, linear, inſerted into the common receptacle of the piſtils below the germens; anthers terminal, linear, of two cells, burſting longitudinally at the inner ſide, ſurmounted by a bluntiſh point. *Piſt.* Germens numerous, imbricated in an oblong ſpike; ſtyles none; ſtigmas reflexed, obtuſe. *Peric.* Berries equal in number to the germens, coriaceous, globoſe, of one cell, diſpoſed in a large cluſter. *Seeds* from four to eight, angular on one ſide, convex on the other.

Eſſ. Ch. Calyx of one leaf, coriaceous, immediately deciduous. Petals numerous, in ſeveral rows. Berries numerous, with ſeveral ſeeds.

1. M. *Champaca.* Sweet Yellow Michelia, or Champawk. Linn. Sp. Pl. 756. (Champacam; Rheede Hort. Mal. v. 1. 31. t. 19. Sampacca; Rumph. Amboyn. v. 2. 199. t. 67. Champe; Bauh. Pin. 470.)—Leaves lanceolate, ſomewhat ovate. Calyx externally ſilky.—Native of Malabar, in ſandy places, flowering twice in the year, but not bearing fruit till it is very old. *Rheede.* Commonly cultivated throughout India, eſpecially in the Malay countries, but never found wild. *Rumphius.* Cultivated at Orford, Lancaſhire, by John Blackburne, eſq. in 1779. *Hort. Kew.* This *tree* is celebrated for the exquiſite perfume of its *flowers,* of which moſt Europeans, who have been in India, ſpeak with rapture, though ſome find it too powerful. The natives adorn their heads with theſe *flowers,* both for the ſake of the perfume, and for the elegant contraſt of their rich orange colour, with their own black hair. The *tree* is of a moderate ſize; the bark of its *root* red, bitter, and very acrid, according to Rheede. *Branches* round, alternate, ſmooth, leafy, chiefly at their extremities. *Leaves* alternate, ſtalked, a ſpan long, ovato-lanceolate, entire, taper-pointed; a little tapering at the baſe; ſomewhat ſilky when young, but finally ſmooth, or nearly ſo; rather glaucous beneath; furniſhed with a midrib, and many tranſverſe, oblique, parallel veins, connected by innumerable fine reticulations. *Footſtalks* an inch long, minutely hairy, channelled above. *Stipulas* none. *Flowers* not unlike a double narciſſus, axillary, ſolitary, on ſimple, ſhort, very thick ſtalks. *Petals* elliptic-lanceolate, the colour of the yolk of an egg, the outermoſt about an inch and a half long. *Calyx* ovate, ſcarcely an inch long, finely ſilky, ſplitting down one ſide, and ſeparating from the baſe, before the flower can expand. *Fruit* reſembling a large bunch of grapes, of a pale yellowiſh-white when ripe, very acrid to the taſte, and unpleaſant to the ſmell, according to Rheede. The *ſeeds* are from four to eight, angular from mutual preſſure, the ſize of ſmall peas.

Such is the real *M. Champaca,* of which we have obtained fine ſpecimens from Madras, and have conſequently been enabled to correct the deſcription of the *calyx,* which authors have greatly miſunderſtood. Rheede and Rumphius miſled Linnæus to ſuppoſe there was none; for he originally deſcribed this plant from books only. Afterwards procuring, by the name of *Tſiampacca lalac,* a ſpecimen of our *Magnolia pumila,* (ſee MAGNOLIA, n. 7, where it will appear how much ſuch exotic names are liable to corruption,) he miſtook this for *Michelia Champaca,* and thence altered the character of the genus, in his *Mantiſſa* 140, attributing to it a calyx of three oblong petal-like leaves. How Lamarck diſcovered and figured a ſhort permanent three-leaved calyx we know not. Linnæus had in his herbarium the real *Champaca,* inſcribed *Tſiampacca coenang,* as far as we can decypher the ſcrawl, which he marked *M. Tſiampacca.*

Tsiampacca. Our Indian botanical friends assure us this is only the same name spelt differently, and therefore some contend for the existence of only one species of *Michelia.* We shall endeavour to establish a second.

2. M. *sylvestris.* Wild Whitish Michelia. (M. Tsiampacca; Linn. Mant. 78. M. euonymoides; Burm. Ind. 124. Sampacca sylvestris; Rumph. Amb. v. 2. 202. t. 68.)—Leaves elliptical. Calyx nearly smooth.—Linnæus received this from India by the name of *Tsiampacca poeti*, or White Champawk, which agrees with the name and synonym in Rumphius. It differs from the former in the broad elliptical shape, and perfect smoothness, of its *leaves.* The *calyx* also is smooth, having merely a very slight silkiness at the tip; the rest being finely granulated. Our specimens shew nothing further, but they agree with all the above synonyms perfectly, except that Burmann has a very erroneous quotation of Sloane, and moreover says the Javanese call this species *Tsiampacca conneng*, which Linnæus, we know not on what authority, applied to the former. We could not retain Burrmann's specific name, because it seems suggested by Sloane's synonym, and is totally irrelative to our plant. *Tsiampacca* and *Champaca* are, as we have said, synonimous and ambiguous. We therefore adopt a name from the manuscripts of Linnæus, which it is pity he altered. Rumphius describes the *M. sylvestris* as a more tall and upright *tree* than the *Champaca*, with larger and broader *leaves*, the breadth of four fingers (exactly as we have them); and he very accurately remarks that they have fewer ribs, or transverse veins. *Flowers* exactly like the former, except that their *petals* are broader, whitish, or straw-coloured, with but a slight degree of odour. When cultivated however they acquire a stronger and more delightful smell, though not equal to the *Champaca.* The *fruit* is much the same, though the *seeds*, which vary from two to seven in number, are scarcely so red. It is very possible that this may, after all, be only the wild state of the *Champaca*, but we have now furnished sufficient materials to prevent any future mistake of either, and we trust the generic character is sufficiently established. Gærtner obtained from Thunberg, as the fruit of *M. Tsiampacca*, what looks most like a *Magnolia*, and we cannot but think, the more it is compared with Rumphius, whose figures, we must always recollect, are diminished, the more it will prove different from his.

If Andrews's tab. 229, *Magnolia fuscata*, (see MAGNOLIA n. 8,) be compared with our description of the *calyx* of *Michelia*, they will be found to agree. The *petals* however are those of a *Magnolia*, and we must still remain in doubt for want of the *fruit* of this elegant shrub. It is curious that Linnæus had a specimen of this *Magnolia*, which he very incautiously marked *Michelia Tsiampacca.* On dissecting a flower, he found the *calyx* of three leaves. Whether this be correct or not, though we have three coloured figures of this plant in our periodical publications, none of them enables us to form even a conjecture, except Andrews, and this but incidentally. We have some suspicion that Loureiro's *Liriodendron Figo* may possibly be the same with *Magnolia fuscata*, but unfortunately his slight mention of the fruit affords no certain information as to its genus. The *calyx* however, being of one leaf, agrees. He says his plant is called at Macao *Fula Figo.* Has this any connection with the *Fulle*, Bauh. Pin. 470?

This fine tribe of plants is so little understood by botanists, and so many errors have attended the history of the *Michelia*, which the Linnæan herbarium alone could explain or remove, that we have been more particular than usual, and still the subject is far from being exhausted. S.

MICHELIA, in *Gardening*, comprehends a plant of the tree or shrub kind, of which the species commonly grown is the champaca, or Indian michelia, (M. champaca.)

Method of Culture.—This is a plant which may be increased by seeds, layers, and cuttings, being managed in the same manner as the more tender green-house plants afterwards.

They afford variety in collections of stove plants.

MICHELPACH, in *Geography*, a town of Austria; 12 miles S.E. of St. Polten.

MICHELSDORF, a town of Bohemia, in the circle of Chrudim; 9 miles N.E. of Leutmischl.

MICHICOUI, a river of America, in the state of Vermont, which runs into lake Champlain. N. lat. 44° 55'. W. long. 72° 56'.

MICHIGAN, the largest lake in the territory of the United States, lies between 41° 8', and 45° 40' N. lat. and between 84° and 87° W. long. Its length is estimated at 260 miles from N. to S., and its circumference at 945 miles; and, according to Mr. Hutchins, it contains 10,368,000 acres. It is navigable for ships of any burden. It communicates with lake Huron at the N.E. part through the straight of Michillimakkinak, which is six miles broad, with a fort of its name on an island at its mouth. In this lake are several kinds of fish, and particularly excellent trout, weighing from twenty to sixty pounds. On the N.W. parts of this lake the waters pass through a narrow strait, and branch out into two bays; that to the northward is called Noquet's bay, and the other to the southward Puans, or Green bay, which forms with the lake an extended peninsula, called cape Townsend, or Vermilion point. About thirty miles S. of Bay de Puans, is lake Winnebago, which communicates with it, and a very short portage interrupts the communication south-westward from Winnebago lake through Fox river, then through Ooisconsin, into the river Missisippi. Chicago river, at the S.W. extremity of lake Michigan, furnishes a communication, interrupted by a still shorter portage, with Illinois river. Lake Michigan receives many small rivers from the W. and E., some of which are 150 and even 250 yards broad at their mouths.

MICHILLIMAKKINAK, called by the Canadians "La Grosse Isle," the name of an island, fort, and village, on the S.W. side of the straits of the same name. The island on which the village and fort stand is very barren, but, as the grand rendezvous of the Indian traders, a considerable traffic is carried on; and its situation will probably render it a place of commercial importance. It is within the line of the United States, and contains 251 inhabitants: distant about 200 miles N.N.W. from Detroit. N. lat. 45° 48' 34". W. long. 84° 30'.

MICHILLIMAKKINAK, *Little*, a river on the N.W. territory of America, which enters the S.E. side of Illinois river, by a mouth fifty yards wide, at which there are between thirty and forty small islands. It runs a N.W. course, and is navigable about ninety miles. On its banks is plenty of good timber, *viz.* red and white cedar, pine, maple, walnut, &c.; and here are also coal-mines.

MICHIPICOTEN, a river which runs into lake Superior, on the N.E. side of the lake. At its mouth it forms a bay of its own name; and on the W. part of the bay is a large island, so called, close to the land. On the E. side of the mouth of the above river, in N. lat. 47° 56', is Michipicoten House, belonging to the Hudson's Bay company.

MICHISCOUI, the Indian and present name of the most northerly river in Vermont. It is navigable seven miles from its mouth.

MICHISCOUI *Tongue*, a long point of land which extends southerly foutherly into lake Champlain from the N.E. corner of Vermont, on the W. fide of the bay of this name, and forms the townfhip of Allburg.

MICHO, the name of a cove or bay of Canada, on the S. coaft of the river St. Lawrence; 218 miles below Quebec. N. lat. 49° 5′. W. long. 66° 30′.

MICHOWITZ, a town of Bohemia, in the circle of Kaurzim; 12 miles W.S.W. of Kaurzim.

MICKELSO, a fmall ifland in the Baltic, E. of Aland. N. lat. 60° 12′. E. long. 20° 5′.—Alfo, a fmall ifland on the E. fide of the gulf of Bothnia. N. lat. 63° 27′. E. long. 21° 19′.

MICKERY, a fmall ifland in the Frith of Forth; 8 miles N.W. of Leith. N. lat. 56° 2′. W. long. 3° 17′.

MICKLE, William Julius, in *Biography*, was born, in 1734, at Langholm, in Dumfriesfhire, Scotland, of which place his father was minifter. After a preparatory education under his father, he was fent to the High-fchool at Edinburgh, where he was continued till he was fixteen years of age, when he went into the counting-houfe of a relation to be initiated in the art of brewing. He remained in this bufinefs a few years; but a tafte for reading and poetry rendered him unfit for the neceffary routine of trade. In 1763, he quitted Edinburgh for London, with a view of foliciting employment in the fea fervice, to which he felt a ftrong inclination. He took in his pocket a poem, entitled "Providence," which he contrived to get introduced to lord Lyttleton, at that period a patron of the mufes, but with refpect to our author it produced nothing but a complimentary correfpondence. Several projects for a fettlement at home and abroad, in a commercial or official fituation, having failed, he at length accepted the humble fituation of corrector to the Clarendon prefs at Oxford. In 1767, he publifhed his poem, entitled "The Concubine," the title of which, after it had gone through three editions, was changed to "Sir Martyn," as the firft title had occafioned fome mifconception of its nature. It was written in the ftyle and manner of Spenfer, and difplays much poetical imagery, with a confiderable facility of verfification. Its object is to expofe the evils and difgraces refulting from illicit love, terminating in concubinage. His name now became known to the public, and a way was prepared for the reception of his moft confiderable performance, which was the tranflation of the "Lufiad" of Camoens. He had, at firft, doubts of the probable fuccefs of fuch a work, and publifhed, as a fpecimen, the firft book; and being encouraged by his friends and the public, he refigned his office at the Clarendon prefs, and took lodgings at a farm-houfe, in order that he might devote his whole attention to the tafk. His tranflation was finifhed in 1775, and publifhed under the title of "The Lufiad, or the Difcovery of India," with an introduction, containing an account of the Portuguefe conquefts in that country, the life of Camoens, a differtation on the Lufiad, &c. &c. This work obtained for him a high rank among the Englifh poets, and it is faid by an able critic, that, "as far as fplendour of diction and melody of verfification can go to eftablifh a poetical character, the name of Mickle has not many fuperiors." No metrical tranflator ever took greater liberties with his original than Mickle; and it is certain that his poem, and that of Camoens, have little more in common than the plan and outline. Their difference confifts not only in the language, but in many circumftances and incidents of the piece. Thus Mickle has painted a ftorm and a naval action in three hundred lines, of which there is not the fmalleft veftige in the original. His fuppreffions are as frequent as his interpolations, of which the reader fhould be apprized, if he go to compare the Portuguefe poem with its Englifh tranflation. His purpofe was to give a poem that might live in the Englifh language, which he has attained. Previoufly to the publication of the Lufiad, he had written a tragedy, entitled the "Siege of Marfeilles," which being offered to Garrick, was refufed as unfit for the ftage. The fame fentence was paffed upon it by Mr. Harris and Sheridan, and he fubmitted, after a time, to their decifion with decent fortitude. In 1779, he went out as fecretary to governor Johnftone, who had been appointed to the command of the Romney man of war. He was left at Lifbon as joint-agent for prizes. Here, on account of the honour that he had done to the chief poet of the country, he received many very many flattering marks of attention, and was admitted into the Royal Academy of Lifbon at its firft opening. While at the Portuguefe capital, he wrote his poem of "Almada-hill, an Epiftle from Lifbon," which by no means fupported the reputation which he had acquired by the Lufiad. In his foreign miffion he had acquired fome property, and on his return he fettled at Wheatley, near Oxford, where he died in 1789, leaving behind him a character for ftrict integrity and honour, intermixed, perhaps, with fome foibles and imperfections.

Mickle *Rooe*, in *Geography*, one of the fmaller Shetland iflands. N. lat. 60° 30′. W. long. 1° 49′.

MICKLEHAM, a village and parifh fituated in the hundred of Copthorn, and county of Surrey, England. The houfes are placed in a vale between Leatherhead and Dorking, and the valley is watered by the river Mole, and claims the attention of the topographer on account of the peculiar and picturefque nature of its fcenery, and the many handfome feats included within its jurifdiction. On the weft of the village rifes a gentle hill, adorned by the handfome manfion of Norbury-park, the property of William Locke, efq. and on the eaft is Mickleham Down, a very fine fheep-pafture, belonging to fir Lucas Pepys, bart. Part of this Down is covered with plantations, which were begun by the late fir Cecil Bifhop, about the year 1763, which ferve both to fhelter and ornament the feat of the proprietor, fituated immediately beneath them. A part of the Roman road, called Stanes-ftreet, can be diftinctly traced not far from the houfe. At fome diftance further, to the fouth-eaft, is an eminence called Boxhill, from the vaft quantity of box trees growing on its fummit and fide. This hill afcends abruptly from the Mole, and commands, from its fummit, a very grand and extenfive profpect. What is remarkable, there is a well on the top of it, the water of which ftands at only fifteen feet from the furface, whereas, on another hill oppofite, it is neceffary to raife the water 430 feet. The Mole, which in its paffage through this parifh forms a very ferpentine current, finks entirely into the ground at different places, which commonly are denominated the Swallows.

The church of Mickleham is a very ancient building, and is rather remarkable in its architecture. It is built of ftone, and confifts of a nave, with a chancel at the eaft end of it, a fmall chapel on the north fide, and a fouth aifle, feparated from the nave by round pillars fupporting femi-circular arches. The eaft window is adorned with handfome tracery works, and on each fide of the chancel are two windows, with lancet-fhaped tops within a round-headed arch, which refts upon round pillars, and is ornamented with a fingle row of fquare billet-work. At the weft end rifes a low fquare tower, ftrengthened by double angular buttreffes, and furmounted by a pyramidal fpire. The font is of folid ftone, the bafon having been hollowed out from it. Here are feveral monuments, but none of them peculiarly interefting. The living is a rectory.

According

According to the parliamentary returns of 1801, the number of inhabitants in the whole parish amounted to 389 persons, of whom 186 were males, and 203 females. The grounds of Norbury-park are finely wooded, and diversified with lofty eminences. The house has long been noted for its pictures and works of art; one room is covered with paintings, by Barrett, and is much admired for its style and execution. It represents the mountain and lake scenery of Westmoreland. See Gilpin's Western Counties, and Manning's History of Surrey, edited by William Bray, esq. F. S. A. fol. vol. ii. 1809.

MICKMACKS, American Indians, who inhabit the country between the Shapody mountains and the gulf of St. Laurence, in Nova Scotia, opposite to St. John's island. These people are said to convey their sentiments by hieroglyphics, marked on the rind of the birch, and on paper, which the Romish missionaries perfectly understand. Many of them reside at the heads of the rivers in King's and Hants counties.

MI CONTRA FA, in *Counterpoint*, was long regarded as a solecism in harmony. The natural diatonic scale consisting of tone, tone, and semitone, as C D *e f*, or *ut, re, mi, fa*; G A ♭ *c*, or *sol, la, mi, fa*; if the 4th *fa*, in the key of C, or C in the key of G, was made sharp, it would be called *tritonus*, or a dissonant series of four whole tones; which, before the ear was accustomed to crude intervals, in the infancy of counterpoint, was so offensive, that it used to be said, *Mi contra fa est diabolus*. Alluding to this in king Lear, act i. sc. 7. there is a passage which has much embarrassed the commentators: "O, these eclipses portend these divisions! *Fa, sol, la, mi.*" Shakspeare, however, shews by the context, that he was well acquainted with the nature of the musical intervals contained in the *tritonus*, or sharp 4th, which, consisting of three tones without the intervention of a semitone, is extremely difficult to sing, and disagreeable to uncultivated ears when sung, if *mi* or *fa* terminate the passage.

The false 5th is only an inversion of the sharp 4th, as B F or F B, which were held in equal horror by our fore-fathers; though at present the chief beauties of melody and harmony are derived from these intervals.

MICOTSI, Moses, in *Biography*, a learned Spanish Jew, who flourished in the 14th century, is chiefly known as author of a work, entitled "Sepher Miseroth Gadol," or "The Great Book of Precepts," which is explanatory of the commandments of the Jewish law, and which was printed at Venice in 1545. It is much applauded by father Simon, who says it is highly deserving of diligent perusal, on account of the great learning and judgment with which the author has treated the subject. Moreri.

MICOYA Bay, in *Geography*, a bay situated on the S.W. coast of Mexico, on the Pacific ocean. N. lat. 10° 18′.

MICRANTHEMUM, in *Botany*, from μικρος, *small*, and ανθος, *a flower*. Michaux Boreal-Amer. v. 1. 10. (Globifera; Gmel. Syst. Nat. Linn. v. 2. 32.)—Class and order, *Diandria Monogynia*. Nat. Ord. *Rotaceæ*, Linn. *Lysimachiæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, in four deep, somewhat spatulate segments; the two uppermost rather the smallest. *Cor.* scarcely longer than the calyx, of one petal, nearly bell-shaped; tube very short, smooth within; limb in four deep unequal segments, obsoletely two-lipped, its upper segment smallest. *Stam.* Filaments two, incurved towards each other, with an appendage at the base; anthers of two roundish lobes. *Pist.* Germen superior, almost globular; style short, rather declined; stigma capitate, depressed, oblique. *Peric.* Capsule nearly globular, clothed with the permanent calyx, of one cell and two valves. *Seeds* numerous, ovate, finely striated, sessile upon the central depressed receptacle.

Ess. Ch. Corolla unequally four-cleft. Stamens with an appendage at their base. Capsule of one cell and two valves. Seeds numerous. Calyx inferior, in four deep spatulate permanent segments.

1. M. *orbiculatum*. Michaux, t. 2. (Anonymos umbrosa; Walt. Carolin. 63. Globifera umbrosa; Gmel. n. 1.)—Native of damp shady places, in the woods of Carolina and Georgia, flowering in August. *Michaux*. *Roots* fibrous, annual? *Stems* prostrate, branched, a span long, thread-shaped, leafy, smooth like every other part of the herb. *Leaves* opposite, sessile, nearly orbicular, entire, one-fourth of an inch long, with one rib, and several nearly longitudinal veins. *Flowers* axillary, alternate, solitary, on short capillary simple stalks, not half the length of the leaves, white, the size of a small pin's head.

MICRANTHUS, (from the same derivation as *Micranthemum*,) Wendl. Obs. 39. (see Phaylopsis); Willd. Sp. Pl. v. 3. 342.

MICRELIUS, John, in *Biography*, a very learned German Lutheran divine, was born at Callin, in Pomerania, in the year 1597. He pursued his theological course at Stettin, and became distinguished for his industry and talents. He took his degrees, in succession, with much applause. In 1653, he made a voyage to Sweden, and received many tokens of respect, and testimonies of liberality, from queen Christina. He died in 1658, leaving behind him several works of great learning and research. Among these may be mentioned "Lexicon Philologicum;" "Lexicon Philosophicum;" "Syntagma Historiæ Mundi;" "Syntagma Hist. Ecclesias;" some school books, as "Arithmeticæ, usus Globorum, &c.;" and a vast number of "Theses," "Orations," &c.

MICROCARPÆA, in *Botany*, so named by Mr. Brown, from μικρος, *small*, and καρπος, *fruit*, the capsules of his original species being no larger than a pin's head, and the numerous seeds consequently extremely minute. Brown Prod. Nov. Holl. v. 1. 435.—Class and order, *Diandria Monogynia*. Nat. Ord. *Personatæ*, Linn. *Scrophulariæ*, Juss.

Ess. Ch. Calyx inferior, tubular, five-sided, five-cleft. Corolla two-lipped. Barren stamens none. Capsule of two valves and two cells, with a contrary, and at length loose, partition.

1. M. *muscosa*. Br. (Limosella diandra; Linn. Mant. 252. Willd. Sp. Pl. v. 3. 342. Pæderota minima; Koenig in Retz. Obs. fasc. 5. 10. Willd. Sp. Pl. v. 1. 77.)—Leaves linear-spatulate, about as long as the flower-stalks.—Gathered by the late Dr. I. G. Koenig, in sandy, occasionally inundated, places, at the Cape of Good Hope, as well as at Madras; and by Mr. Brown in the tropical part of New Holland. This diminutive plant grows in dense patches. When examined separately, it will be found very like the European *Limosella aquatica*, though but one-fourth its size; nor can we wonder at Linnæus for having referred it, though diandrous, to the same genus; especially since Krocker has found the *aquatica* to be sometimes diandrous; see Willdenow. Mr. Brown however, finding the corolla irregular and two-lipped, and the capsule of two cells, thought himself justified in establishing the present as a distinct genus; to which we cannot but assent; though it must be observed that the real *limosella* betrays some irregularity of corolla in the incurvation of its two upper segments.—*M. muscosa* has a considerable likeness to *Montia fontana*. The whole *herb* is smooth. *Roots* fibrous, pale, probably annual. *Stem* creeping,

creeping, branched. *Leaves* oppofite, erect, ftalked, fpatulate, narrow, entire; not an inch long, including their footftalks. *Flower-ftalks* axillary, folitary, quadrangular at leaft when dry, fcarcely overtopping the leaves. *Bracteas* none. *Flowers* folitary, erect; their limb pale purplifh. Segments of the *calyx* broad, fhort, and blunt.

2. M. *cochlearifolia.* (Pæderota cochlearifolia; Koenig MSS. Hedyotis maritima; Linn. Suppl. 119. Willd. Sp. Pl. v. 1. 566.)—Leaves obovate, concave. Flowers nearly feffile.—Gathered by Koenig, and by his pupil Rottler, in the Eaft Indies; we believe on the coaft of Coromandel. This has the habit of the firft fpecies, but is of a much larger proportion. *Root* of long fimple fibres, apparently annual. *Stems* numerous, proftrate, varioufly branched and divaricated, four or five inches long, flender, fmooth, leafy. *Leaves* oppofite, on fhort ftalks, obovate, obtufe, entire, fmooth, fomewhat flefhy, rather concave, about half an inch in length, with fome fmaller axillary ones. *Flowers* axillary, oppofite, folitary, on very fhort thick ftalks. *Capfule* nearly globofe, the fize of coriander feed, pale brown, thin and brittle.

Mr. Brown points out the very near affinity of this plant to the former, from which he fays it differs, in having a capfule without valves. This is indeed fo far correct, that the capfule ufually breaks cafually at the fides; but traces of two diftinct valves, each with a narrow partition from its centre, may readily be perceived, and thefe fometimes feparate regularly at the top, in the ufual way, even to the bafe, as we find by examining various fpecimens. This difficulty therefore being removed, we are glad to find a proper place for the plant in queftion, whofe difagreement with HEDYOTIS we have already pointed out; fee the conclufion of that article. Dr. Koenig having made it, like the former, a *Pæderota,* proves its having but two ftamens, he being fo rigid a Linnæan, that he ufually confidered the characters of the artificial claffes as abfolute, the orders having been, in his day, little obferved.

MICROCHLOA, from μικρος, *fmall,* and χλοα, *a grafs.* Brown Prod. Nov. Holl. v. 1. 208.—Clafs and order, *Triandria Digynia.* Nat. Ord. *Gramina.*

Eff. Ch. Spike unilateral, without joints. Calyx fingle-flowered, of two nearly equal, acute, membranous valves. Corolla included, inverfed, of two beardlefs hairy valves. Stigmas feathery.

1. M. *fetacea.* Br. (Rottboellia fetacea; Roxb. Coromand. v. 2. 17. t. 132. Nardus indica; Linn. Suppl. 105. Willd. Sp. Pl. v. 1. 315.)—Native of old walls, on the coaft of Coromandel, and of the tropical region of New Holland. A diminutive annual grafs, with a fibrous *root,* and feveral erect *ftems,* from two to fix inches high, fmooth, round, and leafy. *Leaves* fhort, keeled, channelled, with a fheathing bafe. *Spikes* terminal, long, fimple, very flender, a little incurved, compofed of a fingle rank of imbricated purplifh *flowers,* all directed one way. *Stamens* yellow, two or three. *Styles* purple.

MICROCORYS, from μικρος, *fmall,* and κορυς, *a helmet,* alluding to the fhortnefs of the upper lip of the flower. Brown Prod. Nov. Holl. v. 1. 502.—Clafs and order, *Didynamia Gymnofpermia.* Nat. Ord. *Verticillatæ,* Linn. *Labiatæ,* Juff.

Eff. Ch. Calyx femi-five-cleft. Corolla ringent; its concave upper lip very fhort; middle fegment of the lower lip broadeft. Two upper ftamens included, the fertile lobe of their anthers fmooth, the empty one bearded; two lower with deeply cloven abortive anthers.

A genus of *fhrubs,* found by Mr. R. Brown in the fouth part of New Holland. All the fpecies have entire *leaves,* three in a whorl. *Flowers* axillary, folitary, either white or purple, each with two *bracteas.*

1. M. *virgata.*—Leaves linear, obtufe, fmooth like the calyx. Bracteas deciduous. Stem erect, with thread-fhaped branches.

2. M. *barbata.*—Leaves linear, obtufe, fmooth. Calyx and corolla externally hairy. Bracteas deciduous. Stem diffufe.

3. M. *purpurea.*—Leaves oval-oblong, recurved at the margin; minutely downy on both fides; dotted beneath. Young branches filky. Calyx hoary. Bracteas briftle-fhaped, permanent.

MICROCOS, fo called by John Burmann, Thefaur. Zeyl. 159, who appears to have had in his contemplation the fmallnefs of the berry, or drupa, and therefore the word is to be derived from μικρος, *fmall,* and κοκκος, *a berry,* abbreviated for the fake of harmony. Linn. Gen. 267. Schreb. 356. Willd. Sp. Pl. v. 2. 1168. Gærtn. t. 57.—Clafs and order, *Polyandria Monogynia.* Nat. Ord. *Columniferæ,* Linn. *Tiliaceæ,* Juff.

Gen. Ch. *Cal.* Perianth inferior, of five oblong, bluntifh, fpreading, deciduous leaves. *Cor.* Petals five, linear, equal, emarginate, rather fpreading, various in fize. Nectary none. *Stam.* Filaments numerous, capillary, the length of the calyx, inferted into the bafe of the germen; anthers roundifh. *Pift.* Germen roundifh, fupported by a fhort five-fided column, at whofe top the ftamens are inferted; ftyle cylindrical, fhorter than the ftamens; ftigma bluntifh. *Peric.* Drupa roundifh. *Seed.* Nut turbinate, clothed with long capillary fibres connected with the pulp, of three clofe cells, filled with folitary kernels.

Eff. Ch. Calyx of five leaves. Petals five, without any feparate nectaries. Drupa ftalked, with a hairy nut of three cells.

Linnæus, after having adopted this genus from Burmann, reduced it in his *Syftema Vegetabilium* to *Grewia,* from which Gærtner, who is followed by Schreber and Willdenow, again feparated it. He feems to have fallen into an error in faying, v. 1. 274, that the feeds of *Grewia* have no albumen; but there are fufficient diftinctions befides. (See GREWIA.) Befides the characters in the fructification, we may add, on the fcore of habit, that the inflorefcence of *Microcos* is panicled and terminal, that of *Grewia* axillary, and either fimple or fomewhat umbellate. We are enabled to ftrengthen the genus with two new fpecies, in addition to the original one.

1. M. *paniculata.* Smooth Microcos. Linn. Sp. Pl. 735. (M. foliis alternis oblongis acuminatis; Burm. Zeyl. 159. t. 74. Grewia Microcos; Linn. Syft. Nat. ed. 12. v. 2. 602. Juff. Ann. du Muf. v. 4. 89. Ait. Hort. Kew. ed. 2. v. 3. 301. Schageri-Cottam; Rheede Hort. Malab. v. 1. 105. t. 56.)—Leaves ovate, nearly fmooth.—Native of various parts of the Eaft Indies, in a fandy foil. A *fhrub* about a man's height, with alternate, round, leafy *branches,* which are a little downy when young only. *Leaves* alternate, on fhort roughifh ftalks, ovate, pointed, more or lefs oblique, from three to five inches long, and two broad, flightly and unequally ferrated, green on both fides, furnifhed from the bafe with three ribs, but the lateral ones vanifh about the middle, and are replaced by many large veins from the mid-rib, connected by an infinity of minute reticulations; both fides are a little rough to the touch, but naked, except a briftly roughnefs on the ribs. *Panicle* terminal, doubly or triply compound, the branches clothed with a fcurfy, fomewhat ftellated, pubefcence. *Flowers* reddifh, two or three together, in a common *involucrum* of about

about feven oblong downy deciduous leaves, refembling thofe of the perianth, which is lefs downy within. *Petals* not longer than the germen, obtufe, recurved, downy at the outfide.

2. M. *tomentofa*. Downy-leaved Microcos.—Leaves elliptical, very downy beneath.—A fpecimen of this is preferved in the herbarium of the younger Linnæus, marked *Grewia*, but without any indication of its native country. The *branch* is round, clothed with denfe rufty down, as are the *footftalks*, *flower-ftalks*, and backs of the *leaves*, the latter part being very foft. The *leaves* are the fize of the former, but elliptical and blunt, with a fhort point, and obfoletely ferrated chiefly towards the extremity. Their upper furface feels foft, from fcarcely vifible downinefs. The *panicle* is much like the foregoing, but the leaves of the *involucrum* are linear, narrow, and more diftant; others refembling them, but three-cleft, being fcattered about the lower part of the *panicle*, fo that they ought rather to be called *bracteas*.

3. M. *fcabra*. Rough-leaved Microcos.—Leaves oblong, heart-fhaped at the bafe, rough at the back.—Sent from Amboyna, by the late Mr. Chriftopher Smith. A larger fpecies than either of the former; its *branches*, *ftalks*, and backs of the *leaves* rough and harfh to the touch. The *leaves* are a foot long or more, four or five inches broad, pointed, obliquely heart-fhaped at the bafe, with five radiating hifpid ribs, and innumerable tranfverfe, parallel, reticulated veins; the margin is flightly uneven; the upper furface rather fhining and fmooth, except the ribs; the under opaque, and minutely hifpid, with ftarry, finally deciduous, hairs. *Panicle* ample, fpreading, repeatedly branched, terminal, but attended by axillary branches, likewife doubly compound, from fome of the upper leaves. *Involucral* leaves, embracing two or three flowers, dilated, membranous, downy, often palmate; the *bracteas* which refemble them, under each branch of the panicle, more decidedly palmate. *Flowers* the fize of the two former, but much more abundant. *Petals* lanceolate, tapering at the bafe, as long as the calyx, hairy at their backs.

We have feen nothing of the fruit of thefe two laft fpecies, but their inflorefcence, with the peculiar involucral leaves or bracteas, being fo unlike in all, and the ftructure of the flowers, as far as we can inveftigate it, agreeing equally well, it is prefumed there can be little uncertainty about their genus, if *Microcos* be allowed that rank at all. S.

MICROCOSM, Μικροκοσμος; formed from μικρος, *little*, and κοσμος, *world*, a Greek term, literally fignifying *little world*; chiefly underftood of *man*, who is fo called by way of eminence, as being an epitome of all that is wonderful in the great world, or macrocofm.

MICROCOSMETER, a name given by Dolæus to an imaginary being, which he fuppofes to refide in the brain, and direct all the actions.

MICROCOUSTICS, the fame with microphones.

MICROGRAPHIA, MICROGRAPHY, compounded of μικρος, *fmall*, and γραφη, *defcription*, a defcription of the parts and portions of objects that are too fmall to be viewed without the affiftance of a microfcope.

MICROLÆNA, in *Botany*, feems to be formed of μικρος, *fmall*, and ληνος, *wool*, alluding to the little bearded ftalk of the flower within the calyx. Brown Prod. Nov. Holl. v. 1. 210.—Clafs and order, *Tetrandria Digynia*. Nat. Ord. *Gramina*.

Eff. Ch. Calyx fingle-flowered, of two minute valves. Corolla fupported by a bearded ftalk, longer than the calyx, double, each of two valves, fmooth; thofe of the outermoft nearly equal, each with a terminal awn. Nectary of two oppofite fcales, alternate with the valves of the corolla. Stigmas feffile, feathery.

1. M. *ftipoides*. Br. (Ehrharta ftipoides; Labill. Nov Holl. v. 1. 91. t. 118.)—Gathered by M. Labillardiere in Van Diemen's land, and by Mr. Brown at Port Jackfon.—A fmooth grafs, about a foot and a half high. *Stem* round, flender, fimple, leafy. *Leaves* fpreading, fhort, flat, taper pointed, with very long fheaths, and a jagged ftipula. *Panicle* a fpan long, capillary, drooping, fimply branched. The bearded ftalk on which the flower ftands within the calyx, and the long awned glumes, give this grafs the afpect of an *Andropogon*, or *Stipa*. The French author defcribes and figures fix *ftamens*, and therefore referred the plant to *Ehrharta*, with which it has no other character in common, nor fcarcely any agreement in afpect. Mr. Brown, after repeated examinations, declares it to be certainly tetrandrous. The *ftigmas* are two, feffile and feathery. *Seed* elliptic-oblong, flightly compreffed, enclofed in the permanent hufks of the corolla. The *nectary* is extremely minute.

MICROLEUCONYMPHÆA, one of Boerhaave's fefquipedalian names, fuch as he diftributed plentifully among the Proteaceous family, and which is equivalent to Small-white-water-lily. He applied it to the plant now more happily termed HYDROCHARIS; fee that article.

MICROLOGUS, Μικρολογος, from μικρος, *parvus*, and λογος, *ratio*, *fermo*, that which gives reafons for obfcure and minute things, a minute enquiry into latent things: the title given by Guido d'Arezzo to his treatife on mufic, in which his fyftem is unfolded.

The moft curious part of the micrologus is the chapter "De Diaphonia, et Organi jura;" as it fhews the ftate of mufic at the time it was written, and gives fuch fpecimens of the firft rude attempts at harmony as may be fafely pronounced authentic. See GUIDO, HEXACHORD, and COUNTERPOINT.

MICROLOMA, in *Botany*, from μικρος, *fmall*, and λωμα, *a fringe*, the five tufts of hairs, alternate with the fcales, in the middle of the flower, having altogether that appearance. Brown Tr. of the Wernerian Society, v. 1. 53. (Ceropegia; Lamarck Illuftr. t. 179.)—Clafs and order, *Pentandria Digynia*. Nat. Ord. *Contortæ*, Linn. *Apocineæ*, Juff. *Afclepiadeæ*, Brown.

Eff. Ch. Corolla pitcher-fhaped, with an inflated angular tube, much longer than the limb, naked at the mouth. Scales five, inferted into the tube under each finus, alternate with as many tufts of hair. Stamens without a crown. Anthers arrow-fhaped, tipped with a membrane; maffes of pollen compreffed, attached by the apex, pendulous. Stigma with a fmall point. Follicles . . . . .

A genus of twining flender *fhrubs*, with oppofite *leaves*, and *umbels* inferted between the *footftalks*. It is formed of the two Linnæan Cape fpecies of *Ceropegia*, which Mr. Brown obferves are widely different from the original fpecies of that genus. See CEROPEGIA, (by miftake CEROPEGIUM).

1. M. *fagittatum*. (Ceropegia fagittata; Linn. Mant. 215. Lamarck fig. 1. Cynanchum radice glandulofa, foliis anguftis finuatis, floribus urceolatis miniatis; Burm. Afr. 36. t. 15.)—Leaves arrow-fhaped, downy. Limb of the corolla rather acute.—Native of the Cape of Good Hope. *Root* of feveral oblong flefhy knobs. *Stems* two or three, flender, twining, fomewhat branched. *Leaves* on fhortifh ftalks, linear-oblong, revolute, dilated and arrow-fhaped at the bafe. *Flowers* in fmall hairy lateral umbels, fcarlet, with a fharp hairy *calyx*. The angles of the *corolla* alfo are downy.

2. M. *lineare.* (Ceropegia tenuifolia; Linn. Mant. 215. Syst. Veg. ed. 14. 255. Lamarck fig. 2. Periploca tenuifolia; Linn. Sp. Pl. 310, β. Cynanchum linearibus foliis acutis, floribus urceolatis rubris; Burm. Afr. 37. t. 16. f. 1.)—Leaves linear, smooth. Limb of the corolla very blunt.—Native of the Cape of Good Hope. The *root* is tuberous. Habit very like the foregoing, but the *leaves* are more narrow, strictly linear throughout, and smooth. *Flowers* red, differing from the former in the very oblique and obtuse form of the segments of their limb.

Mr. Brown appears to have, by mistake, copied the Linnæan specific name *tenuiflora* instead of *tenuifolia*, which last need not have been changed, though the appellation he has chosen we confess to be more particularly expressive.

MICROMETER, an astronomical machine, which, by means of a very fine screw, serves to measure extremely small distances in the heavens; as the apparent diameters of the planets, to a great degree of accuracy.

The word comes from the Greek μικρος, *parvus*, and μετρον, *mensura*: because a small length, *e. g.* an inch, is hereby divided into vast numbers of parts, *e. g.* in some 2800, and in others more.

This instrument is so contrived as to move a fine wire parallel to itself, in the plane of the picture of an object, formed in the focus of a telescope, and with great exactness to measure its perpendicular distance from a fixed wire in the same plane; and thus are measured small angles, subtended by remote objects at the naked eye. *E. G.* Let a planet be viewed through a telescope: and when the parallel wires are opened to such a distance as to appear exactly to touch two opposite points in the circumference of the planet, it is evident, that the perpendicular distance between the wires is then equal to the diameter of the picture of the planet, formed in the focus of the object-glass. Let this distance, whose measure is given by the mechanism of the micrometer, hereafter described, be represented by the line pq, *Plate* X. *Optics*, *fig.* 5; then, since the measure of the focal distance $q4$ may be also known, the ratio of q L to qp, that is, of the radius to the tangent of the angle q L p, will give the angle itself by a table of sines and tangents; and this angle is equal to the opposite angle P L Q, which the real diameter of the planet subtends at L, or at the naked eye. There is some controversy about the invention of the micrometer. Messrs. Auzout and Picard have the credit of it in common fame, as being the first who published it, in the year 1666; but Mr. Townley, in the Philosophical Transactions, reclaims it for one of our own countrymen, Mr. Gascoigne. He relates, that from some scattered papers and letters of this gentleman, he had learnt, that, before our civil wars, he had invented a micrometer, of as much effect as that since made by M. Auzout, and had made use of it for some years, not only in taking the diameters of the planets, and distances upon land, but in determining other matters of nice importance in the heavens; as the moon's distance, &c.

Mr. Gascoigne's instrument fell into the hands of Mr. Townley, who says, that by the help of it he could make above forty thousand divisions in a foot. This instrument being shewn to Dr. Hooke, he gave a drawing and description of it, and proposed several improvements in it, which may be seen in the Philosophical Transactions, Abr. vol. i. p. 217. Mr. Gascoigne divided the image of an object, in the focus of the object-glass, by the approach of two pieces of metal, ground to a very fine edge, in the place of which Dr. Hooke would substitute two fine hairs stretched parallel to one another. Two other methods of Dr. Hooke, different from this, are described in his Posthumous Works, p. 497, &c. An account of several curious observations which Mr. Gascoigne made by the help of his micrometer, particularly in the mensuration of the diameter of the moon and other planets, may be seen in the Phil. Trans. vol. xlviii. p. 190; where Dr. Bevis refers to an original letter of Mr. Gascoigne, to Mr. Oughtred, written in 1640—1, for an account given by the author of his own invention, &c.

Monf. de la Hire, in a discourse on the era of the inventions of the micrometer, pendulum clock, and telescope, read before the Royal Academy of Sciences in 1717, makes M. Huygens the inventor of the micrometer. That author, he observes, in his Observations on Saturn's Ring, &c. published in 1659, gives a method of finding the diameters of the planets by means of a telescope; *viz.* by putting an object, which he calls *virgula*, of a proper bigness to take in the distance to be measured, in the focus of the convex object-glass: in this case, says he, the smallest object will be seen very distinctly in that place of the glass. By such means, he adds, he measured the diameters of the planets, as he there delivers them.

This micrometer, M. De la Hire observes, is so very little different from that published by the marquis de Malvasia, in his Ephemerides, three years after, that they ought to be esteemed the same: and the micrometer of the marquis differed yet less from that published four years after his by Auzout and Picard. Hence, M. De la Hire concludes, that it is to M. Huygens the world is indebted for the invention of the micrometer; without taking any notice of the claim of our countryman Mr. Gascoigne, which, however, is prior by many years to any of them.

M. De la Hire says, that there is no method more simple or commodious for observing the digits of an eclipse, than a net in the focus of the telescope. These, he says, were generally made of silken threads, and for this particular purpose six concentric circles had also been made use of, drawn upon oiled paper; but he advises to draw the circles on very thin pieces of glass, with the point of a diamond. He also gives several particular directions to assist persons in using them. In another memoir he shews a method of making use of the same net for all eclipses, by using a telescope with two object-glasses, and placing them at different distances from one another. Ac. Par. 1701, and 1717.

MICROMETER, *Construction and Use of the.* Wolfius describes a micrometer of a very easy and simple structure, first contrived by Kirchius, thus:

In the focus of a telescope fit a brass or iron ring A B (*Plate* X. *Optics*, *fig.* 6.) with female screws diametrically opposite to each other; into these insert male screws C E and F B, of such length as that they may be turned in the tube, so as to touch each other: and with this instrument very small spaces in the heavens may be accurately measured.

For when any objects, viewed through a tube, appear contiguous to the screws, if these be turned till they just touch two opposite points, whose distance is to be measured, it will be evident how many threads of the screw they are apart. To determine how many seconds answer to each thread, applying the tube towards the heavens, turn the screws till they touch two points, whose distance is already accurately known; and observe the number of threads corresponding to that interval; thus, by the rule of three, a table may be made of the seconds corresponding to the several threads; by means of which, without greater labour, the distances of any points may be determined.

The structure of another micrometer, with the manner of fitting it to the telescope, and applying it, is as follows: A B C g (*fig.* 7.) is a rectangular brass frame, the side A B being about three inches long, and the side B C, as likewise the

the oppofite fide A g, about fix inches; and each of the three fides about eight-tenths of an inch deep: the two oppofite fides of this frame are fcrewed to the circular plate, to be mentioned hereafter.

The fcrew P, which has exactly forty threads in an inch, being turned round, moves the plate G D E F, along two grooves made near the tops of the oppofite fides of the frame; and the fcrew Q, having the fame number of threads in an inch as P, moves the plate R N M Y along two grooves, made near the bottom of the faid frame, in the fame direction as the former plate moves, but with only half the velocity of that other; thefe fcrews are turned both at once, and fo the plates are moved along the fame way, by means of a handle turning the endlefs fcrew S, whofe threads fall in between the teeth of the pinions on the fcrews P and Q. And note, that two half revolutions of the endlefs fcrew S carry the fcrew P exactly once round.

The fcrew P turns the hand a, faftened to it, over a hundred equal divifions, made round the limb of a circular plate, to which the above named two oppofite fides of the frame are fcrewed at right angles; the teeth of the pinion on the fcrew P, whofe number is 5, take into the teeth of a wheel on the backfide of the circular plate, whofe number is 25. Again, on the axis of this wheel is a pinion of two, which takes into the teeth of another wheel, moving about the centre of the circular plate, on the outfide of it, and having fifty teeth; this laft wheel moves the leffer hand b once round the above mentioned circular plate in the $\frac{1}{100}$dth part of the time the hand a is moving round: for becaufe the number of teeth in the pinion of the fcrew P is 5, and the number of teeth of the wheel this pinion moves, is 20; therefore the fcrew P moves four times round in the time that wheel is moving once round. Further, fince there is a pinion of two which takes into the teeth of a wheel, whofe number is 50; therefore this wheel with 50 teeth will move once round in the time that the wheel of 20 teeth moves 25 times round; and, confequently, the fcrew P, or hand a, muft move a hundred times round in the fame time as the wheel of 50 teeth, or the hand b, has moved once round.

Hence it follows, that if the circular plate W, which is faftened at right angles to the other circular plate, be divided into two hundred equal parts, the index x, to which the handle is faftened, will move five of thofe parts in the fame time in which the hand a moves one of the hundred divifions round the limb of the other circular plate. Thus by means of an index x, and plate W, every fifth part of each of the divifions round the other plate may be known.

Further, fince each of the fcrews P and Q have exactly forty threads in an inch; therefore the upper plate G D E F will move one inch while the hand a moves forty times round; the four-thoufandth part of an inch while the hand moves over one of the divifions round the limb; and the twenty-thoufandth part of an inch while the index x moves one part of the two hundred round the limb of the circular plate W: and the under plate R N M Y will move half an inch, the two-thoufandth part of an inch, and the ten-thoufandth part of an inch, the fame way, in the faid refpective times.

Hence, if the under plate, having a large round hole in it, be fixed to a telefcope, fo that the frame is moveable, together with the whole inftrument, except the faid lower plate; and the ftraight fmooth edge H I, of the fixed plate A B I H; as likewife the ftraight fmooth edge D E, of the moveable plate G D E F, be perceivable through the round hole in the under plate, in the focus of the object-glafs; then when the handle of the micrometer is turned, the edge H I, of the narrow plate A B I H, fixed to the frame, and D E, of the moveable plate, will appear through the telefcope equally to aproach to, or recede from, each other.

By thefe edges we fhall be able to meafure the apparent diameters of the fun, moon, &c. the manner of doing which take as follows:

Suppofe, in looking at the moon through the telefcope, you have turned the handle till the two edges D E and H I are opened, fo as juft to touch or clafp the moon's edges; and that there were twenty-one revolutions of the hand a to complete that opening: firft fay, as the focal length of the object-glafs, which fuppofe ten feet, is to radius, fo is one inch to the tangent of an angle fubtended by one inch in the focus of the object-glafs; which will be found twenty-eight minutes thirty feconds: again, becaufe there are exactly forty threads of the fcrews in one inch; fay, if forty revolutions of the hand a give an angle of 28′ 30″, what angle will twenty-one revolutions give? The anfwer will be, fifteen minntes eight feconds; and fuch was the moon's apparent diameter. And fo may the apparent diameters of any other objects be taken. It muft be here obferved, that the divifions on the top of the plate G D E F are diagonal divifions of the revolutions of the fcrews, with diagonal divifions of inches againft them; thus, as the faid plate flides along, thefe diagonals are cut by divifions made on the edge of the narrow plate K L, fixed to the oppofite fide of the frame by means of two fcrews. Thefe diagonal divifions ferve for a regifter to count the revolutions of the fcrews, and to fhew how many there are in an inch, or the parts of an inch.

Dr. Derham tells us, that his micrometer is not, as ufually, to be put into a tube, but to meafure the fpectres of the fun on paper (of any radius), or to meafure any part of them. By this means, he can eafily, and very exactly, with the help of a fine thread, take the declination of a folar fpot at any time of the day; and, by his half-feconds watch, meafure the diftance of the fpot from the fun's eaftern and weftern limb.

A micrometer of a better fort is made in this manner: in the middle of an oblong plate of brafs, (A B, *Plate* X. *Optics*, *fig.* 8.) there is cut an oblong hole, $a\,b\,c\,d\,e\,f$, (to be placed in the focus of a telefcope,) having a fine wire, $b\,e$, extended lengthways over the middle of it, at right angles, to two flender brafs bars or fights $g\,h$, $i\,k$, lying crofs the hole; of which $g\,h$ is fixed to the plate A B by fcrews at g and h, but $i\,k$ is moved parallel to $g\,h$ by twifting a round knob C fixed upon one end of a long iron fcrew D E, which turns upon a tapering point at its end D, while its other end turns round in a hole at E in the centre of an index plate E F, fixed at right angles to the main plate A B. The long fcrew D E works through two hollow fcrews in two cubical blocks of brafs, fixed behind the plate $l\,m$, bent fquare to the plate $n\,o$, that flides upon the main plate A B, either backward or forward, and carries a perpendicular arm $o\,p$ extended over the hole $b\,e$; while p, the extremity of the arm $o\,p$, flides under a brafs ledge $q\,r$, fcrewed to the main plate A B, along the fide of the hole. One fide, $s\,t$, of the moveable fight-plate $i\,k\,s\,t$, lies over the arm $o\,p$, being fixed to it by the flat-headed fcrews at s and t, the holes in the plate $s\,t$ being oblong or larger than the fhanks of the fcrews, to give liberty for placing the edge $i\,k$ coincident with $g\,h$, when carried up to it by turning the fcrew D E by the knob C; the part $i\,k$, which projects over the arm $o\,p$, being hammered down to lie flat upon the main plate A B. The edge $i\,k$, after this adjuftment, will always move parallel to the edge $g\,h$; its inclination to the fcrew D E being every where the fame, provided the fcrew be ftraight, and the interval of the concave fcrews behind $l\,m$ be fufficiently great and their motion fteady. For this purpofe about a quarter-round

round of a third concave ſcrew preſſes upon the long ſcrew D E at v, the block of it being fixed to the middle of a ſpringing plate $w\,v\,x$; whoſe extremities lying behind the blocks at l, m, not ſo near as to touch them, are preſſed towards them with ſcrews at w and x; which occaſions the block at v to ſpring upon the ſcrew D E, and to hold it tight to the oppoſite ſide of the concave ſcrews at l, m. To prevent any motion lengthways in the ſcrew D E, its tapering point D turns in a hollow point at the end of an oppoſite ſcrew y, which working through a fixed block at z, holds up the ſhoulder of the long ſcrew D E, againſt the back of the index-plate, where its neck is inſerted.

The two indexes upon the plate E F ſhew the number of revolutions and parts of a revolution of the ſcrew D E, anſwering to the interval of the ſights $g\,b$, $i\,k$. In the outward plate there is a circular ſlit $\alpha\,\beta\,\gamma$, which diſcovers part of the diviſions upon the circumference of an inner plate, turned about a centre by two wheels and pinions within: ſo that for every revolution of the ſcrew, an index E F, which ſhews the parts of it, one diviſion upon the plate $\alpha\,\beta\,\gamma$, paſſes by a fixed point at β; which ſhews the number of revolutions anſwering to the intervals of the ſights $g\,b$, $i\,k$.

This micrometer received a very great improvement by an ingenious contrivance of the reverend Dr. James Bradley, profeſſor of aſtronomy at Oxford, for turning it in its own plane about the interſection δ of the fixed ſight $g\,b$, and of the tranſverſe wire $b\,\delta\,e$, without ſtirring the teleſcope: which is thus executed. Upon the backſide of the main-plate turned upwards, and here repreſented by the parallelogram G H I K, (*fig.* 9.) there is laid ſuch another plate L M N O, of the ſame breadth and thickneſs but ſomewhat ſhorter; in the middle of which there is an oblong hole, anſwering to the other in the lower plate, but ſomewhat larger; being terminated at its ſides by the ſtraight lines $\varepsilon\,\zeta$, $\eta\,\theta$, and at its ends by the concave arches $\theta\,\iota\,\varepsilon$, $\zeta\,\kappa\,\eta$, whoſe common centre is the point δ above-mentioned. The concave arch $\varepsilon\,\iota\,\theta$ ſlides round this centre againſt a concentric convex arch of an annular plate $\lambda\,\mu\,\nu$; ſomewhat longer than the concave arch, of the ſame thickneſs as the upper parallelogram, and ſtrongly ſcrewed to the under one, round that end of the hole which is neareſt to the centre δ; and at the ſame time the other concave arch $\zeta\,\kappa\,\eta$ ſlides alſo againſt another concentric convex arch $o\,\varpi$, of another annular plate juſt as thick as the upper parallelogram, and ſtrongly ſcrewed to the under one. This convex arch $o\,\varpi$ is ſhorter than the contiguous concave one $\zeta\,\kappa\,\eta$, to give room for the circular motion of the plates; which are held together by two annular plates ſimilar to $\lambda\,\mu\,\nu$ and $o\,\varpi$, but ſomewhat broader, to cover the coincident arches when laid over them, and ſcrewed down to the reſpective annular plates underneath. The circular motion upon theſe arches about their centre δ, is gradually given to the upper parallelogram by an endleſs ſcrew at ϱ, having an axis $\sigma\,\tau$ laid croſs the end of the under parallelogram, and turning upon a point at one end, and in a collar at the other, both fixed to the under plate; while the ſpiral thread ϱ moves the teeth of a braſs arch fixed at v, to the end of the upper parallelogram.

To hold the micrometer in the tube of a teleſcope, along each ſide of the upper parallelogram there is fixed a long braſs plate about an inch broad; having its oppoſite ſides bent contrary ways, ſo as to form two oppoſite ledges, about one-eighth of an inch broad, at right angles to the intermediate part of the plate, as repreſented in the figure. One of the ledges of each plate is placed inwards along the ſides of the upper parallelogram, and is firmly fixed to it by ſeveral ſcrews. The figure $\varphi\,\chi\,\psi\,\omega$ repreſents one of the equal and oppoſite holes cut in the ſides of a ſquare tube, through which the micrometer is put; the notches $\phi\,\chi$ being made to receive the ledges of the ſide-plates, to keep the plate of the micrometer perpendicular to the tube at a juſt diſtance from the object-glaſs. Which diſtance being once determined by trials, as above explained, muſt be kept invariable in all obſervations, by ſtops or pins, if the tube conſiſts of two or more joints that draw in and out.

The Meaſures of the Micrometer.

	Inches.
The length of the plate A B	8.0
Its breadth M N	3.6
Its thickneſs	0.$\frac{1}{2}$
Length of the hole $b\,e$	3.5
Its breadth $g\,b = \delta\,e$	2.2
Breadth of the hole in the other plate at $\zeta\,\eta$	2.6
Length of the ſcrew D E	5.5
Its thickneſs	0.3
The line A b	1.6
The interval $l\,m = w\,x$	3.0
Length of the ſide cheeks	4.5
Their breadth	0.8
Their ledges	0.2
Diameter of the index-plate	3.1
Its thickneſs (being double with two wheels within)	0.3
The greateſt opening of the ſights $g\,b$, $i\,k = \delta\,e$	2.2
Threads of the ſcrew in an inch, 40	

The inch is divided by the index-plates into 40 times 40, or 1600 equal parts. Inſtead of the braſs ſights $g\,b$, $i\,k$, two others, with parallel wires a, may be ſcrewed on at pleaſure.

When the ſight-plates are made to coincide, the two indexes of the revolutions and their parts muſt be ſet to the beginning of the numerations upon the index-plates. Then as the ſights are opened, it is evident from the make of a ſcrew, that the numbers of revolutions will be as the intervals of the ſights, and conſequently as the angles ſubtended by them at the centre of the object-glaſs; the intervals being inſenſibly different from the arches that meaſure theſe ſmall angles. Therefore when any one angle correſponding to a given number of revolutions, is determined by experiment, an angle correſponding to any other number of revolutions may be found by the rule of three. And thus may tables be made to ſhew by inſpection the number of minutes and ſeconds in an angle anſwering to any given number of revolutions and parts.

To determine ſome one angle, the larger the better, becauſe the ſame error in the determination will be proportionably ſmaller in a given angle deduced from it; fix the teleſcope upon any known ſtar in the equator, or very near it, and open the ſights to their utmoſt limit and note the number of revolutions of the ſcrew. Then by a pendulum-clock obſerve the interval of time in the ſtar's tranſit over the given interval of the ſights, and having turned it into minutes and ſeconds of an arch, they are the meaſure of the angle required. But if the ſtar be remote from the equator, the number of minutes and ſeconds thus found, muſt be diminiſhed in the ratio of the radius of the ſine of the ſtar's diſtance from the pole. To this micrometer Dr. Bradley applied an ingenious contrivance, by which it is adapted for taking the difference of right aſcenſion and declination of ſuch objects as are at a greater diſtance than the teleſcope will take in at once, but which paſs through the aperture of it at different times. Let A B C (*fig.* 10.) repreſent a flat ring of braſs, fixed in the focus of the teleſcope; and $a\,b\,c$ a ſmaller

ſmaller concentric ring lodged in a circular groove turned within the larger, and kept in the groove by three ſmall plates of braſs fixed to the outward ring, and extended over the edge of the inner one. Upon the inner ring is fixed a concentric arch of a wheel *de*, having teeth cut in its convexity, which are driven round by the threads of an endleſs ſcrew, whoſe axis D E F turns in a collar at E, and upon a point at F, both fixed to the outward ring. The hairs *g h*, *i k*, croſs at right angles in *f*, the centre of the rings; and when the teleſcope is ſo fixed that the image of the ſtar falls upon *f*, let it move along any line *f q*, and by turning the ſcrew D E F, and by conſequence the hair *f k*, about the fixed point *f* till it touches the ſtar at *q*, it will then coincide with the tract of the ſtar's motion; and then all other ſtars will move parallel to it as was required. To find the difference of declination of two ſtars, he obſerves the times of their appulſes to the edges of two ſlender braſs bars *g i o*, *g k p*, fixed to the inner ring, and equally inclined to its diameter *g h* in ſuch angles that the perpendiculars *f i*, *f k*, on each ſide of *f g*, ſhall be ſeverally equal to half *f g*; and conſequently that the whole baſe *i k*, of the equicrural triangle *i g k*, ſhall be equal to its perpendicular height *f g*; and by conſequence that the difference of any two baſes *i f k*, *l m n*, ſhall be equal to *f m*, the difference of their heights; ſo that the difference of the times of the tranſits of two ſtars over theſe baſes, may give the difference of their declinations. Smith's Optics, art. 876, &c.

M. Caſſini firſt made uſe of four croſs hairs or threads, interſecting one another at half right angles, for determining the difference of right aſcenſions and declinations of objects near the ſame parallel: but the micrometer, according to its latter improvements, will anſwer this purpoſe with greater exactneſs. Dr. Maſkelyne has publiſhed directions for the uſe of it, extracted from Dr. Bradley's papers, in the Philoſ. Tranſ. vol. lxii. art. 6. p. 46, &c.

A conſiderable improvement with regard to the micrometer, was communicated to the Royal Society, in 1743, by Mr. Servington Savery, an account of which, extracted from the minutes by Mr. Short, was publiſhed in the Phil. Tranſ. for 1753, vol. xlviii. art. 26. The firſt hint of ſuch a micrometer was ſuggeſted by M. Roemer, in 1675; and M. Bouguer propoſed a ſimilar conſtruction to that of Mr. Savery, in 1748, for which ſee HELIOMETER. The late Mr. Dollond made a farther improvement in this kind of micrometer, an account of which was given to the Royal Society by Mr. Short, and publiſhed in the Phil. Tranſ. vol. xlviii. art. 27. Inſtead of two object glaſſes, he uſed only one, which (after having been truly ground and well centered) he neatly cut into two ſemi-circles, and fitted each ſemi-circle in a metal frame, ſo that their diameters ſliding in one another, by means of a ſcrew, may have their centres ſo brought together as to appear like one glaſs, and ſo form one image; or by their centres receding, may form two images of the ſame object: it being a property of ſuch glaſſes, for any ſegment to exhibit a perfect image of an object, although not ſo bright as the whole glaſs would give it. If proper ſcales are fitted to this inſtrument, ſhewing how far the centres recede, relative to the focal length of the glaſs, they will alſo ſhew how far the two parts of the ſame object are aſunder, relative to its diſtance from the object glaſs; and conſequently give the angle under which the diſtance of the parts of that object are ſeen. This divided object-glaſs micrometer, which was applied by the late Mr. Dollond to the object end of a reflecting teleſcope, has been with equal advantage adapted by his ſon to the end of an achromatic teleſcope, is ſo eaſy of uſe, and affords ſo large a ſcale, that it is generally looked upon by aſtronomers as the moſt convenient and exact inſtrument for meaſuring ſmall diſtances in the heavens. However, the common micrometer is peculiarly adapted for meaſuring differences of right aſcenſion, and declination of celeſtial objects, but leſs convenient and exact for meaſuring their abſolute diſtances; whereas the object-glaſs micrometer is peculiarly fitted for meaſuring diſtances, but has been generally ſuppoſed improper for meaſuring differences of right aſcenſion and declination. But Dr. Maſkelyne has found that the latter may be applied with very little trouble, and ſmall additional expence to this other purpoſe as well as the former; and he has furniſhed the directions neceſſary to be followed when it is uſed in this manner. The addition requiſite for this purpoſe is a cell, containing two wires, interſecting each other at right angles, placed in the focus of the eye-glaſs of the teleſcope, and moveable round about, by the turning of a button. For the deſcription of this apparatus, together with the method of applying and uſing it, we ſhall refer to Dr. Maſkelyne's paper on the ſubject, in the Phil. Tranſ. vol. lxi. part ii. art. 49. p. 536.

After all, the uſe of the object-glaſs micrometer is attended with difficulties, ariſing from the alterations in the focus of the eye, which are apt to cauſe it to give different meaſures of the ſame angle at different times. In order to obviate theſe difficulties, Dr. Maſkelyne, in 1776, contrived a priſmatic micrometer, or a micrometer conſiſting of two achromatic priſms, or wedges, applied between the object-glaſs and eye-glaſs of an achromatic teleſcope, by moving of which wedges nearer to, or farther from, the object-glaſs, the two images of an object produced by them appeared to approach to or recede from each other, ſo that the focal length of the object-glaſs becomes a ſcale for meaſuring the angular diſtance of the two images. The rationale and uſe of this micrometer are explained in the Phil. Tranſ. vol. lxvii. part ii. art. 36. p. 799, &c. A ſimilar invention by the abbé Rochon, and improved by the abbé Boſcovich, was alſo communicated to the Royal Society, and publiſhed in the ſame volume of the Tranſactions, art. 35. p. 789, &c.

Mr. Ramſden, an ingenious optician, has deſcribed two new micrometers, which he has contrived with a view of remedying the defects of the object-glaſs micrometer. One of theſe is a catoptric micrometer, which, beſide the advantage it derives from the principle of reflection, of not being diſturbed by the heterogeneity of light, avoids every defect of other micrometers, and can have no aberration, nor any defect ariſing from the imperfection of materials, or of execution; as the extreme ſimplicity of its conſtruction requires no additional mirrors or glaſſes to thoſe required for the teleſcope; and the ſeparation of the image being effected by the inclination of the two ſpecula, and not depending on the focus of any lens or mirror, any alteration in the eye of an obſerver cannot affect the angle meaſured. It has peculiar to itſelf the advantages of an adjuſtment, to make the images coincide in a direction perpendicular to that of their motion; and alſo of meaſuring the diameter of a planet on both ſides of the zero, which will appear no inconſiderable advantage to obſervers, who know how much eaſier it is to aſcertain the contact of the external edges of two images than their perfect coincidence. A (*fig.* 11.) repreſents the ſmall ſpeculum of a reflecting teleſcope of Caſſegrain's conſtruction, to which this micrometer is adapted, divided into two equal parts; one of which is fixed on the end of the arm B; the other end of the arm is fixed on a ſteel axis X, which croſſes the end of the teleſcope C. The other half of the mirror A is fixed on the arm D, which arm at the other end terminates in a ſocket *y*, that turns on the axis X; both arms are prevented from bending by the braces, *a*, *a*. G repreſents a double ſcrew, having one part, *e*, cut into double

double the number of threads in an inch to that of the part *g*; the part *e* having a hundred threads in one inch, and the part *g* fifty only. The ſcrew, *e*, works in a nut F, in the ſide of the teleſcope, while the part *g* turns in a nut H, which is attached to the arm B; the ends of the arms B and D, to which the mirrors are fixed, are ſeparated from each other by the point of the double ſcrew preſſing againſt the ſtud *b*, fixed to the arm D, and turning in the nut H on the arm B. The two arms, B and D, are preſſed againſt the direction of the double ſcrew, *e g*, by a ſpiral ſpring within the part *n*; by which means all ſhake or play in the nut H, on which the meaſure depends, is entirely prevented.

From the difference of the threads on the ſcrew at *e* and *g*, it is evident that the progreſſive motion of the ſcrew through the nut will be half the diſtance of the ſeparation of the two halves of the mirror, and conſequently the half mirrors will be moved equally in contrary directions from the axis of the teleſcope C.

The wheel V, fixed on the end of the double ſcrew, has its circumference divided into 100 equal parts, and numbered at every fifth diviſion with 5, 10, &c. to 100; and the index, I, ſhews the motion of the ſcrew with the wheel round its axis, while the number of revolutions of the ſcrew is ſhewn by the diviſions on the ſame index. The ſteel ſcrew, R, may be turned by the key S, and ſerves to incline the ſmall mirror at right angles to the direction of its motion.

The other micrometer, invented and deſcribed by Mr. Ramſden, is ſuited to the principle of refraction. This micrometer is applied to the erect eye-tube of a refracting teleſcope, and is placed in the conjugate focus of the firſt eye-glaſs; in which poſition, as the image is conſiderably magnified before it comes to the micrometer, any imperfection in its glaſs will be magnified only by the remaining eye-glaſſes, which in any teleſcope ſeldom exceeds five or ſix times; and beſides, the ſize of the micrometer glaſs will not be the $\frac{1}{100}$dth part of the area which would be required, if it were placed at the object-glaſs; and yet the ſame extent of ſcale is preſerved, and the images are uniformly bright in every part of the field of the teleſcope. This micrometer is repreſented in *Plate* XI. *Optics*, *fig.* 1. A is a convex or concave lens divided into two equal parts by a plane acroſs its centre; one of theſe ſemi-lenſes is fixed in a frame B, and the other in the frame E, which two frames ſlide on a plate H, and are preſſed againſt it by thin plates, *a*, *a*: the frames, B and E, are moved in contrary directions by turning the button D; L is a ſcale of equal parts on the frame B; it is numbered from each end towards the middle with 10, 20, &c. There are two verniers on the frame E, one at M, and the other at N, for the conveniency of meaſuring the diameter of a planet, &c. on both ſides of the zero. The firſt diviſion on both theſe verniers coincides at the ſame time with the two zeros on the ſcale L; and, if the frame is moved towards the right, the relative motion of the two frames is ſhewn on the ſcale L by the vernier M; but if the frame B be moved towards the left, the relative motion is ſhewn by the vernier N.

This micrometer has a motion round the axis of viſion, for the conveniency of meaſuring the diameter of a planet, &c. in any direction, by turning an endleſs ſcrew F, and the inclination of the diameter meaſured with the horizon is ſhewn on the circle, *g*, by a vernier on the plate V. The teleſcope may be adjuſted to diſtinct viſion by means of an adjuſting ſcrew, which moves the whole eye-tube with the micrometer nearer or farther from the object-glaſs, as teleſcopes are generally made; or the ſame effect may be produced in a better manner, without moving the micrometer, by ſliding the part of the eye-tube *m* on the part *n*, by help of a ſcrew or pinion. The micrometer is made to take off occaſionally from the eye-tube, that the teleſcope may be uſed without it. Phil. Tranſ. vol. lxix. part ii. art. 27.

Dr. Herſchel has applied a lamp micrometer to ſir Iſaac Newton's reflecting teleſcope. (See Phil. Tranſ. vol. lxxii. p. 165, &c. and vol. lxxiii. p. 5, &c.) Two moveable lamps, the light of which comes through two ſmall holes, are placed at a convenient diſtance from the teleſcope, in the direction at which you look at the image. Theſe points of light are looked at by the left eye, and brought, *e. g.* to the oppoſite ſides of a planet looked at by the right eye; and by meaſuring their diſtance from each other, and from the eye, the angle under which the magnified diameter appears will be known, which, divided by the magnifying power of the teleſcope, gives the apparent diameter required. The conſtruction of this micrometer is as follows: A B G C F E (*Plate* XI. *Optics*, *fig.* 5.) is a ſtand nine feet high, upon which a ſemi-circular board, *q h o g p*, is moveable upwards or downwards, in the manner of ſome fire-ſcreens, as occaſion may require, and is held in its ſituation by a peg, *p*, put into any one of the holes of the upright piece A B. This board is a ſegment of a circle of fourteen inches radius, and is about three inches broader than a ſemi-circle, to give room for the handles, *r* D, *e* P, to work. The uſe of this board is to carry an arm L, thirty inches long, which is made to move upon a pivot at the centre of the circle, by means of a ſtring, which paſſes in a groove upon the edge of the ſemicircle *p g o h q*; the ſtring is faſtened to a hook at *o*, (not expreſſed in the figure, being at the back of the arm L,) and paſſing along the groove from *o b* to *q*, is turned over a pulley at *q*, and goes down to a ſmall barrel *e*, within the plane of the circular board, where a double-jointed handle, *e* P, commands its motion. By this contrivance we ſee the arm, L, may be lifted up to any altitude from the horizontal poſition to the perpendicular, or be ſuffered to deſcend by its own weight below the horizontal to the reverſe perpendicular ſituation. The weight of the handle, P, is ſufficient to keep the arm in any given poſition; but if the motion ſhould be too eaſy, a friction ſpring applied to the barrel will moderate it at pleaſure.

In front of the arm, L, a ſmall ſlider, about three inches long, is moveable in a rabbet from the end L towards the centre backwards and forwards. A ſtring is faſtened to the left ſide of the little ſlider, and goes towards L, where it paſſes round a pulley at *m*, and returns under the arm from *m*, *n*, towards the centre, where it is led in a groove on the edge of the arm, which is of a circular form, upwards to a barrel (raiſed above the plane of the circular board) at *r*, to which the handle, *r* D, is faſtened. A ſecond ſtring is faſtened to the ſlider, at the right ſide, and goes towards the centre, where it paſſes over a pulley *n*, and the weight, *w*, which is ſuſpended by the end of this ſtring, returns the ſlider towards the centre, when a contrary turn of the handle permits it to act.

a and *b* are two ſmall lamps, two inches high, one inch and a half in breadth, by one inch and a quarter in depth. The ſides, back, and top, are made ſo as to permit no light to be ſeen, and the front conſiſts of a thin braſs ſliding door. The flame in the lamp, *a*, is placed three-tenths of an inch from the left ſide, three-tenths from the front, and half an inch from the bottom. In the lamp *b*, it is placed at the ſame height and diſtance, meaſuring from the right ſide. The wick of the flame conſiſts only of a ſingle very thin lamp-cotton thread; for the ſmalleſt flame being ſufficient, it is eaſier to keep it burning in ſo confined a place. In the

top

top of each lamp must be a little slit, lengthways, and also a small opening in one side near the upper part, to permit air enough to circulate to feed the flame. To prevent every reflection of light, the side opening of the lamp *a* should be to the right, and that of the lamp *b* to the left. In the sliding door of each lamp is made a small hole, with the point of a very fine needle, just opposite the place where the wicks are burning, so that when the sliders are shut down, and every thing dark, nothing shall be seen but two fine lucid points of the size of two stars of the third or fourth magnitude. The lamp, *a*, is placed so that its lucid point may be in the centre of the circular board, where it remains fixed. The lamp, *b*, is hung to the little slider, which moves in the rabbet of the arm, so that its lucid point, in a horizontal position of the arm, may be on a level with the lucid point in the centre. The moveable lamp is suspended upon a piece of brass, fastened to the slider by a pin exactly behind the flame upon which it moves as a pivot. The lamp is balanced at the bottom by a leaden weight, so as always to remain upright, when the arm is either lifted above, or depressed below, the horizontal position. The double-jointed handles, *r* D, *e* P, consist of light deal rods, ten feet long, and the lowest of them may have divisions, marked upon it near the end P, expressing exactly the distance from the central lucid point in feet, inches, and tenths.

From this construction we see, that a person at a distance of ten feet may govern the two lucid points, so as to bring them into any required position south or north preceding or following, from 0 to 90°, by using the handle P, and also to any distance from six-tenths of an inch to five or six and twenty inches, by means of the handle D. If any reflection or appearance of light should be left from the top or sides of the lamps, a temporary screen, consisting of a long piece of paste-board, or a wire-frame covered with black cloth, of the length of the whole arm, and of any required breadth, with a slit of half an inch broad in the middle, may be affixed to the arm by four bent wires, projecting an inch or two before the lamps, situated so that the moveable lucid point may pass along the opening left for that purpose.

Fig. 6. represents part of the arm L, half the real size; S, the slider; *m*, the pulley, over which the cord, *x t y z*, is returned towards the centre; *v*, the other cord going to the pulley, *n*, of *fig.* 5; R, the brass piece moveable upon the pin *c*, to keep the lamp upright. At R is a wire rivetted to the brass piece, upon which is held the lamp by a nut and screw. *Figs.* 7, and 8, represent the lamps, *a*, *b*, with the sliding doors open, to shew the situation of the wicks. W is the leaden weight, with a hole, *d*, in it, through which the wire R, of *fig.* 6, is to be passed, when the lamp is to be fastened to the slider S. *Fig.* 9. represents the lamp *a*, with the sliding door shut; *l*, the lucid point; and *i k*, the openings at the top, and *s* at the sides, for the admission of air.

Every ingenious artist will soon perceive that the motions of this micrometer are capable of great improvement, by the application of wheels and pinions, and other well known mechanical resources; but, as the principal object is only to be able to adjust the two lucid points to the required position and distance, and to keep them there for a few minutes, while the observer goes to measure their distance, it will not be necessary to say more upon the subject.

Mr. Smeaton's equatorial micrometer, together with its use in an observation of a transit of Mercury, is described and exhibited in the Phil. Trans. vol. lxxvii. art. 33. We have the description of a micrometer for taking the angle of position, with drawings for illustrating its construction, as it was executed by Messrs. Nairne and Blunt, in a paper by Dr. Herschel, Phil. Trans. vol. lxxi. p. 500, and a further account of its use and the mode of improving it by Dr. Herschel, Phil. Trans. vol. lxxv. p. 46. Mr. Troughton's micrometer is applied to the eye-piece of a telescope for measuring exceedingly small angles, as the diameters of the heavenly bodies, &c. *Fig.* 2. is an orthography of this instrument projecting endways; *fig.* 3. is a section of the box containing the wires; and *fig.* 4. a section lengthways: the same letters, as far as they can, are used in all the figures. *Figs.* 2 and 4, A is an eye-tube containing a convex lens at each end; this slides in another tube, *d d*, so as to adjust the glass to distinct vision of the wires; the tube, *d d*, is screwed into another, *b b*, which is much larger, through this a thin long box, D D D, containing the wire slides. The micrometer is screwed to the telescope by a male screw, *e e*, (*fig.* 4.) in the same piece with which is a circular plate, *f f*, cut all round with fine teeth; this plate fits against the flat bottom of the box, *b*, and turns round concentrically with it by means of a ring, *k*, fitting into a conical hole in the centre of the plate, *f f*, and screwed to the box; a small endless screw, *h*, (*fig* 2.) turning in two brass collars screwed to the box, *b*, works in the teeth cut round the plate, *f*, and by that means when the milled head on the arbor of the endless screw is turned, it turns the eye-tube and box, D D, round, to bring it to any convenient position for measuring the angles required; the box containing the wires is shewn open in *fig.* 3, it containing two frames, *b b b* and *l l l l*, one sliding within another, which moves in the box, without lateral shake, yet fitted so as to slide easily backwards and forwards in the box, by the screws *m* and *n*, in the same manner as the microscope in the upper part of the same plate; *o* and *p* are springs to counteract the screws and make the motion pleasant. A wire is stretched across the frame, *b b*, at right angles to its sides, and another of the same size is fixed across the slider, *l l l l*, exactly parallel to the former; a small quantity of the under side of the latter is cut away, and its wire is fixed in another plane to the wire of *b b b*, so that the wires can pass each other without touching, but as near as possible; when they are placed by their screws over each other, and viewed through the eye-tube, they appear but as one wire: the divided circle, *x*, on the nuts of screws are then slipped round, without the screw, to bring the first division on them to the index *l*; the instrument is now adjusted for observing any angle, it is screwed to the telescope, and by the endless screw, *h*, (*fig.* 2.) the micrometer is turned round so as to bring a fixed wire *w*, which is perpendicular to the others, to cover the two objects; the two wires are then separated by turning either of the nuts, F, until the wires include the angle to be measured: the whole box (*fig.* 3.) of the micrometer slides through the tube, in the direction of its length, to follow any moving object. When the observation is completed it is read off by a scale of notches in the box, (*fig.* 3.) determining the number of revolutions the screw has made, and the divisions pointed out on the circles, *x*; by the indexes, *l*, *l*, the number of aliquot parts is denoted; the circular plate, *f f*, is divided into degrees, as shewn in *fig.* 2, and it is by this that the angle line measured makes with the horizon is registered.

The circles are divided in one hundred parts, and have no determinate value in angular measurement, but their value is determined experimentally by observing through the telescope, it is applied to the diameter of the sun, or any other body whose angular measure has been previously and accurately determined by some other divided instrument,

and

and from this the angle given by each obſervation is calculated.

Mr. Cavallo has contrived a micrometer of very ſimple and eaſy conſtruction. It conſiſts of a ſmall ſemi-tranſparent ſcale or ſlip of mother-of-pearl, about the 20th part of an inch broad, and of the thickneſs of common writing paper. It is divided into a number of equal parts by means of parallel lines, every fifth and tenth of which diviſions is a little longer than the reſt.

This micrometer, or divided ſcale, is ſituated within the tube at the focus of the eye-lens of the teleſcope, where the image of the object is formed, and with its divided edge paſſing through the centre of the field of view; though this is not abſolutely neceſſary. It is immaterial whether the teleſcope be a refractor or a reflector, provided the eye-lens be convex, and not concave, as in the Galilean teleſcope.

The ſimpleſt way of fixing it, is to ſtick it upon the diaphragm, which generally ſtands within the tube, at the focal diſtance of the eye-lens.

By looking through the teleſcope, the image of the object and the micrometer will appear to coincide: hence the obſerver may eaſily ſee how many diviſions of the latter meaſure the length or breadth of the former; and knowing the value of the diviſions of the micrometer, he may eaſily determine the angle which is ſubtended by the object.

There are ſeveral methods of aſcertaining the value of the diviſions of a micrometer in a given teleſcope. The following is one of the eaſieſt.

Direct the teleſcope to the ſun, and obſerve how many diviſions of the micrometer meaſure its diameter exactly; then take out of the Nautical Almanack the diameter of the ſun for the day in which the obſervation is made; divide it by the above-mentioned number of diviſions, and the quotient is the value of one diviſion of the micrometer. Thus, ſuppoſe that $26\frac{1}{2}$ diviſions of the micrometer meaſure the diameter of the ſun, and the Nautical Almanack gives for the meaſure of the angle, which is ſubtended by the ſame diameter, $31' 22''$, or (by reducing it all into ſeconds) $1882''$. Divide $1882''$ by 26.5, and the quotient, neglecting a ſmall remainder, is $71''$, or $1' 11''$; which is the value of one diviſion of the micrometer; the double of which is the value of two diviſions; the treble is the value of three diviſions; and ſo forth.

This mother-of-pearl micrometer may be applied to a microſcope; and it will thus ſerve to meaſure the lineal dimenſions of the object; and the value of its diviſions are aſcertained by placing an object of a known dimenſion before the microſcope, and by obſerving how many diviſions of the micrometer meaſure its magnified image; for inſtance, place a piece of paper, which is exactly one-tenth of an inch long, before the microſcope, and if you find that 50 diviſions of the micrometer meaſure its magnified image, you way conclude that each diviſion is equal to, or rather denotes an extenſion of the 500dth part of an inch in the object; for if 50 diviſions meaſure one-tenth, 500 diviſions muſt meaſure the whole inch; &c. Cavallo's Philoſophy, vol. iii. Phil. Tranſ. vol. lxxxi. art. 19.

The micrometer has not only been applied to teleſcopes, and employed for aſtronomical purpoſes; but there have been various contrivances for adapting it to microſcopical obſervations. M. Leeuwenhoek's method of eſtimating the ſize of ſmall objects was by comparing them with grains of ſand, of which a hundred in a line took up an inch. Theſe grains he laid upon the ſame plate with his objects, and viewed them at the ſame time. Dr. Jurin's method was ſimilar to this; for he found the diameter of a piece of fine ſilver wire, by wrapping it as cloſe as he could about a pin, and obſerving how many rings made an inch; and he uſed this wire in the ſame manner as Leeuwenhoek uſed his ſand. Dr. Hooke uſed to look upon the magnified object with one eye, while, at the ſame time, he viewed other objects, placed at the ſame diſtance, with the other eye. In this manner he was able, by the help of a ruler, divided into inches and ſmall parts, and laid on the pedeſtal of the microſcope, to caſt, as it were, the magnified appearance of the object upon the ruler, and thus exactly to meaſure the diameter which it appeared to have through the glaſs; which being compared with the diameter as it appeared to the naked eye, eaſily ſhewed the degree in which it was magnified. A little practice, ſays Mr. Baker, will render this method exceedingly eaſy and pleaſant.

Mr. Martin, in his Optics, recommends ſuch a micrometer for a microſcope as had been applied to teleſcopes; for he adviſes to draw a number of parallel lines on a piece of glaſs with the fine point of a diamond, at the diſtance of $\frac{1}{40}$th of an inch from one another, and to place it in the focus of the eye-glaſs. By this method, Dr. Smith contrived to take the exact draught of objects viewed by a double microſcope; for he adviſes to get a lattice, made with ſmall ſilver wires or ſquares, drawn upon a plain glaſs by the ſtrokes of a diamond, and to put it into the place of the image formed by the object-glaſs. Then by transferring the parts of the object, ſeen in the ſquares of the glaſs or lattice, upon ſimilar correſponding ſquares drawn on paper, the picture may be exactly taken. Mr. Martin alſo introduced into compound microſcopes another micrometer conſiſting of a ſcrew. See both theſe methods deſcribed in his Optics, p. 277.

The moſt minute and accurate diviſion of any ſcale which the editor has ever ſeen, was performed by Mr. Coventry of Southwark. The micrometers of his conſtruction are parallel lines drawn on glaſs, ivory, or metal, from the 10th to the 10,000dth of an inch. Theſe may be applied to microſcopes, for meaſuring the ſize of minute objects, and the magnifying power of the glaſſes; and to teleſcopes, for meaſuring the ſize and diſtance of objects, and the magnifying power of the inſtrument. For meaſuring the ſize of an object in a ſingle microſcope, lay it on a micrometer, whoſe lines are ſeen magnified in the ſame proportion with it, and give at one view the real ſize of the object. For meaſuring the magnifying power of the compound microſcope, the beſt and moſt ready method is the following. On the ſtage in the focus of the object-glaſs, lay a micrometer, conſiſting of an inch divided into one hundred equal parts; count how many diviſions of the micrometer are taken into the field of view; then lay a two-foot rule parallel to the micrometer: fix one eye on the edge of the field of light, and the other eye on the end of the rule, which move, till the edge of the field of light and the end of the rule correſpond; then the diſtance from the end of the rule to the middle of the ſtage will be the half of the diameter of the field: *e. gr.* if the diſtance be ten inches, the whole of the diameter will be twenty, and the number of the diviſions of the micrometer contained in the diameter of the field, is the magnifying power of the microſcope. Thus, ſuppoſe the number of diviſions ſeen in the micrometer to be $\frac{50}{100}$dths, and that the diameter of the field meaſures with the rule twenty inches; the $\frac{50}{100}$dth of 20 inches is 40, which is the diameter of the field; $40 \times 40 = 1600$ the ſuperficies, and $1600 \times 40 = 64000$, the magnified cube of the object: in like manner each object-glaſs or magnifier muſt be proved, and a table kept of their ſeveral magnifying powers. For meaſuring the height and diſtance of objects by a micrometer in in the telescope, see TELESCOPE. Mr. Adams has applied a micrometer, which instantly shews the magnifying power of any telescope.

MICROPHONES, instruments contrived to magnify small sounds, as microscopes do small objects.

MICROPUS, in *Botany*, derived from μικρος, *small*, and πους, *a foot;* possibly from an association of ideas with *Leontopodium*, Lion's-foot, as this genus is nearly assimilated in habit to the *Filago Leontopodium* of Linnæus. It was even supposed by Dr. Sibthorp to be the real Λεοντοποδιον of Dioscorides; (see LEONTOPODIUM.)—Linn. Gen. 451. Schreb. 588. Willd. Sp. Pl. v. 3. 2388. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 1. v. 3. 280. Juss. 185. Lamarck Illustr. t. 694. Gærtn. t. 164. (Gnaphalodes; Tournef. t. 261.)—Class and order, *Syngenesia Polygamia Necessaria*. Nat. Ord. *Compositæ Nucamentaceæ*, Linn. *Corymbiferæ*, Juss.

Gen. Ch. *Common calyx* double; the outer of five, slender, small, obsolete leaves, at the base of the inner, which is very large, and composed of five, loose, distinct, helmet-shaped, compressed leaves, conniving longitudinally at the margin. *Cor.* compound, with ten perfect florets in the disk, and five female ones in the radius: the former of one petal, with five teeth, erect; the latter without any petal. *Stam.* (in the perfect florets) Filaments five, bristle-shaped, very short; anthers cylindrical, tubular, as long as the florets. *Pist.* (in the same florets) Germen obsolete; style thread-shaped, longer than the stamens; stigma obsolete: (in the female ones) Germen obovate, compressed, concealed within each scale of the common inner calyx; style from the inner side of the germen, bristle-shaped, turned towards the perfect florets, the length of the calyx; stigma cloven, slender, pointed. *Peric.* none, except the common inner calyx enlarged and hardened. *Seeds* (in the perfect flowers) none: (in the female ones) solitary, obovate, inclosed each in its appropriate leaflet of the inner calyx. *Recept.* furnished with acute, small scales, which separate the seeds of the females, but not the florets of the disk.

Ess. Ch. Receptacle scaly. Down none. Calyx double. Radius without a corolla. Female florets inclosed by the scales of the common inner calyx.

1. M. *supinus*. Linn. Sp. Pl. 1313. Cavan. Ic. v. 22. t. 35.—Stems prostrate. Leaves opposite, obovate-wedge-shaped.—A native of Portugal, Spain, Italy, and the Levant, flowering from May to September. Introduced into Chelsea garden in 1759, by Mr. Philip Miller.—*Root* annual, somewhat tapering, small, fibrous. *Stems* trailing, numerous, three or four inches long, covered with a sort of silvery nap, as indeed is the whole plant. *Leaves* in pairs, generally opposite, or nearly so, connate, plaited, three-nerved. *Flowers* axillary, sessile, from the base to the top of the stem, minute, in small tufts, white and very downy. *Seeds* ovate, brown.

2. M. *erectus*. Linn. Sp. Pl. 1313. Lœfl. It. Hisp. 166. t. 1. f. 5.—Stems upright. Leaves alternate, lanceolate.—A native of the East, as well as of France, Italy, and Switzerland.—*Root* annual, fibrous. *Stems* erect, branched, extremely downy. *Leaves* alternate, narrower and more woolly than in the last, as is the whole plant, even the *flowers* which are sessile, in axillary tufts.

MICROSCOPE, Μικροσκοπειον, formed of μικρος, *small*, and σκεπτομαι, *I consider;* an optical instrument, by means of which very minute objects are represented exceedingly large, and viewed very distinctly, according to the laws of refraction or reflection.

Microscopes are properly distinguished into simple, or *single;* and compound, or *double*.

MICROSCOPES, *Single*, are those which consist of a single lens, or a single spherule.

MICROSCOPES, *Compound*, consist of two or more lenses duly combined. As optics have been improved, other varieties have been contrived, in the sorts of microscopes: hence we have *reflecting* microscopes, *water* microscopes, &c. Each of these two kinds has its peculiar advantage: for a single glass shews the object nearer at hand, and rather more distinct: and a combination of glasses presents a larger field, or, in other words, exhibits more of an object equally magnified, at the view. As each of these has its advantages, each of them has had its advocates, at least in practice. M. Leeuwenhoek never used any but single microscopes; and, on the contrary, Dr. Hooke made all his observations with double ones.

When, and by whom, microscopes were first invented, is not certainly known. Huygens tells us, that one Drebell, a Dutchman, had the first microscope, in the year 1621, and that he was reputed the first inventor of it: though F. Fontana, a Neapolitan, in 1646, claims the invention to himself, but dates it from the year 1618. As a telescope inverted is a microscope, the discovery might easily enough have arisen from thence.

Nothing more is certain concerning microscopes, than that they were first used in Germany about the year 1621. According to Borellus, they were invented by Zacharias Jansen, in conjunction with his son, who presented the first microscope they had constructed to prince Maurice, and Albert, archduke of Austria. William Borell, who gives this account in a letter to his brother Peter, says, that when he was ambassador in England, in 1619, Cornelius Drebell shewed him a microscope, which he said was the same that the archduke had given him, and had been made by Jansen himself. Borellus de vero Telescopii inventore, p. 35. See LENS.

MICROSCOPES, *Foundation and Theory of Single*. If an object A B (*Plate* XII. *Optics*, *fig.* 1.) be placed in the focus of a small convex lens, or a simple microscope D E, and the eye be applied close to the other side of the microscope, *the object will be seen distinct, in an erect situation, and magnified in the ratio of the distance of the focus to the distance at which objects are to be placed to be seen distinctly by the naked eye.*

For the object A B being placed in the focus of the convex lens D E, the rays issuing from the several points of it, after refraction, will be parallel to each other: consequently, the eye will see it *distinctly*, by virtue of what is proved under the word TELESCOPE.

Further, since one of the rays A F, proceeding from the point A, after refraction, becomes parallel to the incident ray; and therefore, setting aside the thickness of the lens, is found directly against it; and the same holds true of all the other rays carried to the eye; the rays A F and B F, to which the rest coming from A and B are parallel, will enter the eye in the same manner as if they entered without passing through the lens; and will therefore appear erect, as if the lens were away.

Lastly, it is manifest, that the object A B will be seen under the same angle as if viewed by the naked eye: but since it appears very distinct, whereas to the naked eye, at the same distance, it would appear extremely confused; it is the same thing as if the object should seem removed to the distance F H, at which it is viewed with equal distinctness, and under the same angle: the diameter of the object A B, therefore, will be to the apparent diameter I K, as F C to F H, *i. e.* as the distance of the focus of the lens to the distance at which an object is to be placed, in order to view it distinctly. Since, therefore, the interposition of the glass has

has no other effect than to render the appearance distinct, by helping the eye to increase the refraction of the rays in each pencil, it is plain that the greater apparent magnitude is entirely owing to a nearer view than could be taken by the naked eye.

Huygens, in Dioptrics, prop. lix. p. 222, takes it for granted, that an object, seen with the naked eye, is then in its utmost distinctness when seen at the distance of eight digits, or tenths of a foot; which agrees pretty nearly with the observations of others; who make the nearest limit of distinct vision to be eight inches. So that if the glass be a small round globule, whose focal distance is $\frac{1}{20}$th of an inch, this globule will magnify as 8 to $\frac{1}{20}$th, or as 160 to 1.

The distance of distinct vision varies in different individuals. Some have stated it at six inches; others at seven; but it has been generally supposed to be eight inches. The medium of seven inches has been adopted by several optical writers. But whatever it be, if this least distance be divided by the focal distance of the glass, the quotient will shew how much the glass magnifies the diameter of the object.

MICROSCOPES, *Laws of Single.* 1. Simple microscopes magnify the diameter of the object A B in the ratio of the distance of the focus F C to an interval of eight digits: *v. gr.* if the semi-diameter of a lens, equally convex on both sides, be half a digit, and consequently its focal distance the same; A B : I K :: $\frac{1}{2}$: 8 :: 1 : 16; that is, the diameter of the object will be increased in a sedecuple proportion, or as sixteen to one. 2. Since the distance F H is constant, *viz.* eight digits; by how much the distance of the focus F C is smaller, so much the smaller ratio will it have to F H; consequently the diameter of the object will be so much the more magnified. 3. Since, in plano-convex lenses, the distance of the focus is equal to the diameter; and, in lenses equally convex on both sides, to the semi-diameter: simple microscopes will enlarge the diameter so much the more, as they are segments of smaller spheres. 4. If the diameter of the convexities of a plano-convex lens, and a lens convex on both sides, be the same, *viz.* = 1: the distance of the focus of the first will be 1, of the second $\frac{1}{2}$: consequently, the semi-diameter of the object A B will be to the apparent one, in the first case, as 1 to 8; in the latter, as $\frac{1}{2}$ to 8; *i. e.* as 1 to 16. A lens, therefore, convex on both sides, magnifies twice as much as a plano-convex lens.

As the whole depends on the just and steady situation of objects with regard to the lens, various methods have been contrived to that end; whence we have several different kinds of single microscopes. The most simple is as follows:

1. A B (*fig.* 2.) is a little tube, to one of whose bases, B C, is fitted a plain glass, to which an object, *viz.* a gnat, wing of an insect, down, or the like, is applied; to the other base, A D, at a proper distance from the object, is applied a lens convex on both sides, whose semi-diameter is about half an inch; the plain glass is turned to the sun, or the light of a candle, and the object is seen magnified; and, if the tube be made to draw out, lenses of different spheres may be used.

Again, a lens, convex on both sides, is inclosed in a cell A C (*fig.* 3.), and by a screw H is there fastened: through the pedestal C D passes a long screw, by means of which, and the female screw I, a style or needle, fixed perpendicular to its extreme, is kept firm at any distance from the lens: in E is a little tube, on which, and on the point G, the various objects are to be disposed: thus there may be lenses of various spheres applied.

2. But the microscope which is found to answer the end best, is Mr. Wilson's pocket microscope, which has nine different magnifying glasses, eight of which may be used with two different instruments, for better applying them to various objects. One of these instruments is represented at A A B B (*fig.* 4.) and is made of ivory, brass, or silver; it has three thin brass plates at E, and a spiral spring of steel wire H within it; to one of the thin plates of brass is fixed a piece of leather, wood, or ivory F, with a small furrow, G, both in the leather and brass to which it is fixed: in one end of this instrument there is a long screw D, with a convex glass placed in the end of it at C: in the other end, A A, of the instrument there is a hollow screw, in which any of the magnifying glasses, M, are screwed when they are to be made use of. The nine different magnifying glasses are all set in ivory, eight of which are set in the manner expressed at M. The greatest magnifier is marked upon the ivory, in which it is set, with N° 1, the next N° 2, and so on to N° 8; the ninth glass is not marked, but is set in the manner of a little barrel box of ivory, as at *b*, *fig.* 5. R is a flat piece of ivory, of which there are eight belonging to this set of microscopes (though any one who has a mind to keep a register of objects may have as many of them as he pleases); in each of them there are four holes *f, f, f*, in which four or more objects are placed between two thin glasses, or talcs, when they are to be used with the greater magnifiers.

The use of this instrument A A B B is this. Having taken the handle W from the instrument in *fig.* 5, and screwed it upon the button S, take one of your flat pieces of ivory, R, or sliders (if you please to call them so), and slide it betwixt the two thin plates of brass at E, through the body of the microscope, so that the object you intend to look upon be just in the middle; remarking that you put that side of the plate R, where the brass rings are, farthest from the end A A; then you are to screw into the hollow screw in the end A A of the body of your microscope M, the 3d, 4th, 5th, 6th, or 7th magnifying glass; which being done, put the end A A close to your eye, and while you are looking through your magnifying glass upon the object, you are to screw in or out the long screw D, which moving round upon the leather F, held tight to it by the spiral wire H, will bring your object to the true distance; which you will know by seeing it clearly and distinctly: but since in the greater magnifiers you can see but a small part of the object, *viz.* the legs or claws of a flea; while you are looking upon any part of the object, if you take hold of the end of the plate or slider R, on which the object lies, and move it gently, you may see the whole object successively, or any part of the object you please; and if that part of the object you design to look upon be out of the true distance, remember your end screw, D, can always bring it in, by screwing it one way or the other. A simpler and more convenient method of mounting single microscopes is to fix the several magnifying lenses in a flat circular piece of brass, which can be moved round a point as a centre, by the action of an endless screw upon the toothed circumference of the circular plate.

After this manner may be seen all transparent objects, dusts, liquids, crystals of salts, small insects, such as fleas, mites, &c. If they be insects that will creep away, or such objects as one intends to keep, they may be placed between the two register glasses *f, f*. For by taking out (with the point of a pen-knife or small plyers) the ring that keeps in the glasses *f, f*, where the object lies, they will fall out of themselves; so that you may lay the object between the two hollow sides of them, and put the ring in as it was before: but if the objects be dusts or liquids, a small drop of the liquid, or

a little

a little of the duſt laid on the outſide of the glaſs *ff*, and applied as before, will be ſeen very eaſily.

As to the firſt, ſecond, and third magnifying glaſſes, being marked with a + upon the ivory in which they are ſet, they are only to be uſed with thoſe plates or ſliders that are alſo marked with a +, in which the objects are placed between two thin talcs; becauſe the thickneſs of the glaſſes in the other plates or ſliders, hinders the object from approaching to the true diſtance from theſe greater magnifiers. But the manner of uſing them is the ſame with the former: only remember to be careful when you put in or pull out the plate or ſlider R, on which the object lies, or move it from one object to another, not to let it rub your magnifying glaſs; which is done by unſcrewing a little the end ſcrew D, when you put in or pull out your plate, or move it from one object to another.

For ſeeing the circulation of the blood at the extremities of the arteries and veins, in the tranſparent parts of fiſhes' tails, &c. there are two ſhort glaſs tubes, the one bigger and the other leſſer, in which the fiſh is to be put; when theſe tubes are to be uſed, you are to unſcrew the end ſcrew D in the body of the microſcope, until the glaſs tube can be received eaſily into that little cavity G of the braſs plate faſtened to the leather F, under the other two thin plates of braſs at E. When the tail of your fiſh lies flat to the glaſs tube, ſet it oppoſite to your magnifying-glaſs, and by ſcrewing in or out your end ſcrew D, as is ſaid before, you may eaſily bring it to the true diſtance, and ſee the blood circulate with great pleaſure.

If you would ſee the blood circulate in a frog's foot, chooſe ſuch a frog as will juſt go into your tube; then with a little ſtick expand the hinder foot of the frog, and apply it cloſe to the ſide of the tube, obſerving that no part of the frog hinders the light from coming on its foot; and when you have it at the juſt diſtance, by means of the ſcrew D, as above ſaid, you will ſee the rapid motion of the blood in its veſſels, which are very numerous, in the tranſparent thin membrane that is between the frog's toes. For this object the fourth and fifth magnifiers will do very well; but you may ſee the circulation in the tails of water-newts with the fixth and ſeventh glaſſes, becauſe the globules of the blood of thoſe newts are as big again as the globules of the blood of frogs or ſmall fiſh, as has been taken notice of in N° 280 of the Philoſophical Tranſactions, p. 1184.

The circulation cannot ſo well be ſeen by the firſt, ſecond, and third magnifiers, becauſe the thickneſs of the glaſs tube in which the fiſh lies, hinders the approach of the object to the focus of the magnifying glaſs.

The other inſtrument (*fig.* 5.) is made of braſs or prince's metal, with joints P, P, P, to turn eaſily any way, and with a ſmall pair of tongs G G, which open at the points K, by preſſing together the two heads of the pins I, I, for taking up of objects. At the other end of theſe tongs G G, is ſcrewed on a round piece of black wood H, with a piece of ivory let into it, for placing opaque objects on, according to their difference of colour. Upon the end L there is a ſcrew, upon which the glaſs *b* ſet in the barrel-box may be ſcrewed. When the other glaſſes are to be uſed, there is a ring R of braſs to be ſcrewed on the end L, into which ring all the other glaſſes, M, (*fig.* 4.) may be ſcrewed. So when any object is taken up in the points of the tongs K, or laid upon the other end H, it may very eaſily (as one who ſees the inſtrument will perceive) be applied to the true focal diſtance of any of the glaſſes M, by the help of the joints P, P, P, and by means of the ſcrew C, with the nut D, which being regulated by a ſpring N, will bring the object to the exact diſtance for diſtinct viſion.

The glaſs placed in the manner of a barrel-box at *b*, is only to be uſed with the braſs inſtrument (or in your hand) being the leaſt magnifier for greater objects, ſuch as fleas and common inſects, &c. remembering to put the hole at *b* next to your eye.

In the viewing of objects, one ought to be careful not to hinder the light from falling on them, by the hat, peruke, or any other thing, eſpecially in looking at opaque objects; for nothing can be ſeen with the beſt of glaſſes, unleſs the object be at a due diſtance, with a ſufficient light. The beſt lights for the plates or ſliders, where the object lies between the two glaſſes, is a clear ſky-light, or where the ſun ſhines on any white thing, or the reflexion of the light from a looking-glaſs. The light of a candle is likewiſe good for the viewing of very ſmall objects, though it be a little uneaſy to thoſe who are not practiſed in microſcopes to find it out. The only uſe of the convex lens at C (*fig.* 4.) is to collect the light into a narrower compaſs where it falls upon the object, after it has paſſed through a moderate hole in the leather F.

For the convenience of thoſe who would draw, or make any ſketches or deſigns of microſcopical objects, they may alſo have a pedeſtal to fix the two inſtruments above deſcribed, and make them ſtationary to any convenient light. This pedeſtal may be placed on a table, and after the object and ſight are fixed, as many perſons as pleaſe may view the object without any trouble or difficulty in finding the light. (Phil. Tranſ. abr. vol. iv. p. 199, &c.) Mr. Baker in his treatiſe "Of Microſcopes," (vol. i.) has deſcribed an invention for fixing the pocket microſcope of Wilſon, and giving light to it by a ſpeculum. For this purpoſe a ſcroll of braſs is fixed upright and ſteady on a round pedeſtal of wood. A braſs ſcrew is made to paſs through a hole in the upper limb of the ſcroll into the ſide of the microſcope, ſo as to ſcrew it faſt to the ſcroll. On the pedeſtal is fixed an arch, in which a concave ſpeculum, ſet in a box of braſs, is ſuſpended by means of two ſmall ſcrews, that faſten to its oppoſite ſides. As the arch turns on the pin by which it is fixed to the pedeſtal, and the ſpeculum turns within the arch, it may, by this twofold motion, be eaſily adjuſted in ſuch a manner as to reflect the light of the ſky, the ſun, or a candle, directly upwards, through the microſcope that is fixed perpendicularly over it; and by ſo doing, may anſwer almoſt all the purpoſes of the large double reflecting microſcope. The body of the microſcope may alſo be fixed horizontally, and objects may be viewed from that poſition, by any light you chooſe; which is an advantage that does not belong to the reflecting microſcope. It may be alſo rendered further uſeful, by means of a ſlip of glaſs, one end of which being thruſt between the plates where the ſliders go, and the other extending to ſome diſtance, ſuch objects may be placed upon it as cannot be applied on the ſliders; and then, having a limb of braſs that may faſten to the body of the microſcope, and extend over the projecting glaſs a hollow ring on which to ſcrew the magnifiers, all ſorts of ſubjects may be examined with great convenience, if a hole be made in the pedeſtal to place the ſpeculum exactly underneath, and thereby throw up the rays of light. What has been ſaid hitherto, is to be underſtood of *lenticular* microſcopes; as for *ſpherical* ones, their doctrine will be underſtood from what follows.

If an object A B (*fig.* 6.) be placed in the focus of a glaſs ſpherule F, and the eye be behind it, *v. gr.* in the focus G; the object will be ſeen diſtinct, in an erect ſituation, and magnified, as to its diameter, in a ratio of $\frac{3}{4}$ths of the diameter E I, to the diſtance at which objects are to be placed to be ſeen diſtinctly with the naked eye.

 The

The firſt part of the propoſition is proved in the ſame manner of ſpheres, as of lenſes. As, then, a good eye ſees an object diſtinctly at the diſtance of eight digits, a glaſs ſpherule will enlarge the diameter of an object in a ratio of $\frac{3}{4}$ths of the diameter to eight digits. Suppoſe, then, the diameter of the ſpherule E $\frac{1}{10}$th of a digit, C E will be $= \frac{1}{20}$, and F E $= \frac{1}{40}$; and therefore F C $= \frac{1}{20} + \frac{1}{40} = \frac{3}{40}$. Conſequently, the true diameter of an object to its apparent one is in the ratio of $\frac{3}{40}$ to 8; *i.e.* as 3 to 320, or as 1 to 106 nearly.

Now a lens, convex on both ſides, increaſes the diameter in a ratio of the ſemidiameter to the ſpace of eight digits; wherefore $\frac{1}{2}$ having a leſs ratio to eight than $\frac{3}{4}$ths, if a lens and a ſphere have the ſame diameter, the former will magnify more than the latter; and, pretty much after the ſame manner, it may be ſhewn, that a ſphere, of a leſs diameter, magnifies more than another of a large one.

As for the methods of caſting little glaſs ſpherules for microſcopes, they are various. The firſt perſon who improved ſingle microſcopes by uſing ſmall globules of glaſs, made by melting them in the flame of a candle, was Hartſocker, who thus diſcovered the animalcula in ſemine maſculino, and laid the foundation of a new ſyſtem of generation. Wolfius deſcribes the following method of making globules of this kind; a ſmall piece of very fine glaſs, ſticking to the wet point of a ſteel needle, is to be applied to the extreme blueiſh part of the flame of a lamp, or, which is better, to the flame of ſpirit of wine, to prevent its being blackened: being there melted and run into a little round drop, it is to be removed from the flame, upon which it inſtantly ceaſes to be fluid; folding, then, a thin plate of braſs, and making very ſmall ſmooth perforations, ſo as not to leave any roughneſs on the ſurfaces; and, farther, ſmooth them over, to prevent any glaring, fit the ſpherule between the plates againſt the apertures, and put the whole in a frame, with objects convenient for obſervation.

Mr. Adams gives another method, thus: take a piece of fine window-glaſs, and raiſe it, with a diamond, into as many lengths as you think needful, not exceeding an eighth of an inch in breadth; then holding one of thoſe lengths between the fore-finger and the thumb of each hand, over a very fine flame, till the glaſs begins to ſoften, draw it out till it be as fine as a hair, and break; then, applying each of the ends into the pureſt part of the flame, you have two ſpheres preſently, which you may make larger, or leſs, at pleaſure: if they ſtay long in the flame, they will have ſpots; ſo they muſt be drawn out immediately after they are turned round. As to the ſtem, break it off as near the ball as poſſible; and, lodging the remainder of the ſtem between the plates, by drilling the hole exactly round, all the protuberances are buried between the plates; and the microſcope performs to admiration.

Mr. Butterfield, in the Phil. Tranſ. N° 141, recommends, for making glaſs globules clear and without ſpecks, the flame of a lamp, made with rectified ſpirit of wine, and inſtead of a cotton wick, fine ſilver-wire, doubled like a ſkain of thread; then having beaten ſome fine glaſs to powder, and waſhed it clean, he directs to take a little of it upon the ſharp point of a ſilver needle, wetted with ſpittle, and to hold it in the flame, turning it about till it melts, and becomes quite round. When many globules are thus formed, he rubs them with ſoft leather; and having ſeveral ſmall pieces of thin braſs plates, twice as long as they are broad, he doubles them up into the form of a ſquare, and puſhes a fine hole through the middle of them, and having rubbed off the bur about the holes with a whetſtone, and blackened the inſide of the plates with the ſmoke of a candle, he places a globule between the two holes, and tacks the plates together with two or three rivets.

Dr. Hooke uſed to take a very clear piece of glaſs, and to draw it out into long threads in a lamp; then he held theſe threads in the flame, till they ran into round globules hanging to the end of the threads. Then having fixed the globules with ſealing-wax to the end of a ſtick, ſo that the threads ſtood upwards, he ground off the ends of the threads upon a whetſtone, and poliſhed them upon a ſmooth metal plate with a little putty. Mr. Stephen Gray tells us, (Phil. Tranſ. N° 221. 223.) that for want of a ſpirit lamp, he laid a ſmall particle of glaſs, about the ſize of the intended globule, upon the end of a piece of charcoal; and by means of a blaſt-pipe, with the flame of a candle, he ſoon melted it into a globule. He thus made them indifferently clear, and the ſmalleſt very round; but the larger by reſting upon the coal were a little flattened, and became rough on that ſide. He therefore ground and poliſhed them upon a braſs plate, till he reduced them to hemiſpheres. But he found that the ſmall round globules not only magnified more, but ſhewed objects more diſtinct than the hemiſpheres.

By theſe methods may ſpheres be made much ſmaller than any lens; ſo that the beſt ſingle microſcopes, or thoſe which magnify the moſt, are made of them. For ſuppoſe the diameter of a ſpherule to be $\frac{1}{16}$ of a digit, the diſtance of its focus will be $\frac{1}{64}$; and therefore its real diameter to its apparent one, as $\frac{1}{32} + \frac{1}{64}$; that is, as $\frac{3}{64}$ to 8, or as 3 to 512; or, laſtly, as 1 to 170. The ſurface of an object, therefore, will be increaſed by it in the proportion of 1 to 28900, and its bulk in a ratio of 1 to 4913000.

Mr. Leeuwenhoek and M. Muſchenbroek have ſucceeded very well in ſpherical microſcopes; and the apparatus of the latter is much commended; but we forbear any deſcriptions of them; it being eaſy for any one who conſiders the ſtructure of thoſe conſiſting of lenſes, to conceive how thoſe of ſpheres may be contrived.

Mr. Leeuwenhoek's microſcopes were all ſingle ones; each of them conſiſting of a ſmall double convex glaſs ſet in a ſocket, between two ſilver plates, riveted together, and pierced with a ſmall hole; and the object was placed on the point of a needle, ſo contrived, as to be placed at any diſtance from the lens. If the objects were ſolid, he faſtened them with glue; and if they were fluid, or, on other accounts, required to be ſpread on glaſs, he placed them on a ſmall piece of Muſcovy talc, or glaſs blown very thin, which he afterwards glued to his needle. He had however a different apparatus for viewing the circulation of the blood, which he could fix to the ſame microſcopes. Thoſe which he bequeathed to the Royal Society were contained in a ſmall Indian cabinet, in the drawers of which were thirteen little boxes or caſes, in each of which were two microſcopes, neatly fitted up in ſilver; and both the glaſs and the apparatus were made with his own hands. The greateſt magnifier among theſe enlarged the diameter of an object about 160 times Phil. Tranſ. Abr. vol. vi. p. 129, &c. Id. vol. viii. p. 121, &c.

Several writers, ſays Mr. Baker (ubi infra) have repreſented the glaſſes uſed by Mr. Leeuwenhoek in his microſcopes, to be little globules or ſpheres of glaſs; but he aſſures us, from an inſpection of his cabinet, that every one of the 26 microſcopes contained in it, was a double convex lens, and not a ſphere or globule.

The ſmalleſt globules, and conſequently the greateſt magnifiers for microſcopes that have yet been executed, were made by F. Di Torre of Naples, who, in 1765, ſent four of them to the Royal Society. The largeſt of them was only

only two Paris points in diameter, and is ſaid to magnify the diameter of an object 640 times; the ſecond was the ſize of one Paris point; magnifying the diameter 1280 times, and the third no more than one-half of a Paris point, or the 144th part of an inch in diameter, and was ſaid to magnify the diameter of an object 2560 times, and conſequently the ſquare of ſuch a diameter 6,553,600 times. But ſince the focus of a glaſs globule is at the diſtance of one-fourth of its diameter, and, therefore, that of the third globule of Di Torre, above mentioned, only the 576th part of an inch diſtant from the object, it muſt be with the utmoſt difficulty that globules ſo minute as theſe can be employed to any purpoſe; and Mr. Baker, to whoſe examination they were referred, conſiders them as matters of curioſity rather than of real uſe. (Phil. Tranſ. vol. lv. p. 246. vol. lvi. p. 67, &c.) For an account of obſervations made with theſe globules on the blood, ſee Blood.

Experience, ſays Mr. Baker, in his treatiſe "Of Microſcopes," has taught us, that thoſe globules which were at firſt highly extolled and much ſought after, admit ſo little light, can ſhew only ſuch an exceeding minute part of any object, are ſo difficult to be uſed, and ſtrain the eyes ſo much, that their power of magnifying, for want of due diſtinctneſs, is rather apt to produce error than to diſcover truth, and therefore now they are very rarely employed.

In order to ſtate clearly and diſtinctly the method of determining the magnifying powers of glaſſes employed in ſingle microſcopes, we ſhall obſervo, that if the focus of a convex lens (*e. g.*) be at one inch, and the natural ſight at eight inches, which is the common ſtandard, an object may be ſeen through that lens at one inch diſtant from the eye; and will appear, in its diameter, eight times larger than to the naked eye. But as the object is magnified every way equally, in length as well as breadth, we muſt ſquare this diameter, to know really how much it appears enlarged; and we ſhall then find, that its ſuperficies is indeed magnified ſixty-four times.

Again: ſuppoſe a convex lens whoſe focus is at one-tenth of an inch diſtant from its centre: in eight inches there are eighty ſuch tenths of an inch; and therefore an object may be ſeen through this lens eighty times nearer than it can diſtinctly by the naked eye. It will conſequently appear eighty times longer, and eighty times broader, than it does to common ſight; and as eighty multiplied by eighty makes ſix thouſand and four hundred, ſo many times it really appears magnified.

To go one ſtep farther: if a convex glaſs be ſo ſmall, that its focus is no more than one-twentieth of an inch diſtant; we ſhall find that eight inches, the common diſtance of ſight, contains an hundred and ſixty of theſe twentieth parts; and, in conſequence, the length and breadth of an object, when ſeen through ſuch lens, will each be magnified an hundred and ſixty times; which multiplied by an hundred and ſixty, to give the ſquare, will amount to twenty-five thouſand ſix hundred; and ſo many times, it is plain, the ſuperficies of the object muſt appear larger than it does to the naked eye at the diſtance of eight inches.

Therefore, in a ſingle microſcope, to learn the magnifying power of any glaſs, no more is neceſſary than to bring it to its true focus; the exact place of which will be known, by an object's appearing perfectly diſtinct and ſharp when placed there. Then, with a pair of ſmall compaſſes, meaſure, as nearly as you can, the diſtance from the centre of the glaſs to the object you were viewing, and afterwards applying the compaſſes to any ruler with a diagonal ſcale of the parts of an inch marked on it, you will eaſily find how many parts of an inch the ſaid diſtance is. When that is known, compute how many times thoſe parts of an inch are contained in eight inches, the common ſtandard of ſight, and that will give you the number of times the diameter is magnified: ſquaring the diameter will give you the ſuperficies; and if it be an object whoſe depth or whole contents you would learn, multiplying the ſuperficies by the diameter will ſhew the cube or bulk.

A Table of the Magnifying Powers of Convex Glaſſes, employed in Single Microſcopes, according to the Diſtance of their Focus: Calculated by the Scale of an Inch divided into an Hundred Parts: Shewing how many Times the Diameter, the Superficies, and the Cube of an Object is magnified, when viewed through ſuch Glaſſes, to an Eye whoſe natural Sight is at Eight Inches, or Eight Hundred of the Hundredth Parts of an Inch.

		Hundred parts of an inch:	Magnifies the Diameter.	Magnifies the Superficies.	Magnifies the Cube of an Object.	
	$\frac{1}{2}$ or	50	16	256	4,096	
	$\frac{4}{10}$ or	40	20	400	8,000	
	$\frac{3}{10}$ or	30	26	676	17,576	
	$\frac{1}{5}$ or	20	40	1,600	64,000	
		15	53	2,806	148,877	
		14	57	3,249	185,193	
		13	61	3,721	226,981	
		12	66	4,356	287,496	
		11	72	5,184	373,248	
The focus of a glaſs at	$\frac{1}{10}$ or	10	80	6,400	512,000	Times.
		9	88	7,744	681,472	
		8	100	10,000	1,000,000	
		7	114	12,996	1,481,544	
		6	133	17,689	2,352,637	
	$\frac{1}{20}$ or	5	160	25,600	4,096,000	
		4	200	40,000	8,000,000	
		3	266	70,756	18,821,096	
	$\frac{1}{50}$ or	2	400	160,000	64,000,000	
		1	800	640,000	512,000,000	

N.B. The

N.B. The greateft magnifier in Mr. Leeuwenhoek's Cabinet of Microfcopes, prefented to the Royal Society, has its focus, as nearly as can well be meafured, at $\frac{1}{20}$th of an inch diftance from its centre, and confequently magnifies the diameter of an object 160 times, and the fuperficies 25,600. But the greateft magnifier in Mr. Wilfon's fingle microfcopes, as they are now made, has ufually its focus at no farther diftance than about the fiftieth part of an inch; whereby it has the power of enlarging the diameter of an object 400, and its fuperficies 160,000 times.

The following Table is calculated on the fuppofition that the neareft diftance at which we can fee diftinctly is feven inches; and fhews the magnifying power of fmall convex lenfes or fingle microfcopes, not exceeding an inch in focal length.

Focal Diftance of the Lens or Microfcope.		Number of Times that the Diameter of an Object is magnified.		Number of Times that the Surface of an Object is magnified.	Number of Times that the Cube of an Object is magnified.
100dths of an Inch.		Times.	Dec. of a Time.	Times.	Times.
1	100	7	.00	49	343
$\frac{3}{4}$	75	9	.33	87	810
$\frac{1}{2}$	50	14	.00	196	2744
$\frac{2}{5}$	40	17	.50	306	5360
$\frac{3}{10}$	30	23	.33	544	12698
$\frac{2}{10}$	20	35	.00	1225	42875
	19	36	.84	1354	49836
	18	38	.89	1513	58864
	17	41	.18	1697	69935
	16	43	.75	1910	83453
	15	46	.66	2181	101848
	14	50	.00	2500	125000
	13	53	.85	2894	155721
	12	58	.33	3399	198156
	11	63	.67	4045	257259
$\frac{1}{10}$	10	70	.00	4900	343000
	9	77	.78	6053	470911
	8	87	.50	7656	669922
	7	100	.05	10000	1000000
	6	116	.66	13689	1601613
$\frac{1}{20}$	5	140	.00	19600	2744000
$\frac{1}{25}$	4	175	.00	30625	5359375
	3	233	.33	54289	12649337
$\frac{1}{50}$	2	350	.00	122500	42875000
	1	700	.00	490000	343000000

Ferguson's Mechanics by Brewfter, vol. ii. p 449.

Microscope, *Water*. Mr. S. Gray, and, after him, Wolfius, and others, have contrived water microfcopes, confifting of fpherules, or lenfes of water, inftead of glafs, fitted up fomewhat after the manner of thofe above mentioned (as fpheres of water may be likewife ufed inftead of glafs in any of the common microfcopes.) But fince the diftance of the focus of a lens or fphere of water is greater than that of one of glafs (the fpheres whereof they are fegments being the fame), water microfcopes magnify lefs, and are therefore lefs efteemed than thofe of glafs. The fame Mr. Gray firft obferved, that a fmall drop or hemifpherule of water, held to the eye by candlelight or moonlight, without any other apparatus, magnified the animalcula contained in it vaftly more than any other microfcope. The reafon is, that the rays, coming from the interior furface of the firft hemifphere, are reflected fo as to fall under the fame angle on the furface of the hind hemifphere, to which the eye is applied, as if they came from the focus of the fpherule; whence they are propagated to the eye in the fame manner as if the objects were placed without the fpherule in its focus. Phil. Tranf. N° 221. 223. Smith's Optics, vol. ii. p. 334, &c.

Hollow glafs fpheres, of the diameter of about half a digit, filled with fpirit of wine, are frequently ufed for microfcopes: but they do not magnify near fo much.

Dr. Brewfter, in the Appendix to his edition of Ferguson's Mechanics, &c., defcribes a microfcope totally different from that of Mr. Gray, though founded upon the fame general principle. Inftead of water, he makes ufe of very pure and vifcid turpentine, which he takes up by the point of a piece of wood, and drops fucceffively upon a thin and well polifhed glafs: different quantities being thus taken up and dropped in a fimilar manner form four or more plano-convex lenfes of turpentine varnifh, which may be made of any focal length, by taking up a greater or lefs quantity of the fluid. The lower furface of the glafs having been firft fmoaked with a candle, the black pigment below the lenfes is then to be removed, fo that no light may pafs by their circumference. The piece of glafs is then to be perforated, and furrounded with a toothed wheel, which can be moved round the hole as a centre by an endlefs fcrew. The apparatus is then placed in a circular cafe, and this cafe fixed to an horizontal arm by means of a brafs pin, which paffes through its upper and under furfaces, and through the hole already mentioned, which does not embrace the pin very tightly, in order that the toothed wheel may revolve with facility. On the upper furface of the circular cafe is an aperture directly above the line defcribed by the centres of the fluid lenfes, when moving round the central hole; and in this aperture is inferted a fmall cap, with a little hole at its top, to which the eye is applied. A moveable ftage carries the flider, on which microfcopic objects are laid, and is brought nearer or removed from the lenfes by a vertical fcrew. The objects on the flider are illuminated by a plain mirror, which has both a vertical and horizontal motion for this purpofe. When the microfcope is thus conftructed, the object to be viewed is placed upon the flider, and the endlefs fcrew is turned till one of the lenfes be directly under the aperture; and the flider is thus raifed or depreffed by the vertical fcrew, till the object be brought into the focus of the lens. In this manner, by turning the endlefs fcrew, and bringing all the lenfes, one after another, directly below the aperture, the object may be fucceffively examined with a variety of magnifying powers. Thefe fluid lenfes have been employed as the object-glaffes of compound microfcopes.

The *fingle aquatic microfcope* of Mr. Ellis has the advantage of being fimple in its conftruction, portable, and very commodious for the purpofes of practical botanifts, the obfervers of animalcula, &c. K (*fig.* 7.) reprefents the box containing the whole apparatus: it is generally made of fifhfkin; and on the top there is a female fcrew, for receiving the fcrew that is at the bottom of the pillar A: this is a pillar of brafs, and is fcrewed on the top of the box. D is a brafs pin which fits into the pillar; on the top of this pin is a hollow focket to receive the arm which carries the magnifiers; the pin is to be moved up and down, in order to adjuft the lenfes to their focal or proper diftance from the object. [N. B. In the reprefentations of this microfcope, the pin D is delineated as paffing through a focket at one fide of the pillar A; whereas it is ufual at prefent to make it pafs down a hole bored through the middle of the pillar.] E, the bar which carries the magnifying lens; it fits into the focket socket X, which is at the top of the pin or pillar D. This arm may be moved backwards and forwards in the socket X, and sideways by the pin D; so that the magnifier, which is screwed into the ring at the end E of this bar, may be easily made to traverse over any part of the object that lies on the stage or plate B. F F is a polished silver speculum, with a magnifying lens placed at the centre thereof, which is perforated for this purpose. The silver speculum screws into the arm E, as at F. G, another speculum, with its lens, which is of a different magnifying power from the former. H, the semicircle which supports the mirror I; the pin R, affixed to the semicircle H, passes through the hole which is towards the bottom of the pillar A. B, the stage, or the plane, on which the objects are to be placed; it fits into the small dove-tailed arm which is at the upper end of the pillar D A. A plane round glass, with a small piece of black silk stuck on it, is used to lie in a circular groove made in the stage B. A hollow watch glass is to be laid occasionally on the stage instead of the plane glass. L, a pair of nippers. These are fixed to the stage by the pin at bottom; the steel wire of these nippers slides backwards and forwards in the socket, and this socket is moveable upwards and downwards by means of the joint, so that the position of the object may be varied at pleasure. The object may be fixed in the nippers, stuck on the point, or affixed, by a little gum-water, &c. to the ivory cylinder N, which occasionally screws to the point of the nippers.

To use this microscope: take all the parts of the apparatus out of the box; then begin by screwing the pillar A to the cover of it; pass the pin R of the semicircle which carries the mirror through the hole that is near the bottom of the pillar A; push the stage into the dove-tail at B, slide the pin into the pillar (see the N.B. above); then pass the bar E through the socket which is at the top of the pin D, and screw one of the magnifying lenses into the ring at F. The microscope is now ready for use: and though the enumeration of the articles may lead the reader to imagine the instrument to be of a complex nature, we can safely affirm that he will find it otherwise. The instrument has this peculiar advantage, that it is difficult to put any of the pieces in a place which is appropriated to another. Let the object be now placed either on the glasses of the stage, or in the nippers L, and in such manner that it may be as nearly as possible over the centre of the stage: bring the speculum F over the part you mean to observe; then throw as much light on the speculum as you can, by means of the mirror I, and the double motion of which it is capable; the light received on the speculum is reflected by it on the object. The distance of the lens F from the object is regulated by moving the pin D up and down, until a distinct view of it is obtained. The best rule is, to place the lens beyond its focal distance from the object, and then gradually to slide it down till the object appears sharp and well defined. The adjustment of the lenses to their focus, and the distribution of the light on the object, are what require the greatest attention: on the first the distinctness of the vision depends; the pleasure arising from a clear view of the parts under observation is due to the modification of the light. No precise rule can be given for attaining accurately these points; it is from practice alone that ready habits of obtaining these necessary properties can be acquired, and with the assistance of this no difficulty will be found.

Mr. B. Martin has also contrived a microscope for similar purposes with those to which that of Mr. Ellis is adapted. A B (*fig.* 8.) represents a small arm supporting two or more magnifiers, one fixed to the upper part as at B, the other to the lower part of the arm at C; these may be used separately or combined together. The arm A B is supported by the square pillar I K, the lower end of which fits into the socket E of the foot F G; the stage D L is made to slide up and down the square pillar; H, a concave mirror for reflecting light on the object.—To use this microscope, place the object on the stage, reflect the light on it from the concave mirror, and regulate it to the focus, by moving the stage nearer to or farther from the lens at B. The ivory sliders pass through the stage; other objects may be fixed in the nippers M, N, and then brought under the eye-glasses; or they may be laid on one of the glasses which fit the stage. The apparatus to this instrument consists of three ivory sliders; a pair of nippers; a pair of forceps; a flat glass and a concave ditto, both fitted to the stage.

The two last microscopes are frequently fitted up with a toothed rack and pinion, for the more ready adjustment of the glasses to their proper focus.

Dr. Withering, in his "Botanical Arrangements," describes a portable botanic microscope. It consists of three brass plates, A, B, C, (*fig.* 9.) which are parallel to each other; the wires D and E are rivetted into the upper and lower plates, which are by this means united to each other; the middle plate or stage is moveable on the aforesaid wires by two little sockets which are fixed to it. The two upper plates each contain a magnifying lens, but of different powers; one of these confines and keeps in their places the fine point F, the forceps G, and the small knife H.—To use this instrument, unscrew the upper lens, and take out the point, the knife, and the forceps; then screw the lens on again, place the object on the stage, and then move it up or down till you have gained a distinct view of the object, as one lens is made of a shorter focus than the other; and spare lenses of a still deeper focus may be had if required. This little microscope is the most portable of any. Its principal merit is its simplicity.

Mr. B. Martin has contrived to mount several lenses in one frame, which are convenient for various purposes, and are carried in the pocket. He calls this apparatus a "Hand Megalascope," from its use in viewing the larger sort of small objects expeditiously. The case with its three frames and lenses, is represented in *fig.* 10. The lenses are commonly of 1, 1½ and 2 inches focus; they are contrived so as to turn over each other, and that into the case. The three lenses singly afford three magnifying powers; and by combining two and two, we obtain three more; *d* with *e* making one, *d* with *f* another, and *e* with *f* a third; and all three combined together make another; so that by this simple apparatus we have seven different magnifying powers. When the three lenses are combined, it is better to turn them in, and look through them by the small apertures in the sides of the case. The eye in this case is not incommoded by external light; the aberration of the superfluous rays through the glasses is precluded; and the eye coincides more exactly with the common axes of the lenses.

M. Lyonet has invented a curious and useful microscope, for the purpose of minute dissections and microscopic preparations. A B (*fig.* 11.) is the anatomical table, which is supported by a pillar N O; this is screwed on the foot C D. The table A B is prevented from turning round by means of two steady pins. In this table or board there is a hole G, which is exactly over the centre of the mirror E F, that is to reflect the light on the object; the hole G is designed to receive a flat or concave glass, on which the objects for examination are to be placed.

R X Z is an arm formed of several balls and sockets, by which means it may be moved in every possible situation; it is fixed to the board by means of the screw H. The last

arm

arm I Z has a female ſcrew, into which a magnifier may be ſcrewed as at Z. By means of the ſcrew H, a ſmall motion may be occaſionally given to the arm I Z, for adjuſting the lens with accuracy to its focal diſtance from the object.

Another chain of balls is ſometimes uſed, carrying a lens to throw light upon the object; the mirror is likewiſe ſo mounted, as to be taken from its place at K, and fitted on a clamp, by which it may be fixed to any part of the table A B.

To uſe the Diſſecting Table.—Let the operator ſit with his left ſide near a light window; the inſtrument being placed on a firm table, the ſide D H towards the ſtomach, the obſervations ſhould be made with the left eye. In diſſecting, the two elbows are to be ſupported by the table on which the inſtrument reſts, the hands reſting againſt the board A B; and in order to give it greater ſtability (as a ſmall ſhake, though imperceptible to the naked eye, is very viſible in the microſcope), the diſſecting inſtruments are to be held one in each hand, between the thumb and two fore-fingers.

Microscopes, *Theory of Compound, or Double.* Suppoſe an object-glaſs E D, (*Plate* XII. *Optics, fig.* 1.) the ſegment of a very ſmall ſphere, and the object A B placed without the focus F.

Suppoſe an eye-glaſs G H, convex on both ſides, and the ſegment of a ſphere greater (though not too great) than that of D E; and let it be ſo diſpoſed behind the object, as that if C F : C L :: C L : C K; the focus of the eye-glaſs may be in K.

Laſtly, ſuppoſe L K : L M :: L M : L I.

If, then, O be the place in which an object is ſeen diſtinct with the naked eye; the eye, in this caſe, being placed in I, will ſee the object A B diſtinctly, in an inverted ſituation, and magnified in a compound ratio of M K to L K, and L C to C O; as is proved from the laws of dioptrics; *i. e.* the image itſelf is larger than the object, and we are able to view it diſtinctly at a leſs diſtance. *E. G.* If the image be twenty times larger than the object, and by the help of the eye-glaſs we are able to view it five times nearer than we could have done with the naked eye, it will, on both theſe accounts, be magnified 5 times 20, or 100 times.

Microscopes, *Laws of Double.* 1. The more an object is magnified by the microſcope, the leſs is its *field*, *i. e.* the leſs of it is taken in at one view.

2. To the ſame eye-glaſs may be ſucceſſively applied object-glaſſes of various ſpheres, ſo as that both the entire objects, but leſs magnified, and their ſeveral parts, much more magnified, may be viewed through the ſame microſcope. In which caſe, on account of the different diſtances of the image, the tube L K, in which the lenſes are fitted, ſhould be made to draw out. For the proportion of the object-glaſs to the eye-glaſs, ſome commend the ſubduple ratio, and ſome the ſubſeſquiſextile. De Chales will have the ſemidiameter of the convexity of the object-glaſs to be $\frac{1}{3}$ of a digit, or, at moſt, $\frac{1}{2}$; in the eye-glaſs an entire digit, or even $1\frac{1}{2}$. Cherubin makes the ſemidiameter of the object-glaſs $\frac{1}{4}$, $\frac{1}{3}$, or $\frac{1}{2}$ of a digit; the ſemidiameter of the eye-glaſs $1\frac{1}{3}$, or $1\frac{1}{2}$ of a digit.

3. Since it is proved that the diſtance of the image L K from the object-glaſs D E will be greater, if another lens, concave on both ſides, be placed before its focus; it follows, that the object will be magnified the more, if ſuch a lens be here placed between the object-glaſs D E, and the eye-glaſs G H. Such a microſcope is much commended by Conradi, who uſed an object-lens, convex on both ſides, whoſe ſemidiameter was two digits, its aperture equal to a muſtard-ſeed; a lens, concave on both ſides, 12, or at moſt 16 digits; and an eye-glaſs, convex on both ſides, of ſix digits.

4. Since the image is projected to the greater diſtance, the nearer another lens, of a ſegment of a larger ſphere, is brought to the object-glaſs; a microſcope may be compoſed of three lenſes which will magnify prodigiouſly.

5. From theſe conſiderations it follows, that the object will be magnified the more, as the eye-glaſs is the ſegment of a ſmaller ſphere; but the field of viſion will be the greater, as the ſame is a ſegment of a larger ſphere. If, then, two eye-glaſſes, the one a ſegment of a larger, the other of a ſmaller ſphere, be ſo combined, as that the object appearing very near through them, *i. e.* not farther diſtant than the focus of the firſt, be yet diſtinct; the object, at the ſame time, will be exceedingly magnified, and the field of viſion much greater than if only one lens was uſed; and the object will be ſtill more magnified, and the field enlarged, if both the object and eye-glaſs be double. But in regard an object appears dim, when viewed through ſo many glaſſes, part of the rays being reflected in paſſing through each, the multiplying of lenſes is not adviſable; and the beſt, among compound microſcopes, are thoſe which conſiſt of one object-glaſs and two eye-glaſſes. Theſe eye-glaſſes are placed ſometimes cloſe together, and ſometimes an inch aſunder; by which means, although the object appears leſs magnified, yet the viſible area is much enlarged by the interpoſition of a ſecond eye-glaſs, and thus a much pleaſanter view is obtained. This additional lens is called the amplifying glaſs, and is generally about $1\frac{1}{2}$ inch in diameter, and $2\frac{1}{2}$ inches in focal length.

Dr. Hooke tells us, in the preface to his Micrography, that in moſt of his obſervations he uſed a microſcope of this kind, with a middle eye-glaſs of a conſiderable diameter, when he wanted to ſee much of the object at one view, and took it out when he would examine the ſmall parts of an object more accurately; for the fewer refractions there are, the more light and clear the object appears.

For a microſcope of three lenſes, De Chales commends an object glaſs of $\frac{1}{3}$ or $\frac{1}{4}$ of a digit; and the firſt eye-glaſs he makes 2 or $2\frac{1}{2}$ digits; the diſtance between the object-glaſs and eye-glaſs about twenty lines. Conradi had an excellent microſcope, the object-glaſs of which was half a digit, and the two eye-glaſſes (which were placed very near) four digits; but it anſwered beſt, when, in lieu of the object-glaſs, he uſed two glaſſes, convex on both ſides, their ſphere about a digit and a half, or at moſt two, and their convexities touching each other within the ſpace of half a line. Euſtachius de Divinis, inſtead of an object-glaſs convex on both ſides, uſed two plano-convex lenſes, whoſe convexities touched; Grindelius did the ſame, only that the convexities did not quite touch. Zahnius made a binocular microſcope, in which both eyes were uſed.

It is obſerved that compound microſcopes ſometimes exhibit a fallacious appearance, by repreſenting convex objects concave, and *vice verſâ*. See Phil. Tranſ. N° 476. p. 387.

The magnifying power of a microſcope with more than two lenſes, muſt be computed from the effect of all the lenſes (ſee Lens); or it may be aſcertained experimentally in the following manner. Place part of a divided ruler before the microſcope, ſo that, looking through the inſtrument, you may ſee one of its diviſions magnified; then open the other eye alſo, and looking with it at the ruler out of the microſcope, you will perceive the image of the magnified diviſion as it were projected upon the ruler; and you may eaſily ſee how many diviſions of the unmagnified ruler meaſure, or are equal to, the ſingle magnified diviſion, and that numbe is the magnifying power of that microſcope. Thus, if the ruler

ruler be divided after the common way into inches and tenths, and if you find that one magnified tenth is equal to three inches, you may conclude that the microscope magnifies 30 times.

MICROSCOPE, *Structure or Mechanism of a Double.* The industry and address of our countryman, Mr. Marshal, here deserve to be remembered: the construction of the original double microscope being of his contrivance. In this the eye-glass is at W (*Plate* XIII. *fig.* 1.) the object-glass at C, the middle glass at A 1: B is the cover or lid, to keep out the dust from the eye-glass W; X is the place of the eye, W a screw where the eye-glass lies; A 1 a screw where the middle glass lies; A 2 the drawer, where the outermost tube A 1 A 2 is disjoined from the inner one, of the same length; Z the frame or basis on which the microscope stands firm; T a small drawer in the frame or basis, with a ledge or till in it, having six partitions to hold so many several object-glasses, one magnifying more than another, and fixed in brass cells ready to screw on at C, and marked 1, 2, 3, 4, 5, 6; these partitions are also marked 1, 2, 3, 4, 5, 6; the other part of the drawer serves to hold the object-plate; a pair of small nippers, to take up, or handle any object conveniently; another object-plate, having one side white and the other black, to fix your objects upon, as black upon white, and white objects on black. L M is a brass ball and socket, on which the whole body of the microscope is moveable, so as to lie in any position for the light. L K, a square brass pillar, on which the microscope is moveable up and down, by means of the collar E, into which the arm D (holding the microscope) is continued. G, another brass collar sliding up and down on the pillar L K, having a small screw H, by which it is, as occasion serves, fixed fast to the said pillar, at any height. I, a large brass nut, in whose centre is a female screw, fitted to the male screw F, which is fixed in the collar E; by the turning of which nut I (the collar G being first fixed to the pillar by the screw H) the microscope is raised up or down on the pillar, and made to come nearer or go farther from the object P *c*; and, which is also a very great advantage, the axis of the microscope is always kept perpendicular to that point of the object, over which it was first placed; so that here is not the inconvenience which occurs in other glasses of often losing the sight of the object, by screwing the glass C higher or lower. P Q is a glass object-plate fixed in a brass frame, whose arm N N is fixed to the pillar by means of the nut O. The arm N N hath in it a slit, by which it is easily put on, or taken off the pillar, and by which it may be fixed upon it at any distance. P, a small fish lying on the glass-plate, that the circulation of the blood may be seen in the end of the tail-fin. R, a convex glass, by whose help a bright spot of light is brought from a candle at S, standing on the ground, while the microscope stands on the edge of a table or stool, which spot of light, *c*, serves to render the circulation more conspicuous. V, a leaden coffin to be put on the fish, to hinder it from springing away, and moving his tail out of the light. 1, 2, 3, 4, 5, 6, are marked on the pillar L K, to shew the respective distances of the object-glasses from the object you look upon according as the object-glasses you make use of magnify more or less. Thus, for instance, if you use the object-glass 5 or 6 (either of which will shew the circulation of the blood) you must fix the upper edge of the collar E, at the mark 5 or 6 on the pillar. And then the microscope will be very near its exact distance from the object; so that by a small turn or two of the nut I one way or the other, to be found by trial, you may soon fit it exactly to your own eye.

By this microscope liquors also may be very commodiously examined; for if you place a small drop of any liquor on the glass-plate, just in the middle of the spot of light *c*, the parts of it will become very visible, and its animalcula, if it have any, will be discovered. And thus may the eels in vinegar, the small creatures in black-pepper water, or in water where wheat, barley, &c. has been infused, the eels and other small living creatures in puddle-water, be as plainly seen as by almost any other microscope.

In the microscope, in which the objects are illuminated by reflection, made by Mr. Culpeper and Mr. Scarlet, as an improvement of Mr. Marshal's, the inner tube, *a b*, (*fig.* 2) which slides in the outer, *c d*, holds all the glasses. The eye-glass is at *a a*, the broad middle glass at *b b*, and the object-glass, being set in a button at *e*, is screwed upon the end of a narrower tube *f g*; which being fixed in the base of the inner tube, passes freely through a hole in the base of the outer. The buttons that contain several object-glasses are marked 1, 2, 3, &c. and the convexity of the inner tube is also marked with dotted circles, numbered 1, 2, 3, &c. in order to bring that circle to coincide with the mouth *c c* of the outer tube, whose number is the same as that of the object-glass then made use of. But if the object does not yet appear quite distinct, the pinion R must be turned, which, by a rack on the tube of the microscope, brings it nearer to the object placed below it. Of these glasses the greater magnifiers are known by their having smaller apertures.

The base *d d* of the outer tube is supported by three brass pillars, fixed into a wooden pedestal *h*; and a little below the object-glass *f*, a circular plate *i k* is fixed like a stage between the pillars, having a circular hole in the centre to receive glasses, &c. to place objects upon. Three small brass circles *m n*, with holes through the middle of them, are to be placed over the hole in the middle of the stage; and then the ivory sliders with objects may be put between the two uppermost of these circles, which are pressed together by a spiral springing wire lodged between the two undermost; the two outermost being held together by two small pillars passing through two holes in the circumference of the middle circle. For viewing the circulation of the blood, the button *p*, on the under side of the frame of a broad plane glass *q r*, being put through a slit made in the stage, a small brass bolt *s*, under the stage, must be shoved inwards, till a smaller slit in it embraces the neck of the said button; and then the fish being laid upon this glass, and covered with the leaden coffin V, (*fig.* 1.) its tail may be brought exactly under the object-glass by turning the glass *p q* about the button, or by shoving it inwards or outwards along the slit in the stage. The circular object-plate *v x* has a like button in its centre, to be put into the same slit as before; and then the different objects, placed between two talcs in the holes made round the circumference of the plate, may be viewed successively by turning the plate about its centre.

All these transparent objects are illuminated extremely well in this microscope, either by candle-light or sky-light reflected upwards from a concave looking-glass *y z*, placed in a frame from the centre *h* of the pedestal. While you are viewing the object through the microscope, turn this concave upon its horizontal poles *y*, *z*, and you will soon find out that position of it in which it reflects the most light through the hole in the stage upon the object; and this happens when it reflects the rays very obliquely. Opaque objects, when laid upon a black ebony or a white ivory plate, put into the hole upon the stage, may be illuminated by candle-light transmitted through a double convex lens $\alpha\beta$; the stem of the frame $\alpha\beta$, in which it turns, being put into the hole in the stage. The candle must be placed in a line drawn from the object through the middle of this lens, at such a distance from it as

 shall

ſhall cauſe the ſpot of light upon the object-plate to be the narroweſt. By day-light this lens gives little or no advantage to the direct ſky-light.

Mr. Adams, in his "Eſſays," has deſcribed an improvement of this kind of microſcope, which is as follows: A B (*Plate* XIV. *fig.* 1.) repreſents the body of the microſcope, containing a double eye-glaſs and a body-glaſs: it is here ſhewn as ſcrewed to the arm C D, from whence it may be occaſionally removed, either for the convenience of packing, or when the inſtrument is to be uſed as a ſingle microſcope.

The eye-glaſſes and the body-glaſſes are contained in a tube which fits into the exterior tube A B; by pulling out a little this tube when the microſcope is in uſe, the magnifying power of each lens is increaſed.

The body A B of the microſcope is ſupported by the arm C D; this arm is fixed to the main pillar C F, which is ſcrewed firmly to the mahogany pedeſtal G H; there is ſometimes a drawer to this pedeſtal, which holds the apparatus.

N I S, the plate or ſtage which carries the ſlider-holder K L: this ſtage is moved up or down the pillar C F, by turning the milled nut M; this nut is fixed to a pinion, that works in a toothed rack cut on one ſide of the pillar. By means of this pinion, the ſtage may be gradually raiſed or depreſſed, and the object adjuſted to the focus of the different lenſes.

K L is a ſlider-holder, which fits into a hole that is in the middle ſtage N I S; it is uſed to confine and guide either the motion of the ſliders which contain the objects, or the glaſs tubes that are deſigned to confine ſmall fiſhes for viewing the circulation of the blood. The ſliders are to be paſſed between the two upper plates, the tubes through the bent plates.

L is a braſs tube, to the lower part of which is fixed the condenſing lens for concentrating the light reflected up from the mirror O; it fits into the under part of the ſlider-holder K L, and may be ſet at different diſtances from the object, according to its diſtance from the mirror or the candle.

O is the frame which holds the two reflecting mirrors, one of which is plane, the other concave. Theſe mirrors may be moved in various directions, in order to reflect the light properly, by means of the pivots on which they move, in the ſemicircle Q S R, and the motion of the ſemicircle itſelf on the pin S: the concave mirror generally anſwers beſt in the day-time; the plane mirror combines better with the condenſing lens, and a lamp or candle. At D there is a ſocket for receiving the pin of the arm Q (*fig.* 2.) to which the concave ſpeculum R, for reflecting light on opaque objects, is ſcrewed. At S is a hole and ſlit for receiving either the nippers *a b c* (*fig.* 7.), or the fiſh-pan (*fig.* 8.); when theſe are uſed, the ſlider-holder muſt be removed. A hole is made in the oppoſite ſide of the ſtage to receive the pin *g* of the convex lens S, *fig.* 3.

To uſe this microſcope: Take it out of the box. Screw the body into the round end of the upper part of the arm C D. Place the braſs ſliders, which contain the magnifiers, into the dove-tailed ſlit which is on the under ſide of the aforeſaid arm, as ſeen at E, and ſlide it forwards until the magnifier you mean to uſe is under the centre of the body: oppoſite to each magnifier in this ſlit there is a notch, and in the dove-tailed part of the arm C D there is a ſpring, which falls into the above-mentioned notch, and thus makes each magnifier coincide with the centre of the body. Paſs the ivory ſlider you intend to uſe between the upper plates of the ſlider-holder K L, and then reflect as ſtrong a light as you can on the object by means of one of the mirrors; after this, adjuſt the object to the focus of the magnifier and your eye, by turning the milled ſcrew M, the motion of which raiſes and depreſſes the ſtage N I S. The degree of light neceſſary for each object, and the accuracy required in the adjuſtment of the lenſes to their proper focal diſtance from the object, will be eaſily attained by a little practice.

When *opaque* objects are to be examined, remove the ſlider-holder, and place the object on a flat glaſs, or fix it in the nippers (*fig.* 7.); the pin *c* of theſe fits into the hole on the ſtage; ſcrew the concave ſpeculum R into the arm Q (*fig* 2.) and then paſs the pin of this arm through the ſocket D, (*fig.* 1.) the light is now to be reflected from the concave mirror to the ſilver ſpeculum, and from this down on the object. No exact rule can be given for reflecting the light on the object; we muſt therefore refer the reader to the mother of all aptneſs, practice. The ſpeculum muſt be moved lower or higher, to ſuit the focus of the different magnifiers and the nature of the object.

The foregoing directions apply equally to the uſing of this inſtrument as a *ſingle* microſcope; with this difference only, that the body A B is then removed, and the eye is applied to the upper ſurface of the arm C D, exactly over the magnifiers.

This microſcope is ſometimes made with the following *alterations*, which are ſuppoſed to render it ſtill more convenient and uſeful. The arm C D that carries the body and magnifiers is made both to turn on a pin, and to ſlide backwards and forwards in a ſocket at C; ſo that, inſtead of moving the objects below on the ſtage, and diſturbing them, the magnifiers are more conveniently brought over any part of the objects as deſired. The condenſing glaſs is made larger, and ſlides upon the ſquare bar C F quite diſtinct from the ſtage, like the mirrors below; and it is thereby made uſeful for any other objects that may be applied on glaſſes fitted to the ſtage, as well as thoſe put into the ſlider-holder K. It is thereby not confined to this ſtage alone, as in the preceding. When the body A B is taken away, the arm C D may be ſlipt away from its bar, with the magnifiers, and the forceps, wire, and joint, applied to it as at *fig.* 7.; and it thereby ſerves the purpoſe of a ſmall hand ſingle or opaque microſcope, for any object occaſionally applied to this wire. The magnifiers in the ſlider E are mounted in a wheel caſe, which perhaps prevents its being in the way ſo much as the long ſlider E before deſcribed. This contrivance is repreſented in *fig.* 5, and ſeparated in *fig.* 4.

Mr. Martin's new univerſal compound microſcope, which combines the uſes and advantages of the ſingle, compound, opaque, and aquatic microſcopes, as now conſtructed by the opticians of London, is repreſented in *fig.* 5. A, B, D, is the body of the microſcope; which conſiſts of four parts, *viz.* A B the eye-piece, or that containing the eye-glaſſes, and is ſcrewed into the top of a moveable or ſliding tube which contains the body-glaſs ſcrewed into its lower part. D is the exterior tube or caſe, in which the other ſlides up and down in an eaſy and ſteady manner. This motion of the interior tube is uſeful to increaſe or decreaſe the magnifying power of the body-glaſs when thought neceſſary, as before-mentioned. E is a pipe or ſnout ſcrewed on to the body of the microſcope D, and at its lower part, over the ſeveral magnifying lenſes hereafter deſcribed. F G H I is the ſquare ſtem of the microſcope, upon which the ſtage R moves in an horizontal poſition, upward or downward, by means of the fine rack-work of teeth and pinion. K L is a ſtrong ſolid joint and pillar, by which the poſition of the inſtrument is readily altered from a vertical one to an oblique or to a perfectly horizontal one, as may be required: it is thus well adapted to the eaſe of the obſerver either ſitting or ſtanding; and as it is very often convenient to view objects by direct unreflected light, when the ſquare ſtem F I is placed in an horizontal poſition for this purpoſe, the mirror T is then to be taken off in order to prevent the obſtruction of the

the rays. N O P, the tripod or foot by which the whole body of the microſcope is ſteadily ſupported; theſe three arms fold up under each other at N, when packed into the caſe. W is a braſs frame, that contains the condenſing lens, and acts in conjunction with the large concave and plane mirrors below at T; the reflected rays from which, either of the common light or of that of a candle or lamp, it agreeably modifies, and makes ſteady in the field of view.

The particulars of the apparatus to this microſcope are as follow: Q (ſee alſo *fig.* 4.) is a circular braſs box, containing ſix magnifiers or object lenſes, numbered 1, 2, 3, 4, 5, 6; the digits of which appear ſeverally through a ſmall round hole *y*, (*fig.* 4.) in the upper plate of it. To the upper ſide is fixed a ſmall circle of braſs *z*, by which it is connected with, and ſcrewed into, the round end of the arm *a b c d*; which is a long piece of braſs, and moves through either by teeth or pinion, or not, as may be deſired, in *e f*; which is a ſocket on the upper part of the pillar, and admits, with a motion both eaſy and ſteady, the braſs arm. R is a fixed ſtage, upon which the objects to be viewed are to be placed: it is firmly faſtened to the ſquare pillar, which is moved by the rack-work. In the middle is a large circular hole, for receiving concave glaſſes, with fluids, &c. it has alſo a ſliding ſpring-frame to faſten down ſlips of glaſs or other things: at *q t x* are three ſmall ſockets or holes, intended to receive ſeveral parts of the apparatus. S is the refractor, or illuminating lens, for converging the ſun's rays upon opaque objects laid upon the ſtage R. Or it may be fixed, as in *fig.* 3. to move in a ſemicircle, fixing its long ſhank *g*, in a ſpring ſocket *h*, in the arm *i*; this arm moving every way by a ſtout pin *k* in the ſocket *t* of the ſtage. In this manner it is eaſily adjuſted to any poſition of the ſun, candle, &c.—T, the reflecting-glaſs frame, containing a concave and plane ſpeculum, which is moved upon the ſquare pillar by the hand. The uſe of it is to illuminate all tranſparent objects that are applied to the ſtage above.

Beſides the apparatus repreſented, there is an auxiliary moveable ſtage; which by means of a pin is placed in the hole *t* of the ſtage R, and can be moved in an horizontal direction over the whole field of the ſtage. In this ſtage, there are three circular holes with ſhouldered bottoms; a large one in the middle, and on each ſide a ſmall one, for the reception of the three following neceſſary articles: a watch-glaſs to be placed in the large hole, to hold fluids containing animalcules, &c.; a circular piece of ivory, one ſide of which is black, the other white, to ſupport opaque objects of different contraſted colours; and circular plane and concave glaſſes, for extemporaneous tranſparent objects.—The ſame uſe is made of the two ſmall holes as of the large one, only in a leſſer degree, to receive ſmall concave glaſſes, plates, &c.

L (*fig.* 6.) is the ſilvered ſpeculum, called a *Lieberkhun*, which makes the ſingle opaque microſcope, by being ſcrewed to the ſlider *a b c* (*fig.* 5.) in room of the box of lenſes Q, and the body A E above it. The chief uſe of this is to view very ſmall objects ſtrongly illuminated near the compounded focus of the mirror T (*fig.* 5.) In *fig.* 7. are the forceps or pliers, for holding ſuch kind of objects, and by which they can be applied very readily to the focus of the lens in the Lieberkhun. They have a motion all ways by means of the ſpring ſocket *a*, the joint *b*, and the ſhank *c*: they are placed with the pin *c* in the ſocket *t* of the fixed ſtage R (*fig.* 5.) and 7 is a ſmall piece of ivory, to be placed upon the pointed end of the pliers: it is black upon one ſide, and white upon the other, to receive opaque objects.

R (*fig.* 2.) is a Lieberkhun of a larger ſize than that firſt mentioned, with a hole in its centre: this is ſcrewed into the hole Q of a braſs ring, faſtened to a long wire *d*; which moves up and down in the ſpring ſocket *x* of the ſtage R, (*fig.* 5.) in which it alſo moves ſideways; and thus, with the body A E above, forms an *aquatic compound* microſcope for ſhewing all ſorts of objects in water and other fluids placed under it in a watch-glaſs on the ſtage.

Sometimes a cone is uſed, with a proper aperture to exclude ſuperfluous light, that would diſturb a critical obſervation of a curious object; it is ſcrewed to the under ſide of the fixed ſtage R.

There is what is uſually called a bug-box, conſiſting of a concave glaſs with a plane one ſcrewed over it; by means of which a bug, louſe, flea, &c. may be ſecured and viewed alive. It is to be placed on the ſtage. R

Fig. 8. is the fiſh-pan. In the long concave body *a b*, a fiſh may be ſo confined by the ribband *c*, that the tranſparent tail may be in part over the ſlit or hole at *d*. In this ſtate, it is placed on the ſtage R, with the pin *d* in the hole *t* of the ſtage, and moves freely and horizontally for viewing the circulation of the blood, &c.

A ſlider-holder may be placed on the ſtage R: it receives the ſliders and tubes when filled with tranſparent objects, to be viewed either by the compound or ſingle microſcope.

Fig. 9. repreſents the ivory ſlider, to hold the objects between the tales as uſual.

Fig. 10. is a uſeful auxiliary ſlider framed in braſs. In this ſlider ſmall concave glaſſes are cemented; and a ſlip of plane glaſs ſlides over them; by which any ſmall living object, as mites, &c. may be confined without injury, and deliberately viewed.

The inſtrument has a ſet of glaſs tubes, three in number, one within another; they are uſeful for ſmall tadpoles, waternewts, eels, &c. when the circulation of the blood is to be viewed. There is a ſmall hole at one end of each tube, that ſerves to admit the air; for when they are filled with water, the other end is ſtopped with a cork.

A ſmall ivory box, containing ſpare tales and wires, to ſupply the ſliders with occaſionally.

X, (*fig.* 6.) is a braſs cell or button, containing a very ſmall lens, properly ſet between two ſmall plates of braſs, that it may be brought very near to the object when viewed with it as a ſingle microſcope. This magnifier is ſcrewed into the ſame hole as the wheel of ſix magnifiers Q are in *fig.* 5.

There is a lens, adapted to view and examine objects, by magnifying them ſufficiently, ſo as to be able to apply them to the microſcope for inſpection: on this account it is called the *explorator*.

The preceding are the chief articles of the apparatus; which, on account of their being ſomewhat different from what is applied to other microſcopes, we have been thus particular in deſcribing. In uſing the microſcope, and while viewing objects by either the ſingle or compound inſtrument, the focal diſtances of the magnifiers are made perfectly exact by turning of the pinion at the nut *w*, in one way or the other, very gently in the teeth of the rack-work at the front of the bar F I.

It is neceſſary that the centres of the object lenſes or magnifiers, the ſtage, and the mirrors at bottom, ſhould all be in a right line in the axis of the microſcope, when opaque objects are to be viewed, that are placed upon the ivory plate 7, or the forceps, and all other ſuch ſorts of objects which are placed in the centre of the ſtage R, or the ſlider-holder: but when aquatic or living objects, which require a great ſpace to move in, are to be viewed, then the horizontal motion at *e f* (*fig.* 5.) is made uſe of, and the view may be extended laterally over the whole of the diameter of the object or field of view; and by putting the arm *a b c* forward or or backward in its socket *e f*, the view is extended in the contrary direction equally well; and in this manner the whole of the objects may be viewed without the least disturbance.

As the brass arm *a b c* may be brought to the height of three or four inches above the stage R; so, by means of the rack-work motion of the stage, a lens of a greater focal distance than the greatest in the wheel Q may be occasionally applied in place of the wheel, and thereby the larger kind of objects be viewed; the instrument becoming, in this case, what is called a *megalascope*. Two sizes of these lenses, furnished with Lieberkhuns, are shewn at L M, *fig.* 6.

In viewing moving living objects, or even fixed ones, when nice motions are requisite, a rack-work and pinion is often applied to the arm *a b c*: the arm is cut out with teeth; and the pinion, as shewn at Y, is applied to work it. This acts but in one direction; and, in order to produce an equally necessary motion perpendicular to this, rack-work and pinion is applied tangent-wise to the stage, which is then jointed.

To fit microscopes, as well as telescopes, to short-sighted eyes, the object-glass and the eye-glass must be placed a little nearer together, so that the rays of each pencil may not emerge parallel, but may fall diverging upon the eye.

MICROSCOPE, *Reflecting*, is properly that which magnifies by reflection, as the above-mentioned ones do by refraction.

The structure of such a microscope may be conceived thus: near the focus of a concave speculum, AB (*Plate* XIII. *fig.* 3.) place a minute object C, that its image may be formed larger than itself in D; to the speculum join a lens, convex on both sides, E F, so as the image D may be in its focus.

The eye will here see the image inverted, but distinct, and enlarged; consequently, the object will be larger than if viewed through the lens alone.

The inventor of this microscope is the great sir I. Newton; but the objects appear dim in it.

Any telescope is converted into a microscope, by removing the object-glass to a greater distance from the eye-glass. And since the distance of the image is various, according to the distance of the object from the focus; and it is magnified the more, as its distance from the object-glass is greater; the same telescope may be successively converted into microscopes, which magnify the object in different degrees.

The construction of this microscope is more particularly explained in *fig.* 4. in which, instead of the lens d e f, there is placed a small speculum *d e f*; so that the object *a c b* being placed above it, at a little greater distance from the focus *g*, has its image A C B, formed by reflection, as in the other case it was by refraction, through the lens d f. Now if we suppose the focal distance of the object speculum *d e f*, and lens d e f the same, the effect of the microscope in other respects will be the same also.

For the distance of the object *a b* above the speculum, will be equal to the distance of the object a b below the lens, in order that the image may be formed at the same distance C *e*. The position of the object will be inverted; for all the rays flowing from the point *a*, will be reflected by the speculum to the point A, in the same manner as if they came by refraction through the lens from the point a. Thus the part *b* in the object will be reflected to the focus B in the image, which, therefore, is inverted. The power of magnifying will also be the same in this and in the reflecting telescope of a similar construction. For since the image A B and the object *a b* are seen under equal angles from the vertex *e* of the speculum, the triangles *a e b*, and A *e* B will be similar, and therefore A B : *a b* :: C *e* : *c e*; but in the other it is A B : a b :: C e : c e. But the latter ratio of these analogies is the same in both, and consequently the first is so too. This microscope is not so easy to manage as the common sort. For vision by reflection, as it is much more perfect, so it is far more difficult than that by refraction. Nor is this microscope so useful for any but very small or transparent objects. For the object, being between the speculum and image, would, if it were large and opaque, prevent a due reflection.

In Dr. Smith's reflecting microscope there are two reflecting mirrors, one concave and the other convex, and the image is viewed by a lens. To explain it, let A D (*fig.* 5.) be a large concave speculum, and *a d* a small convex one, each perforated in the middle with the holes B C, *b c*. Both these are segments of the same sphere, or ground on tools of an equal radius, *viz.* of two inches, that so the focal distance of each speculum may be just one inch.

These two speculums are placed at the distance of about 1½ inch from each other, that so an object O P Q, being placed a little below the smaller speculum, might be between the focus F and centre E of the larger speculum. Things thus circumstanced, the rays P A, P D, which flow from the point P in the object, on the speculum A D, will be reflected towards a focus *p*, where an image *o p q* would be formed, if the rays were not intercepted by the convex speculum *a d*; and the point *p* being nearer than its focus *f*, the rays A *a*, D *d*, which tend or converge towards it, will be reflected to a focus *P*, where the last image, *O P Q*, will be formed, to be viewed through the eye-glass G, by the eye at I.

This microscope, though far from being executed in the best manner, performed, Dr. Smith says, nearly as well as the very best refracting microscopes; so that he did not doubt, but that it would have excelled them, if it had been executed properly. Dr. Smith's own account of this instrument may be seen in his Optics, Remarks, p. 94.

MICROSCOPE, *Solar*, called also the *camera obscura* microscope, was invented by Mr. Lieberkuhn in 1738 or 1739, and is composed of a tube, a looking-glass, a convex lens, and a Wilson's microscope. The tube *c* (*fig.* 6.) is brass near two inches in diameter, fixed in a circular collar of mahogany, with a groove on its periphery on the outside, denoted by 2, 3, and connected by a cat-gut to the pulley 4 on the upper part; which turning round at pleasure, by the pin 5 within, in a square frame, may be adjusted easily to a hole in the shutter of a window, by the screws 1, 1, in such a manner that no light can pass into the room, but through the aforesaid tube *c*. Fastened to the frame by hinges, on the side that goes without the window, is a looking-glass G, which, by means of a jointed brass-wire, 6, 7, and the screw H 8, coming through the frame, may be moved either vertically or horizontally, to throw the sun's rays through the brass tube into the darkened room. The end of the brass tube without the shutter has a convex lens, 5, to collect the rays, thrown on it by the glass G, and bring them to a focus in the other part, where D is a tube sliding in and out, to adjust the object to a due distance from the focus; and to the end G of another tube F, is screwed one of Wilson's simple pocket microscopes, containing the object to be magnified in a slider; and by the tube F, sliding on the small end E of the other tube D, it is brought to a true focal distance.

The solar microscope has been introduced into the small and portable, as well as the large camera obscura; and if the image be received upon a piece of half-ground glass, shaded from the light of the sun, it will be sufficiently visible. M. Lieberkuhn made considerable improvements in his solar microscope, particularly in adapting it to the view of opaque objects; and M. Æpinus, Nov. Com. Petrop. vol. ix. p. 326, has contrived, by throwing the light upon the foreside of any object, before it is transmitted through the

the object lens, to represent with equal advantage all kinds of objects by it. In this improvement, the body of the common solar microscope is retained, and only an addition made of two brass plates, C A and B A (*fig.* 7.) joined by a hinge, and kept at a proper distance by a screw. A section of these plates, and of all the necessary parts of the instrument, may be seen in *fig.* 8, where *c*, *a*, represent rays of the sun converging from the illuminating lens, and falling upon the mirror *d b*, which is fixed to the nearer of the brass plates. From this they are thrown upon the object at *e f*, and thence are transmitted through the object lens at K, and a perforation in the farther plate, upon a screen, as usual. The use of the screw *n* is to vary the distance of the two plates, and thereby to adjust the mirror to the object with the greatest exactness. A very considerable improvement may be made in the solar microscope, by substituting Ramsden's achromatic eye-piece instead of the convex object-lens. For M. Euler's method of introducing vision by reflected light into this microscope, see MAGIC *lantern*.

An improved *solar* microscope, as used with the improved single microscope, with teeth and pinions, is exhibited in *Plate* XV. *figs.* 1, 2, and 3. The former figure represents the whole form of the single microscope; the parts of which are as follows: A B C D the external tube; G H I K the internal moveable one; Q M part of another tube within the last, at one end of which is fixed a plate of brass hollowed in the middle, for receiving the glass tubes: there is also a moveable flat plate, between which, and the fixed end of the second tube, the ivory sliders are to be placed. L, a part of the microscope, containing a wire spiral spring, keeping the tube Q M with its plates firm against the fixed part I K of the second tube.

E F is the small rack-work of teeth and pinion, by which the tube I G is moved gradually to or from the end A B, for adjusting the objects exactly to the focus of different lengths. N O is a brass slider, with six magnifiers; any one of which may easily be placed before the object. It is known when either of the glasses is in the centre of the eye-hole, by a small spring falling into a notch in the side of the slider, made against each of the glasses. Those parts of the apparatus before described, *viz.* iron-sliders, with holder, glass tubes, forceps, Lieberkhuns, buttons, &c. &c. are made use of to this microscope. G H is a brass cell, which holds an illuminating glass for converging the sun's beams, or the light of a candle strongly upon the objects. The aperture of the glass is made greater or less, by two circular pieces of brass, with holes of different sizes, that are screwed separately over the said lens. But at times, objects appear best, when the microscope is held up to the common light only, without this glass. It is also taken away when the microscope is applied to the apparatus now to be described.

Fig. 2. represents the apparatus, with the single microscope screwed to it, which constitutes the *solar* microscope. A B is the inner moveable tube, to which the single microscope is screwed. C D is the external tube, containing a condensing convex glass at the end D, and is screwed into the plate E F, which is cut with teeth at its circumference, and moved by the pinion I, that is fixed with the plate G H. This plate is screwed fast against the window-shutter, or board fitted to a convenient window of a darkened room, when the instrument is used. K L is a long frame, fixed to the circular plate E F; containing a looking-glass or mirror for reflecting the solar rays through the lens in the body of the tube D. O is a brass milled head, fastened to a worm or endless screw; which on the outside turns a small wheel, by which the reflecting mirror M is moved upwards or downwards.

In using this microscope, the square frame G H is first to be screwed to the window-shutter, and the room well darkened: which is best done by cutting a round hole of the size of the moveable plate E F, that carries the reflector, in the window-shutter or board; and by means of two brass nuts *a*, *a*, let into the shutter to receive the screws P, P, when placed through the holes in the square frame G H, at the two holes Q, Q; which will firmly fasten the microscope to the shutter, and is easily taken away by only unscrewing the screws P, P.

A white paper screen, or white cloth to receive the images, is to be placed several feet distant from the window: which will make the representations the larger in proportion to the distance. The usual distances are from six to 16 feet.

The frame K L, with its mirror M, is to be moved by turning the pinion I, one way or the other, till the beams of the sun's light come through the hole into the room: then, by turning of the worm at O, the mirror must be raised or depressed, till the rays become perfectly horizontal, and go straight across the room to the screen. The tube C D, with its lens at D, is now to be screwed into the hole of the circular plate E F: by this glass the rays will be converged to a focus; and from thence proceed diverging to the screen, and there make a large circle of light. The single microscope, (*fig.* 1.) is to be screwed on to the end A B (*fig.* 2.) of the inner tube; and the slider N O, with either of the lenses marked 1, 2, 3, 4, 5, or 6, in the centre of the hole at the end A B. This will occasion a circle of light upon the screen much larger than before. The slider or glass tube, with the objects to be viewed, is to be placed between the plates at I K against the small magnifier, and moved at pleasure. By shifting the tube A B in or out, you may place the object in such a part of the condensed rays as shall be sufficient to illuminate it, and not scorch or burn it; which will generally require the glass to be about one inch distant from the focus. It now remains only to adjust the object, or to bring it so near to the magnifier that its image formed upon the screen shall be the most distinct or perfect: and it is effected by gently turning the pinion F, (*fig.* 1.) a small matter one way or the other. If the object be rather large in size, the least magnifiers are generally used, and *vice versâ*.

N° 1. is the greatest magnifier, and N° 6. the least, in the brass slider N O. But, if desired, single lenses of greater magnifying powers are made: and they are applied, by being screwed to the end A B, (*fig.* 1.) and the brass slider N O is then taken away.

The same object may be variously magnified, by the lenses severally applied to it; and the degree of magnifying power is easily known by this rule: *As the distance of the object is to that of its image from the magnifier; so is the length or breadth of the object to that of the image.*

Instead of the brass sliders with the lenses N, O, there is sometimes screwed a lens of a large size, and longer focal distance: the instrument is then converted into a *megalascope*; and is adapted for viewing the larger kind of objects contained in larger sliders, such as is represented at R (*fig.* 3.) And, in the same manner, small objects of entertainment, painted upon glass like the sliders of a magic lanthorn, are much magnified, and represented upon the same screen.

The *lucernal* microscope of Mr. Adams, as mounted to view opaque objects, is represented in *fig.* 4. A B C D is a large mahogany pyramidal box, which forms the body of the microscope; it is supported firmly on the brass pillar F G, F G, by means of the ſocket H and the curved piece I K.

L M N is a guide for the eye, in order to direct it in the axis of the lenſes; it conſiſts of two braſs tubes, one ſliding within the other, and a vertical flat piece, at the top of which is the hole for the eye. The outer tube is ſeen at M N, the vertical piece is repreſented at L M. The inner tube may be pulled out or puſhed in, to adjuſt it to the focus of the glaſſes. The vertical piece may be raiſed or depreſſed, that the hole, through which the object is to be viewed, may coincide with the centre of the field of view; it is fixed by a milled ſcrew at M, which could not be ſhewn in this figure.

At N is a dove-tailed piece of braſs, made to receive the dove-tail at the end of the tubes M, N, by which it is affixed to the wooden box A B C D E. The tubes M, N, may be removed from this box occaſionally, for the convenience of packing it up in a leſs compaſs.

O P, a ſmall tube which carries the magnifiers.

O, one of the magnifiers; it is ſcrewed into the end of a tube, which ſlides within the tube P; the tube P may be unſcrewed occaſionally from the wooden body.

Q R S T V X, a long ſquare bar, which paſſes through the ſockets Y, Z, and carries the ſtage or frame that holds the objects; this bar may be moved backward or forward, in order to adjuſt it to the focus by means of the pinion which is at *a*.

b, a handle furniſhed with an univerſal joint, for more conveniently turning the pinion. When the handle is removed, the nut (*fig.* 5.) may be uſed in its ſtead.

d e, a braſs bar, to ſupport the curved piece K I, and keep the body A B firm and ſteady.

f g h i, the ſtage for opaque objects: it fits upon the bar Q R S T by means of the ſocket *h i*, and is brought nearer to or removed farther from the magnifying lens by turning the pinion *a*: the objects are placed in the front ſide of the ſtage (which cannot be ſeen in this figure) between four ſmall braſs plates: the edges of two of theſe are ſeen at *k l*. The two upper pieces of braſs are moveable; they are fixed to a plate, which is acted on by a ſpiral ſpring, that preſſes them down, and confines the ſlider with the objects: this plate, and the two upper pieces of braſs, are lifted up by the ſmall nut *m*.

At the lower part of the ſtage, there is a ſemicircular lump of glaſs *n*, which is deſigned to receive the light from the lamp (*fig.* 29.), and to collect and throw it on the concave mirror *o*, whence it is to be reflected on the object.

The upper part *f g r s* (*fig.* 4.) of the opaque ſtage takes out, that the ſtage for tranſparent objects may be inſerted in its place.

Fig. 6. repreſents the ſtage for tranſparent objects; the two legs 5 and 6 fit into the top of the under part *r s h i* of the ſtage for opaque objects; 7 is the part which confines or holds the ſliders, and through which they are to be moved; 9 and 10 a braſs tube, which contains the lenſes for condenſing the light, and throwing it upon the object: there is a ſecond tube within that, marked 9 and 10, which may be placed at different diſtances from the object by the pin 11.

When this ſtage is uſed as a ſingle microſcope, without any reference to the lucernal, the magnifiers, or object lenſes, are to be ſcrewed into the hole 12, and to be adjuſted to a proper focus by the nut 13.

N. B. At the end A B (*fig.* 4.) of the wooden body there is a ſlider, which is repreſented as partly drawn out at A; when quite taken out, three grooves will be perceived; one of which contains a board that forms the end of the box; the next contains a frame with a greyed glaſs; and the third, or that fartheſt from the end A B, two large convex lenſes.

In the uſe of this microſcope for examining opaque objects, take out the wooden ſlider A (*fig.* 4.), then lift out the cover and the grey glaſs from their reſpective grooves under the ſlider A.

Put the end N of the guide for the eye L M N into its place, ſo that it may ſtand in the poſition which is repreſented in this figure.

Place the ſocket, which is at the bottom of the opaque ſtage, on the bar Q X T, ſo that the concave mirror *o* may be next the end D E of the wooden body.

Screw the tubes P, O, into the end D E. The magnifier you intend to uſe is to be ſcrewed on the end O of theſe tubes.

The handle G *b*, or the milled nut (*fig.* 5.), muſt be placed on the ſquare end of the pinion *a*.

Place the lamp lighted before the glaſs lump *n*, and the object you intend to examine between the ſpring-plates of the ſtage; and the inſtrument is ready for uſe.

In all microſcopes there are two circumſtances, which muſt be particularly attended to: firſt, the modification of the light, or the proper quantity to illuminate the object; ſecondly, the adjuſtment of the inſtrument to the focus of the glaſſes and eye of the obſerver. In the uſe of the lucernal microſcope there is a third circumſtance, which is, the regulation of the guide for the eye.

1. To throw the light upon the object. The flame of the lamp is to be placed rather below the centre of the glaſs lump *n*, and as near it as poſſible; the concave mirror *o* muſt be ſo inclined and turned as to receive the light from the glaſs lump, and reflect it thence upon the object: the beſt ſituation of the concave mirror and the flame of the lamp depends on a combination of circumſtances, which a little practice will diſcover.

2. To regulate the guide for the eye, or to place the centre of the eye-piece L ſo that it may coincide with the focal point of the lenſes and the axis of viſion: Lengthen and ſhorten the tubes M, N, by drawing out or puſhing in the inner tube, and raiſing or depreſſing the eye-piece M L, till you find the large lens (which is placed at the end A B of the wooden body) filled by an uniform field of light, without any priſmatic colours round the edge; for till this piece is properly fixed, the circle of light will be very ſmall, and only occupy a part of the lens: the eye muſt be kept at the centre of the eye-piece L, during the whole of the operation; which may be rendered ſomewhat eaſier to the obſerver, on the firſt uſe of the inſtrument, if he hold a piece of white paper parallel to the large lens, removing it from or bringing it nearer to them till he find the place, where a lucid circle, which he will perceive on the paper, is brighteſt and moſt diſtinct; then he is to fix the centre of the eye-piece to coincide with that ſpot; after which a very ſmall adjuſtment will ſet it perfectly right.

3. To adjuſt the lenſes to their focal diſtance. This is effected by turning the pinion *a*, the eye being at the ſame time at the eye-piece L. The grey glaſs is often placed before the large lenſes, while regulating the guide for the eye, and adjuſting for the focal diſtance.

If the obſerver in the proceſs of his examination of an object, advance rapidly from a ſhallow to a deep magnifier, he will ſave himſelf ſome labour by pulling out the internal tube at O.

The upper part *f g r s* of the ſtage is to be raiſed or lowered occaſionally, in order to make the centre of the object coincide with the centre of the lens at O.

To

To delineate objects, the grey glass must be placed before the large lenses; the picture of the object will be formed on this glass, and the outline may be accurately taken by going over the picture with a pencil.

The opaque part may be used in the day-time without a lamp, provided the large lenses at A B are screened from the light.

To use the Lucernal Microscope in the Examination of transparent Objects.—The instrument is to remain as before: the upper part *f g s* of the opaque stage must be removed, and the stage for transparent objects, represented at *fig.* 6, put in its place; the end 9 10 to be next the lamp.

Place the greyed glass in its groove at the end A B, and the objects in the slider-holder at the front of the stage; then transmit as strong a light as you are able on the object, which you will easily do by raising or lowering the lamp.

The object will be beautifully depicted on the grey glass: it must be regulated to the focus of the magnifier, by turning the pinion *a*.

The object may be viewed either with or without the guide for the eye. A single observer will see an object to the greatest advantage by using this guide, which is to be adjusted, as we have described above. If two or three wish to examine the object at the same time, the guide for the eye must be laid aside.

Take the large lens out of the groove, and receive the image on the grey glass; in this case, the guide for the eye is of no use: if the grey glass be taken away, the image of the object may be received on a paper screen.

Take out the grey glass, replace the large lenses, and use the guide for the eye; attend to the foregoing directions, and adjust the object to its proper focus. You will then see the object in a blaze of light almost too great for the eye, a circumstance that will be found very useful in the examination of particular objects. The edges of the object in this mode will be somewhat coloured: but as it is only used in this full light for occasional purposes, it has been thought better to leave this small imperfection, than, by remedying it, to sacrifice greater advantages; the more so, as this fault is easily corrected, and a new and interesting view of the object is obtained, by turning the instrument out of the direct rays of light, and permitting them to pass through only in an oblique direction, by which the upper surface is in some degree illuminated, and the object is seen partly as opaque, partly as transparent. It has been already observed, that the transparent objects might be placed between the slider-holders of the stage for opaque objects, and then be examined as if opaque.

Some transparent objects appear to the greatest advantage when the lens at 9 10 is taken away; as, by giving too great a quantity of light, it renders the edges less sharp.

The variety of views which may be taken of every object, by means of the improved lucernal microscope, will be found to be of great use to an accurate observer: it will give him an opportunity of correcting or confirming his discoveries, and investigating those parts in one mode which are invisible in another.

To throw the Image of transparent Objects on a Screen, as in the Solar Microscope.—It has been long a microscopical desideratum, to have an instrument by which the image of transparent objects might be thrown on a screen, as in the common solar microscope: and this not only because the sun is so uncertain in this climate, and the use of the solar microscope requires confinement in the finest part of the day, when time seldom hangs heavy on the mind; but as it also affords an increase of pleasure, by displaying its wonders to several persons at the same instant, without the least fatigue to the eye. This purpose is now effectually answered, by affixing the transparent stage of the lucernal to a lanthorn, with one of Argand's lamps.—The lamp is placed within the lanthorn, and the end 9 10 of the transparent stage is screwed into a female screw, which is rivetted in the sliding part of the front of the lanthorn; the magnifying lenses are to be screwed into the hole represented at 12, and they are adjusted by turning the milled nut. The quantity of light is to be regulated by raising and lowering the sliding plate or the lamp.

Apparatus which usually accompanies the improved Lucernal Microscope.—The stage for opaque objects, with its semicircular lump of glass, and concave mirror. The stage for transparent objects, which fits on the upper part of the foregoing stage. The sliding tube, to which the magnifiers are to be affixed: one end of these is to be screwed on the end D of the wooden body; the magnifier in use is to be screwed to the other end of the inner tube. There are eight magnifying lenses, so constructed, that they may be combined together, and thus produce a very great variety of magnifying powers. A fish-pan, such as is represented at *Plate* XIV. *fig.* 8. A steel wire, with a pair of nippers at one end, and a small cylinder of ivory at the other. (*Plate* XIV. *fig.* 7.) A slider of brass, containing a flat glass slider, and a brass slider, into which are fitted some small concave glasses. A pair of forceps. Six large, and six small ivory sliders, with transparent objects. Fourteen wooden sliders, with four opaque objects in each slider; and two spare sliders. Some capillary tubes for viewing small animalcula. One of the improved Argand lamps, which are the most suitable for microscopic purposes, either with this or any other instrument, on account of the clearness, intensity, and steadiness of the light. A description of its structure will be found under the article LAMP.

The Microscope for opaque objects was also invented by M. Lieberkuhn about the same time with the former, and remedies the inconvenience of having the dark side of an object next the eye; for by means of a concave speculum of silver, highly polished, in whose centre a magnifying lens is placed, the object is so strongly illuminated, that it may be examined with ease. A convenient apparatus of this kind, with four different speculums and magnifiers of different powers, was brought to perfection by Mr. Cuff. Phil. Trans. N° 458. § 9.

The several parts of this instrument, made either of brass or silver, are as follows:

Through the first side A (*Plate* XV. *fig.* 7.) passes a fine screw B, the other end of which is fastened to the moveable side C.—D is a nut adapted to the said screw, by the turning of which the two sides A, C, are gradually brought together.—E is a spring of steel, that separates the said two sides when the nut is unscrewed.—F, a piece of brass turning round in a socket, whence proceeds a small spring tube moving upon a rivet, through which tube there runs a steel wire, one end of which terminates in a sharp point G, and the other hath a pair of plyers, H, fastened to it.—The point and plyers are to thrust into or take up and hold any insect or object: and either of them may be turned upwards, as suits your purpose best.—I, a ring of brass with a female screw within it, mounted on an upright piece of the same metal, which turns round on a rivet, that it may be set at a due distance when the least magnifiers are employed.—This ring receives the screws of all the magnifiers.—K, a concave speculum of silver, polished as bright as possible, in the centre of which a double convex lens is placed, with a proper aperture to look through it. On the back of this speculum a male screw,

ſcrew, L, is made fit to the braſs ring I to ſcrew into the ſaid ring at pleaſure.

There are four of theſe concave ſpecula, of different depths, adapted to four glaſſes of different magnifying powers, to be uſed as objects to be examined may require. The greateſt magnifiers are known by having the leaſt apertures. M, a round object-plate, one ſide white and the other black, intended to render objects the more viſible, by placing them, if black upon the white, and if white on the black ſide. A ſteel ſpring N turns down on each ſide to make any object faſt; and iſſuing from the object-plate is a hollow pipe, to ſcrew it on the needle's point G.—O, a ſmall box of braſs, with a glaſs on each ſide, contrived to confine any living object, in order to examine it: this alſo has a pipe to ſcrew upon the end of the needle G.—P, a turned handle of wood, to ſcrew into the inſtrument when it is made uſe of.—A pair of braſs plyers accompanies this inſtrument to take up any object, or manage it with conveniency: and a ſoft hair bruſh, to clean the glaſſes or ſpecula, or apply a drop of any liquid to the iſinglaſs of the box O, in order to view the animalcules.—Alſo, a ſmall ivory box for iſinglaſſes, to be placed, when wanted, in the ſmall braſs box O.

When you would view any object, ſcrew the ſpeculum, with the magnifier you think beſt to uſe, into the braſs ring I. Place your object either on the needle G, in the plyers H, on the object-plate M, or in the braſs hollow box O, as may be moſt convenient, according to the nature and condition of it: then holding up your inſtrument by the handle P, look againſt the light, through the magnifying lens, and by means of the nut D, together with the motion of the needle, by managing its lower end the object may be turned about, raiſed, or depreſſed, brought nearer the glaſs, or put farther from it, till you hit the true focal diſtance, and the light be ſeen reflected from the ſpeculum ſtrongly upon the object: by which means it will be ſhewn in a manner ſurpriſingly diſtinct and clear. And for this purpoſe the light of the ſky, or of a candle, will anſwer to your ſatiſfaction.

This microſcope is principally intended for opaque objects, but tranſparent ones may alſo be viewed by it: obſerving only, that when ſuch come under examination, it will not always be proper to throw on them the light reflected from the ſpeculum: for the light tranſmitted through them, meeting the reflected light, may, together, produce too great a glare. A little practice will teach how to regulate both theſe lights to good advantage. For an account of microſcopes attached to aſtronomical inſtruments, and deſigned for aſſiſting the obſerver to read off minute diviſions; ſee CIRCLE.

MICROSCOPIC OBJECTS. All things too minute to be viewed diſtinctly by the naked eye, are proper objects for the microſcope. Dr. Hooke has diſtinguiſhed them to be exceeding ſmall bodies, exceeding ſmall pores, or exceeding ſmall motions.

Exceeding ſmall bodies muſt either be the parts of larger bodies, or things, the whole of which is exceedingly minute, ſuch as ſmall ſeeds, inſects, ſalts, ſands, &c.

Exceeding ſmall pores are the interſtices between the ſolid parts of bodies, as in ſtones, minerals, ſhells, &c. or the mouths of minute veſſels in vegetables, or the pores in the ſkin, bones, and other parts of animals.

Exceeding ſmall motions are the movements of the ſeveral parts or members of minute animals, or the motion of the fluids, contained in either animal or vegetable bodies. Under one or other of theſe three heads, almoſt every thing about us affords us matter of obſervation, and may conduce both to our amuſement and inſtruction.

An examination of theſe objects, however, ſo as to diſcover truth, requires a great deal of attention, care, and patience, with ſome ſkill and dexterity, to be acquired chiefly by practice, in the preparing, managing, and applying them to the microſcope.

Whatever object offers itſelf as the ſubject of our examination, the ſize, contexture, and nature of it, are firſt to be conſidered, in order to apply it to ſuch glaſſes, and in ſuch a manner as may ſhew it beſt. The firſt ſtep ſhould always be to view the whole together, with ſuch a magnifier as can take it in all at once, and after this the ſeveral parts of it may the more fitly be examined, whether remaining on the object, or ſeparated from it. The ſmaller the parts are which are to be examined, the more powerful ſhould be the magnifiers employed; the tranſparency or opacity of the object muſt alſo be conſidered, and the glaſſes employed accordingly ſuited to it; for a tranſparent object will bear a much greater magnifier than one which is opaque, ſince the nearneſs that a glaſs muſt be placed at, unavoidably darkens an object if in its own nature opaque, and renders it very difficult to be ſeen, unleſs by the help of the apparatus contrived for that purpoſe, which has a ſilver ſpeculum. Moſt objects, however, become tranſparent by being divided into extremely thin parts.

The nature of the object alſo, whether it be alive or dead, a ſolid or a fluid, an animal, a vegetable, or a mineral ſubſtance, muſt likewiſe be conſidered, and all the circumſtances of it attended to, that we may apply it in the moſt advantageous manner. If it be a living object, care muſt be taken not to ſqueeze or injure it, that we may ſee it in its natural ſtate and full perfection. If it be a fluid, and that too thick, it muſt be diluted with water; and if too thin, we ſhould let ſome of its watery parts evaporate. Some ſubſtances are fitteſt for obſervation when dry, others when moiſtened; ſome when freſh, and others after they have been kept ſome time.

Light is the next thing to be taken care of; for on this the truth of all our obſervations depends; and a very little obſervation will ſhew how very different objects appear in one degree of it to what they do in another: ſo that every new object ſhould be viewed in all degrees of light, from the greateſt glare of brightneſs to perfect obſcurity, and that in all poſitions to each degree, till we hit upon the certain form and figure of it. In many objects it is very difficult to diſtinguiſh between a prominency and a depreſſion, a black ſhadow, and a black ſtain, and in colour between a bright reflection and whiteneſs. The eye of a fly, in one kind of light, appears like a lattice drilled full of holes; in the ſunſhine like a ſolid ſubſtance, covered with golden nails; in one poſition like a ſurface covered with pyramids, in another with cones, and in others with ſtill different ſhapes.

The degree of light muſt always be ſuited to the object; if that be dark, it muſt be ſeen in a full and ſtrong light, but if tranſparent, the light ſhould be proportionably weak: for which reaſon there is a contrivance both in the ſingle and double microſcope to cut off abundance of the rays, when ſuch tranſparent objects are to be examined by the largeſt magnifiers. The light of a candle for many objects; and eſpecially for ſuch as are very bright and tranſparent, and very minute, is preferable to day-light; for others a ſerene day-light is beſt; but ſun-ſhine is the worſt light of all, for it is reflected from objects with ſo much glare, and exhibits ſuch gaudy colours, that nothing can be determined from it with any certainty. This, however, is not to be extended to the ſolar, or camera obſcura microſcope; for in that nothing but ſun-ſhine can do, and the brighter that is, the better; but in that way we do not ſee the object itſelf on which

which the sun-shine is cast, but only the image or shadow of it exhibited on a screen; and therefore no confusion can arise from the glaring reflection of the sun's rays from the object to the eye, which is the case in other microscopes. But then in that solar way we must rest contented with viewing the true form and shape of an object, without expecting to find its natural colour; since no shadow can possibly wear the colour of the body it represents.

Most objects require also some management, in order to bring them properly before the glasses. If they are flat and transparent, and such as will not be injured by pressure, the best way is to enclose them in sliders between two Muscovy talcs or isinglass. In this way the feathers of butterflies, the scales of fishes, and the farinæ of flowers, may be very conveniently preserved, as also the parts of insects, the whole bodies of minute ones, and a great number of other things. These are to be kept in sliders, each containing three, four, or more holes, and these must not be filled promiscuously; but all the things preserved in one slider should be such as require one and the same magnifying power to view them, that there may not be a necessity of changing the glasses for every object; and the sliders should be marked with the number of the magnifier it is proper to be viewed with. In placing the objects in the sliders, it is always proper to have a small magnifier, of about an inch focus, in your hand, to examine and adjust them by, before they are fixed down with the rings.

Small living objects, such as lice, fleas, bugs, mites, minute spiders, &c. may be placed between these talcs without injuring them, if care be taken to lay on the brass rings without pressing them down, and they will remain alive many weeks in this manner; but if they are too large to be treated thus, they should be either preserved between two concave glasses, or else viewed immediately, by holding them in the pliers, or sticking them on the point at the other end of that instrument.

If fluids come under examination, to discover the animalcules in them, a small drop is to be taken with a hair-pencil; or on the nib of a clean pen, and placed on a plate of glass; and if they are too numerous to be thus seen distinctly, some water warmed, by holding it in the mouth, must be added to the drop, and they will then separate, and be seen distinctly. This is particularly necessary in viewing the animalcules in the *semen masculinum* of all creatures; which, though extremely minute, are always so numerous, that without this caution their true form can seldom be seen. But if we are to see the salts in a fluid, the contrary method must be observed, and the plate of glass must be held gently over the fire, till part of the liquor is evaporated.

The dissection of minute animals, as lice, fleas, &c. requires patience and care; but it may be done very accurately by means of a needle and a fine lancet, placing the creature in a drop of water, for then the parts will readily unfold themselves, and the stomach, guts, &c. be very distinctly seen.

These seem the best ways of preserving transparent objects; but the opaque ones, such as seeds, woods, &c. require a very different treatment, and are best preserved and viewed in the following manner.

Cut cards into small slips about half an inch long, and a tenth of an inch broad; wet these half way of their length in gum-water, and with that fasten on several pieces of the object, and as the spots of cards are of different colours, such should be chosen for every object as are the most different from its own colours. These are very convenient for viewing by the microscope made for opaque objects with the silvered speculum; but they are proper for any microscope that can view opaque bodies.

A small box should be contrived for these slips, with little shallow holes for the reception of each; and this is conveniently done, by cutting pieces of paste-board, such as the covers of books are made of, to the size of the box, so that they will just go into it, and then cutting holes through them with a small chissel, of the shape of the slips of card, these paste-boards having then a paper pasted over their bottom, are cells very proper for the reception of these slips, which may be taken out by means of a pair of plyers, and will always be ready for use.

Great caution is to be used in forming a judgment on what is seen by the microscope, if the objects are extended or contracted by force or dryness.

Nothing can be determined about them, without making the proper allowances; and different lights and positions will often shew the same object as very different from itself. There is no advantage in any greater magnifier than such as is capable of shewing the object in view distinctly; and the less the glass magnifies, the more pleasantly the object is always seen.

The colours of objects are very little to be depended on, as seen by the microscope; for their several component particles being by this means removed to great distances from one another, may give reflections very different from what they would, if seen by the naked eye.

The motions of living creatures also, or of the fluids contained in their bodies, are by no means to be hastily judged of, from what we see by the microscope, without due consideration; for as the moving body, and the space in which it moves, are magnified, the motion must be so too; and therefore that rapidity with which the blood seems to pass through the vessels of small animals must be judged of accordingly. Suppose, for instance, that a horse and a mouse move their limbs exactly at the same time, if the horse runs a mile while the mouse runs fifty yards; though the number of steps are the same in both, the motion of the horse must notwithstanding be allowed the swiftest; and the motion of a mite, as viewed by the naked eye, or through the microscope, is perhaps not less different. Baker's Microscope, p. 52. 62. Adams on the Microscope. See ANIMALCULES and *Plates of* MICROSCOPIC *Objects*.

MICROSTEMMA, in *Botany*, from μικρος, *small*, and στεμμα, *a crown*, alluding to the sort of coronet which accompanies the anthers.—Brown Tr. of the Wern. Soc. v. 1. 25. Prodr. Nov. Holl. v. 1. 459.—Class and order, *Pentandria Digynia*. Nat. Ord. *Contortæ*, Linn. *Apocineæ*, Juss. *Asclepiadeæ*, Brown.

Ess. Ch. Corolla wheel-shaped, five-cleft. Crown of the stamens of one leaf, fleshy, with five lobes, alternate with the anthers, which are without any membranous point. Masses of pollen attached laterally by the middle, lying over the stigma, which is pointless. Follicles slender, smooth. Seeds comose.

1. M. *tuberosum*. Br.—Native of New Holland, within the tropic. A smooth upright perennial herbaceous plant, with a tuberous *root*. *Stem* simple in the lower part, and furnished with minute leaves; branched above. *Leaves* opposite, linear. *Umbels* lateral and terminal, nearly sessile. *Corolla* blackish-purple, bearded at the inside.

MICROTEA, named by Professor Swartz, from μικροτης, *smallness*, on account of the parts of fructification being extremely minute, compared with others of its natural order. —Swartz Prod. 53. Ind. Occ. 542. Schreb. 797. Willd. Sp. Pl. v. 1. 1309. Mart. Mill. Dict. v. 3. Lamarck Illustr.

Illuftr. t. 182. Clafs and order, *Pentandria Digynia.* Nat. Ord. *Holeraceæ*, Linn. *Atriplices*, Juff.

Gen. Ch. *Cal.* Perianth inferior, of five, oblong, permanent leaves. *Cor.* none. *Stam.* Filaments five, thread-fhaped, the length of the calyx, inferted into the receptacle; anthers rather globofe. *Pift.* Germen fuperior, roundifh, echinated; ftyles two, very fhort, divaricated; ftigmas fimple. *Peric.* a dry, leathery, flender drupa, befet with prickles. *Seed*, a roundifh, fmooth nut, with a fingle kernel.

Eff. Ch. Calyx of five leaves, fpreading. Corolla none. Drupa dry and prickly. Seed roundifh, covered with a leathery, echinated bark.

1. M. *debilis.* Willd. n. 1. Swartz Ind. Occ. t. 12.—(Schollera; Rohr Act. Soc. Hafn. v. 2. p. 1. 210.)—A native of feveral of the Weft India iflands.—The whole plant is fmooth, and about a foot in height. *Stem* herbaceous, branched, diffufe, nearly erect, ftriated. *Branches* irregular, diverging, weak, fpreading. *Leaves* alternate, on ftalks, ovato-lanceolate, pointed, entire, nerved, veinlefs, rather fucculent, and of a dark green colour. *Flower-ftalks* terminal or lateral, oppofite to the leaves, each bearing two, flender, rather clofe. *Clufters* of numerous, nearly upright *flowers*, moftly directed one way, on feparate, fhort ftalks, very minute, greenifh-white. Bracteas lanceolate, pellucid. *Drupa* the fize of muftard-feed, with very minute, prickly-edged cells all over the furface. *Nut* black and fhining; or it may be confidered as a *feed* covered with a leathery, prickly, or muricated bark.

Mr. Van Rohr, in the Copenhagen Tranfactions, named this plant which was communicated to him by Jacquin, *Schollera*, in honour of the author of *Flora Barbienfis.*

MICROTIS, fo named by Mr. Brown, from μικρος, *fmall*, and ους, ωτος, *an ear*, alluding to a pair of minute ear-like appendages to the anther. Brown Prodr. Nov. Holl. v. 1. 320.—Clafs and order, *Gynandria Monandria.* Nat. Ord. *Orchideæ.*

Gen. Ch. *Cal.* Perianth three-leaved, ringent; its two fide-leaves feffile, nearly oppofite to the lip. *Cor.* Petals two, much like the calyx, afcending. Nectary a lip proceeding from the lower part of the ftyle, oblong, obtufe, fpreading, callous at the bafe. *Stam.* Anther an hemifpherical, moveable, terminal lid, of two cells, attached to the pofterior edge of the top of the ftyle, permanent, accompanied by a membranous auricle at each fide; maffes of pollen two in each cell, powdery, affixed by their bafe to the ftigma. *Pift.* Germen inferior, obovate, erect, furrowed; ftyle erect, funnel-fhaped; ftigma in front. *Peric.* Capfule of one cell. *Seeds* numerous, minute.

Eff. Ch. Calyx ringent, its fide-leaves nearly oppofite to the lip. Petals afcending. Lip without a fpur, obtufe, callous at the bafe. Anther a lid, terminating the ftyle behind. Pollen powdery.

Five fpecies of this new genus were found by Mr. Brown in New Holland, chiefly in the colder parts, and a fifth is our *Epipactis unifolia.* (See Epipactis.) The *bulbs* are undivided and naked. *Herbage* fmooth. *Leaf* folitary, cylindrical, fiftulous, embracing the ftem with its long fheathing bafe. *Spike* of many fmall, greenifh or white, *flowers*, the *lip* of fome of which is undivided, in others two-lobed. The leaves of the *calyx*, as well as the petals, are more or lefs linear, the former frequently revolute. The *lip* differs greatly in form in the different fpecies, and its margin is in fome even and naked, in others wavy, warty, or tuberculated. The appearance of the whole is obferved by Mr. Brown to be very different from *Epipactis*, and moft like another genus of his own, named *Prafophyllum.*

MICTUS Cruentus. See *Bloody* Urine.

MID, or Middle, in *Philofophy* and *Mathematics.* See Mean and Medium.

MIDA, in *Natural Hiftory*, the name of a worm or maggot, of which is produced the purple fly, found on bean-flowers, and thence called the bean-fly.

MIDAD Alhendi, in the *Materia Medica of the Arabians*, a name given to the common indigo blue.

The exprefs meaning of the words is India ink; but this is an erroneous name, founded on Pliny's mifunderftanding the words of Diofcorides.

MIDAS, in *Fabulous Hiftory* and *Mythology*, was, according to Paufanias, the fon of Gordius and Cybele, and reigned in the Greater Phrygia, as we learn from Strabo. According to the former of the two authors, he built the city of Ancyra, and that of Peffinus, upon mount Agdiftis, famed for the tomb of Atys; but the latter merely fays, that he and Gordius his father fixed their refidence near the river Sangar, in cities, which in his time were mean villages: as he was rich, and a great economift, it was fabled that he turned into gold whatever he touched. It is fuggefted that this fable took its rife from his having been the firft who difcovered gold in the Pactolus. From his infancy it was forefeen, that he would be very rich and very frugal, becaufe the ants, approaching his cradle, had put grains of corn into his mouth. However, his talent for accumulation did not extend to the acquirement of tafte and knowledge in the fine arts; and, perhaps, his dulnefs and inattention to thefe, provoked fome mufical poet to invent the fable of his decifion in favour of Pan againft Apollo.

Pan, who thought he excelled in playing the flute, offered to prove that it was an inftrument fuperior to the lyre of Apollo. The challenge was accepted, and Midas, who was appointed the umpire in this conteft, deciding in favour of Pan, was rewarded by Apollo, according to the poets, with the ears of an afs, for his ftupidity.

The fcholiaft upon Ariftophanes, for explaining the fiction of the affes' ears, which Apollo had prefented to Midas, fays that it was defigned to intimate that he had a very fine ear, like that animal, or becaufe he kept fpies through all his dominions, or becaufe he commonly dwelt in a place named ωτα ονε, the affes' ears. The fable reports, that his power of converting whatever he touched into gold was given him by Bacchus; but the prefent foon became injurious to him; for it is faid, that whilft he was waiting for his dinner, the water in which he wafhed his hands, and alfo the bread, wine, and meat that were ferved up to him, were converted into gold, when he was ready to ftarve amidft all his riches: but applying to Bacchus, with a requeft that he would revoke the grant, Bacchus ordered him to wafh his hands in the Pactolus, by which act he transferred the virtue which he poffeffed to the river, which, from that time, rolled a golden fand. This fable is thus explained. Midas, frugal to avarice, reigned over a very rich country, and made confiderable fums by the fale of his corn, wine, and cattle. His avarice afterwards changed its object, and having learned that the Pactolus furnifhed gold duft, he abandoned the care of the country, and employed his fubjects in gathering the gold of that river, which brought him a new and ample fupply. On account of his attention to religion among the Lydians, he was reckoned, according to Juftin, a fecond Numa.

Midas's *Ear-fhell*, in *Conchology.* See Trumpet-*Fifh.*

MIDDATOOR, in *Geography*, a town of Hindooftan, in Golconda; 15 miles S.E. of Canoul.

MIDDEL-

MIDDELBURG, a sea-port town of Holland, in the state of Zealand, situated in the centre of Walcheren, of which it is the capital. The town-house is a magnificent building; and the fortifications are strong and regular, with eight gates, and twelve bastions for defending the walls and ramparts, besides large and deep ditches filled with water; and such also is its situation, that the inhabitants may lay the country under water whenever they please. The number of inhabitants has been estimated at about 26,000. N. lat. 51° 34'. E. long. 3° 29'.

MIDDING, in *Agriculture*, a provincial term applied to a dunghill.

MIDDLE BANK, in *Geography*, one of the fishing banks of Newfoundland; S.E. of Cape Breton. N. lat. 45°. See FISHERY.

MIDDLE *Cape*, lies to the south-west of cape Anthony, in Staten Land, on the strait Le Maire, and the most westerly point of that island; at the extremity of South America.

MIDDLE *Island*, a small island in the straits of Salayer, near the south coast of Celebes. S. lat. 5° 40. E. long. 120° 52'.—Also, a small island in the East Indian sea, near the south-west coast of Boulton. S. lat. 5° 38'. E. long. 123° 50'.—Also, an island in the straits of Sunda, in the Indian sea. N. lat. 5° 57'. E. long. 104° 53'.—Also, a small island in Upper Canada, east of the Bass islands, and north of Ship island and Cunningham's island, in lake Erie.

MIDDLE *Islands*, a cluster of small islands in lake Huron. N. lat. 45° 1'. W. long. 83° 33'.—Also, a cluster of small islands in the Pacific ocean, near the coast of Mexico. N. lat. 9° 30'.

MIDDLE *Island Creek*, a river of Virginia, which runs into the Ohio, N. lat. 39° 16'. W. long. 81° 22'.

MIDDLE *Lake*, a lake of Canada; 300 miles N. of Quebec. N. lat. 51° 44'. W. long. 69° 35'.

MIDDLE *Latitude*, in *Navigation*, is half the sum of two given latitudes.

MIDDLE *Latitude sailing*, is used for a method of working the several cases in sailing, nearly agreeing with Mercator's way, but without the help of meridional parts. See SAILING.

MIDDLE *Point*, in *Geography*, a cape on the east coast of Labrador. N. lat. 59°. W. long. 63°.

MIDDLE *Region*. See REGION.

MIDDLE *Sister*, in *Geography*, a small island at the west end of lake Erie, in Upper Canada, situated between the East and West Sister.

MIDDLE *States*, one of the grand divisions of the United States of America, comprehending New York, New Jersey, Pennsylvania, Delaware, Ohio, and Indiana.

MIDDLE *Teint*, in *Painting*. See HALF-TEINT.

MIDDLE *Voice*, in the *Greek Language*, holds an intermediate rank between the Active and the Passive, being supposed to have a middle signification between them. Its tenses are formed partly on the model of the Active, and partly on that of the Passive tenses. The tenses peculiar to the middle voice are the two futures, the two aorists, the perfect, and the pluperfect. The two futures and the two aorists borrow the terminations of the Passive, while the two perfect tenses borrow those of the Active voice. For the manner in which these tenses are formed, we refer to the valuable Grammar of the Greek Tongue, on a new and improved plan, by Mr. John Jones. This excellent grammarian also observes, that as the middle voice derives its origin and explanation from the Passive, it is frequently used, like a Passive verb, in a sense purely active, and has after it an accusative noun; and this usage abounds in all writers of prose as well as poetry. It is further observed, that when an accusative noun is not annexed, the personal pronoun, combined with the verb in the oblique case, is the object of the verb. Hence it is that the middle verb expresses a reciprocal or reflex sense. Our author infers from this statement, that the middle verb is in the strictest sense an Active verb; but whether or not it conveys a reflex signification, depends on the circumstance whether an accusative noun be annexed or not. The presence of a noun in the accusative, causes, as it were, the combined pronoun to disappear, and the verb becomes purely active; while its absence gives room for the objective pronoun to display itself, which consequently assigns to the verb the character of "reflex." Although the middle verb contains an objective pronoun in itself, yet it is sometimes distinctly annexed, in order to render the meaning more emphatic or prominent. Sometimes a noun equivalent to the reflex pronoun is annexed to a middle verb. For the illustration of these remarks by apposite examples, we refer to the author himself, *ubi supra*.

MIDDLE *Wales*, in a *Ship*, two or three thick strakes wrought fore and aft, between the lower and middle deck-ports, in three-deck ships.

MIDDLEBOROUGH, in *Geography*, the Namaskett of the ancient Indians, a post-town in Plymouth county, Massachusetts, incorporated in 1669, and containing 4458 inhabitants; 40 miles S. by E. of Boston. This town is remarkable for a large range of ponds, which produce several sorts of fish, and large quantities of iron ore.

MIDDLEBOURG KEY, a small islet, separated from St. Martin's in the West Indies, on the north-east.

MIDDLEBROOK, a post-town of America, in Augusta county, Virginia; 186 miles from Washington.

MIDDLEBURG, a post-town of America, in Lowden county, Virginia; 47 miles from Washington.—Also, a post-town of Nelson county, Kentucky; 603 miles from Washington.

MIDDLEBURG, a town of Flanders, which derived its name from an abbey called "Middleburg," to which it belonged. In this town the free exercise of the Roman Catholic religion is allowed; 7 miles N.E. of Bruges. N. lat. 51° 16'. E. long. 3° 15'.

MIDDLEBURG. See EA-OO-WEE.

MIDDLEBURG, *New*, a town of Dutch Guiana, at the extremity of the colony.

MIDDLEBURG, a small island near the west coast of New Guinea. S. lat. 0° 18'. E. long. 132° 32'.—Also, a small island in the gulf of Manar, near the west coast of Ceylon; 18 miles N. of Manar.

MIDDLEBURY, a post-town of America, in Vermont, capital of Addison county. Here are a brewery on a large scale, three grist mills, four saw mills, a forge, a gun and card manufactory, gaol, court-house, college, and about 400 dwelling-houses. The township lies on the east side of Otter creek, and contains 1263 inhabitants; 511 miles N.E. of Washington.

MIDDLEFAHRT, a town of Denmark, on the west coast of the island of Funen, in the Little Belt, which is here scarcely one mile wide, and called "Middlefahrt sound." Here is a ferry to Snogboy in Jutland; 34 miles W. of Odensee. N. lat. 55° 32'. E. long. 9° 39'.

MIDDLEFIELD, a township of America, in Hampshire county, Massachusetts; 30 miles N.W. of Springfield; incorporated in 1783, and containing 817 inhabitants.—Also, a thriving town in Trumbul county, state of Ohio; 15 miles N. of Warren.

MIDDLEHAM, a small market-town and parish in the wapentake

wapentake of Hang-Weſt, in the North Riding of the county of York, England, is ſituated on the ſouthern bank of the river Ure, 10 miles from Richmond, 44 from York, and 229 from London. Leland ſays, "The toun is ſet on a hille ſide. The greate hil above hit more then a mile of hit is cawllid Penhil, and is countid the hieſt hille of Richemontſhire. Middleham caſtle joynith harde to the toun ſide, and is the faireſt caſtel of Richemontſhire next Bolton, and the caſtel hathe a parke by hit caullid Sonſkne, and another cawllid Weſtpark, and the third caullid Gauneleſſe, half a mile of. Weſtparke and Gaunleſſe be well woddid. There is at the eſt ende of Midlcham a little hoſpital, with a chapel of Jeſus." The pariſh church is a handſome ſtructure. In the year 1476, Richard duke of Glouceſter (afterwards king Richard III.) obtained a licence from his brother, Edward IV., to make it collegiate, with proviſion for a dean, ſix chaplains, four clerks, and ſix choriſters; but the eſtabliſhment was never completed. The miniſter of the pariſh hath yet the title of dean of Middleham, and enjoys ſeveral privileges; but there probably never were any chaplains, clerks, or choriſters. The caſtle, now in ruins, was the birth-place of king Richard III.; and in it Edward IV. was confined, after having been taken priſoner in his camp by Nevill, earl of Warwick. Middleham contained, according to the return in the year 1801, under the population act, 154 houſes, and 728 inhabitants, of whom a conſiderable number are employed in the woollen manufacture. A weekly market is held on Monday, and here are three annual fairs.

MIDDLE-HORNED, in *Agriculture*, a term applied to an uſeful breed of neat cattle. This breed, which are often employed in team labour, is diſtinguiſhed by different characteriſtic marks in the different varieties; which, in the Devonſhire ſort, is by a high red colour without white ſpots, by a light dun ring round the eye, by the muzzle having the ſame colour, by being fine in the bone and clean in the neck, by the medium length of the horns, and their being turned upwards, by being thin-faced, fine in the chops, wide in the hips, with a tolerable barrel, rather flat on the ſides, by the tail being ſmall and ſet on high, by being thin-ſkinned and ſilky in handling, and by the property of fattening at an early age, or arriving quickly at maturity. They are admirably fitted for the purpoſe of draught in hardineſs, quick movement, and the form of the ſhoulder.

The principal varieties of this breed are the Devonſhire, the Suſſex, and the Herefordſhire; all of which are highly uſeful ſorts, and differ in ſome ſlight particulars from each other, as is ſeen under the head *Cattle*, where a full deſcription of each kind is given. See CATTLE.

MIDDLESEX, *Earl of*, in *Biography*. This nobleman is often mentioned in opera annals, from the year 1741, when Handel retired from the Haymarket theatre as manager, or *impreſario;* his lordſhip having taken upon himſelf that perilous and troubleſome office, perſevered in his love of dramatic muſic, and of rule, to his great loſs, till 1748. See OPERA *Hiſtory in England.*

MIDDLESEX, in *Geography*, an inland county of England, is bounded on the north by Hertfordſhire, on the ſouth by the river Thames, which divides it from Surrey, on the weſt by the river Colne, which ſeparates it from Buckinghamſhire, and on the eaſt by the river Lea, which divides it from Eſſex. Its ſhape is extremely irregular, but, on the whole, approaches to that of the quadrangle. The greateſt extent of the ſhire, from eaſt to weſt, meaſures about 20 miles; and its greateſt breadth, from north to ſouth, about 17 miles. The ſuperficial area of the whole county is eſtimated by Mr. Middleton, in his Agricultural Survey, at 280 ſquare miles, or 179,200 acres. Some other writers, however, ſtate its contents at 218,000 acres. According to the parliamentary returns of 1801, it contained 118,083 houſes, inhabited by 818,129 perſons, *viz.* 373,655 males, and 444,474 females, of whom 162,260 were ſtated to be employed in different branches of trade and manufactures, and in agriculture.

This county, before the Roman invaſion, formed part of the territories of the Trinobantes, or Trinovantes, a tribe of Britons, who are ſuppoſed to have derived their name from the peculiar nature of the country they occupied; being a broad valley on the banks of a wide ſpreading river. This tribe poſſeſſed two conſiderable cities, or fortified places; of which the eminence between the Thames and Moorfields, nearly the centre of modern London, was the ſcite of one; the other, and moſt important at that early period, was Camalodunum, now Colcheſter in Eſſex. Being torn by internal diſſentions, the Trinobantes were the firſt who found themſelves compelled to ſubmit to the Roman arms. After the complete ſubjugation of the iſland, their territories, and conſequently Middleſex, were included in the diviſion called Flavia Cæſarienſis; and Londinum or Auguſta, now London, became a principal Roman ſtation, though, from ſome cauſe unknown, it never was dignified with the name of a colony. See an intereſting account of the Roman ſtation and antiquities of London, by J. Moſer, eſq., in European Magazine for September 1812.

After the retreat of thoſe illuſtrious conquerors, and the eſtabliſhment of the Saxon heptarchy, this county appears for ſome time to have conſtituted a kingdom of itſelf; for which, however, its kings were obliged to do homage to thoſe of Kent or Mercia. It was ultimately incorporated with the kingdom of the Eaſt Saxons, and remained in that condition till the diſſolution of their monarchy, by the ſubjugation of the ſeveral kingdoms of the heptarchy to one monarch. Subſequent to this event, the hiſtory of London is intimately connected with the hiſtory of Middleſex. See Turner's Hiſtory of the Anglo-Saxons, 2 vols. 4to.

The ſurface of this county, though moſtly flat, preſents a variety of hills, near its union with Hertfordſhire, many of which riſe almoſt imperceptibly to their ſummits, and are, on that account, admirably adapted for the purpoſes of agriculture; being ſufficiently ſloping to ſecure a proper drainage, and, at the ſame time, free from abrupt elevations. This inequality of ſurface, moreover, contributes in no ſmall degree to health, ornament, and beauty; though only a few ſpots can be conſidered as eminently pictureſque. The ground, for the moſt part, aſcends from the banks of the Thames towards the north; and, within four miles of London, appears a range of gentle eminences, which ſhelters the metropolis from the northern blaſts, and agreeably breaks the uniformity of the horizon. Of theſe heights the chief are Hampſtead, Highgate, and Muſwell Hill; all of which afford many pleaſing and extenſive proſpects. So likewiſe does Harrow Hill, which, from riſing in a ſort of iſolated manner, forms a prominent object for many miles around. This eminence approaches a higher and more extenſive ridge, ſtretching north-eaſtward in interrupted ſwells from Pinner, Stanmore, Elſtree, Totteridge, and Barnet, to the foreſt ſcenery of Enfield Chace. The average elevation of theſe hills is about 400 feet above the ſtream of the Thames. Such land as lies contiguous to that river, and to the Colne and Lea, is in general perfectly level, and exhibits a ſtate of the higheſt cultivation.

The mineralogy of this county affords fewer objects of intereſt than perhaps any other in England. According to Mr.

Mr. Middleton, the diſpoſition of the ſtrata is, "firſt, cultivated ſurface; ſecondly, ſiliceous gravel, from five to ten feet in thickneſs; thirdly, a ſtrong leaden coloured earth, generally called clay, varying from one to three hundred feet in thickneſs; fourthly, marine ſediment, ſometimes cockle ſhells, but principally oyſters, agglutinated together, and hardened into a ſort of ſtony ſtratum, three, four, or five feet deep; fifthly, looſe ſand and gravel, from which the water is found to riſe in ſuch quantity, as to preclude the poſſibility of digging further. No metallic ſtrata have yet been diſcovered in any part of the county; and appearances indicate, that if there really are any ſuch, they lie at too great a depth to be made ſubject to the operations of the miner." A thin ſtratum of fullers' earth, however, was found, in 1802, about a mile from Paddington, on the Edgeware road; and in 1798, a quantity of looſe coal, twelve inches in thickneſs, was diſcovered at Chelſea, nearly fifty feet from the ſurface. Foſſil ſhells, principally bivalves, together with other marine exuviæ, have occurred in different parts.

The ſoils in Middleſex are various, but loam and clay, or ſand and gravel, more or leſs intermixed with loamy clay, are the moſt prevalent. The latter ſort of ſurface predominates on the ſummits of moſt of the hills. Hampſtead Hill conſiſts chiefly of yellow iron-ſtained ſand, with ſome loam and rounded flints placed on a pure white ſand, many feet in depth. A loamy ſand is the prevailing ſoil in that diſtrict of the county which forms its ſouth-weſternmoſt angle, and lies beeween the river Thames, and the road ſtretching from Hounſlow to Colnbrook. From Tottenham to Enfield Waſh the ſuper-ſtratum is of a ſimilar deſcription, and reſts upon the ſame under ſtrata. Weſtward from Hanwell and Hounſlow, the loam exiſting in much greater quantity than the ſand, agriculturiſts diſtinguiſh the ſoil here by the appellation of a ſandy loam. The ſame ſoil is found in the pariſhes of Twickenham, Iſleworth, Ealing, Chiſwick, Kenſington, Fulham, Brompton, and Chelſea, as likewiſe in the ſouth diviſion of the pariſh of Harefield. All the land from Ruiſlip and Ickenham on the weſt, to Gneeford, Apperton, and Harrow on the eaſt, and between Pinner on the north, and Northcote on the ſouth, is compoſed of ſtrong loam; the land about Muns is of the ſame kind, and the level between Iſlington, Hampſtead, and Hornſey, is a ſtrong but very unproductive loam. The loamy clay predominates on the north ſide of a hill between Uxbridge Common and Harefield, to the northweſt of Ruiſlip, and between the river Brent and Hampſtead on the Hendon road. From Nightingale Hall by Colney Hatch to Whetſtone, the ſoil is a loamy clay mixed with pebbles of flint, and alſo from Potters'-Bar for about two miles towards South Mims. The north ſide of Highwood Hill has a thin layer of loamy clay on a ſubſoil of yellow clay, every where abounding with rounded flints. In the Iſle of Dogs, and in all the lands on the flat borders of the rivers Lea and Colne, together with ſome ſpots immediately adjacent to the Brent and the Thames, the ſoil is of that peculiarly rich kind which is formed by the collection of the various ſubſtances that may be waſhed down by the rivers from the high grounds, villages, towns, and cities. The moors extending from Rickmanſworth to Staines conſiſt chiefly of peat on a ſubſoil of ſiliceous gravel, which in various parts ſhews itſelf at the ſurface. Some peat has likewiſe been found in the Iſle of Dogs.

Middleſex, from its ſituation with regard to London, preſents more variety in its agriculture than any county in Great Britain. To give the reader, therefore, a proper idea of this ſubject, it will be neceſſary to enter at greater length into detail than might otherwiſe be requiſite. In general, however, it may be premiſed that the eaſtern diviſion of the county, with the exception of the gardens in the vicinity of the metropolis, are appropriated to meadow, paſture, and potatoe-grounds; and that the weſtern diviſion, excepting Hounſlow Heath, Sunbury, and Ruiſlip commons, and ſome other ſpots, conſiſts chiefly of arable lands.

The greater part of the upland, meadow, and paſture-grounds in this county has, no doubt, been at one time under cultivation, as they ſtill exhibit unequivocal marks of the plough. Theſe grounds are kept in the higheſt ſtate of order, and are plentifully furniſhed with manure, ſo that they afford the moſt luxuriant crops. The manner and period of applying the manure are ſtudied by the farmers with great attention. They obſerve, ſays Mr. Middleton, the ſtate of the atmoſphere, and ſhould it indicate rain after the hay is removed from the ground, they put the dung of neat cattle upon it. Should the barometer, however, not promiſe rain in conſiderable quantities, the decompoſed manure is allowed to remain on the dunghills till the end of September, at which time it is put on while the ground is dry enough to bear the loaded carts without injury. Meadow land in the occupation of cow-keepers is uſually mown two or three times during ſummer, the great number of cows kept by them enabling them to dreſs it every year. As their chief object is to obtain their hay of a ſoft graſſy nature, they cut it young, conceiving it to be better provender for milk cows in that ſtate than after the ſeedling ſtems have riſen.

The paſturage or graſs-lands lie principally, if not entirely, on the banks of the ſeveral rivers with which this county is ſupplied. Thoſe adjoining to the river Lea contain about 2000 acres, of which upwards of 1200 are incloſed, and the remainder divided by land-marks among a great number of proprietors. The ſeveral tracts of graſs-lands on the banks of the Colne include about 2500 acres, and ſuch of them as are incloſed are extremely fertile. By far the greater proportion of them, however, are Lammas Meads; and one of the neceſſary conſequences of this condition is, that the ditches are ſo much neglected as to be grown up. The richeſt graſs-land in the whole county is that of the Iſle of Dogs, which, ſince the formation of the Eaſt India Docks, has been reduced from 1000 to leſs than 500 acres.

Before concluding the ſubject of meadow and graſs-lands, it may not be improper to notice ſhortly the method of haymaking practiſed in this county, the decided ſuperiority of the farmers in that art being acknowledged by all who have any pretenſions to agricultural ſkill. Here it is reduced to a regular ſyſtem, unknown in other parts of the kingdom. When the graſs is about to be mown, the farmer engages a certain number of perſons for that work, according to the extent of his lands. At the ſame time he provides five haymakers to each mower, who are paid by the day. On the firſt day all the graſs mown before nine o'clock is tedded, in which operation great care is taken to ſhake it out well, and ſtrew it evenly over the ground. After this, it is turned once or twice with ſimilar care; and in the courſe of the afternoon is raked into what are called ſingle wind rows, and towards the evening is put into graſs cocks. On the ſecond day the buſineſs commences by tedding all the graſs mown on the firſt day after nine o'clock, and all that has been mown this day before nine o'clock. Next the graſs cocks are well ſhaken out into ſeparate plats, called ſtaddles, of five or ſix yards diameter. The ſtaddles are next turned, and after that is done, the graſs tedded in the morning is turned once or twice in the ſame manner as deſcribed for the firſt day. After dinner the ſtaddles are

are formed into double wind rows; the grafs is next raked into fingle wind rows; then the double wind rows are put into baftard cocks; and laftly, the fingle wind rows are put into grafs cocks. On the third day the grafs mown and not fpread on the fecond day, and alfo that mown in the early part of this day, is firft tedded in the morning, and the grafs cocks are fpread into ftaddles, as before, and the baftard cocks into ftaddles of lefs extent. Thefe leffer ftaddles, though laft fpread, are firft turned, then thofe that were in the grafs cocks, and laftly, the grafs, once or twice; after which, the people go to dinner. Should the weather prove fine, the hay which was in baftard cocks the preceding night, will, this afternoon, be in a proper ftate to be carried, but not fo if the weather has been cloudy and cool. In the latter cafe, the firft operation after dinner is to rake the grafs cocks of the laft night into double wind rows, and the grafs which was this morning fpread from the fwaths into fingle wind rows. Afterwards, the baftard cocks of the laft night are made up into full fized cocks, and care taken to rake the hay up clean, and alfo to put the rakings upon the top of each cock. Next, the double wind rows are put into baftard cocks, and the fingle wind rows into grafs cocks, as on the preceding days. On the fourth day the great cocks are ufually carried before dinner. The other operations of the day are conducted in the fame routine as on thofe already defcribed, and fo on daily till the harveft is finifhed.

The fruit gardens of Middlefex, folely intended for the fupply of the public market, are fuppofed to occupy about 3000 acres. They extend, principally, on each fide of the high road, from Kenfington through the parifhes of Hammerfmith, Brentworth, Ifleworth, and Twickenham. Thefe gardens, on an average, furnifh conftant employment to about ten perfons *per* acre, men, women, and children; but during the fruit feafon, this number is increafed from thirty-five to forty. The annual produce of the labour of thefe individuals collectively is eftimated at 300,000*l.*, about three-fourths of the whole fupply of London. In thefe gardens it is ufual to have two crops, one called an *upper*, and the other an *under* crop. The former confifts of the larger fpecies of fruits, and the latter of the fmaller, fuch as rafpberries, goofeberries, currants, and others which are known to fuffer little injury by exclufion from the influence of the fun. Some gardens are inclofed by very high walls, againft which grow a vaft variety of wall fruits; and artificial banks are alfo frequently formed, by means of which the gardeners are enabled to raife certain crops many weeks earlier than they could otherwife effect.

The nurfery gardens lie moftly in the neighbourhoods of Chelfea, Brompton, Kenfington, Hackney, Dalfton, Bow, and Mile-End, and are computed to comprife upwards of 1500 acres. In thefe gardens are to be found almoft every variety of fruit trees, ornamental fhrubs, and rare plants, known in any quarter of the world. Indeed, fo celebrated are the nurfery-men of Middlefex for the cultivation of exotics, that, in times of peace, a great exportation of thefe articles takes place to France, Spain, Portugal, Italy, Ruffia, and other countries.

The extent of ground fituated in Middlefex appropriated to kitchen gardens for the fupply of the London markets, is eftimated at nearly 3000 acres, or about one-fourth of the whole lands fo employed in the neighbourhood of the metropolis. About a tenth part of thefe gardens is entirely prepared by the fpade, and the remainder partly by the fpade, and partly by the plough. The average produce of thefe gardens, which are kept in a ftate of high fertility by an abundant fupply of manure, is fuppofed to amount to 200*l.* *per* acre annually, the profit upon which may be about 120*l.* Willows for the ufe of the bafket-makers are much cultivated in the iflands and on the banks of the Thames, particularly in the vicinity of Brentford, Twickenham, and Sunbury. The profits arifing from this fpecies of cultivation are faid to be immenfe, but they are carefully concealed from public fcrutiny.

Farms in this county, from the manifold divifion of its landed property, are ufually of fmall extent. The rents vary extremely, according to local and other circumftances, being in fome places averaged fo low as ten fhillings, and in others at above twelve pounds. They are, without exception, paid in money, with the addition, in fome few inftances, of fupplying the landlord's family in town with frefh butter at 8*d.* or 9*d.* *per* pound, of 16 ounces to the pound, and with cream at 6*d.* *per* pint. Tithes, from which only a very few farms are free, are chiefly taken in kind, though in fome cafes an annual compofition is preferred. The wages of labourers in hufbandry here in winter vary from ten to twelve fhillings *per* week, and in fummer from twelve to fifteen. Thofe employed only in hay-time and harveft have from fifteen to eighteen fhillings, with beer occafionally, and fometimes a dinner. A great part of the agricultural bufinefs, however, is done by the piece, the prices varying according to the feafon. Farm-houfes, built within the laft hundred years, are moftly conftructed of brick, and well adapted for the accommodation of a refpectable family. The offices erected within the fame period are likewife laid out upon a good plan. If of older date, however, than the 18th century, both houfes and offices are of wood, lathed and plaiftered, with the roofs thatched; and from the many repairs, additions, and alterations they have undergone, have the appearance of being built by piece-meal, to fuit the immediate wants of the farmers, who may properly be divided into various claffes or defcriptions of perfons. Thofe who rent land in the immediate neighbourhood of the metropolis are chiefly cow-keepers, gardeners, and nurfery-men. The lands lying immediately behind their's are occupied by the villas of wealthy citizens and others; and thefe are fucceeded by farmers, who may be again divided, firft, into perfons with whom farming is but a fecondary occupation; and, fecondly, fuch as, having acquired an eafy fortune by other purfuits, retire to farming, with the idea of uniting profit and amufement in their agricultural labours. The third clafs is lefs numerous than either of the former, and confifts likewife of perfons who have abandoned fome former purfuit entirely, and directed their attention exclufively to farming as a profeffion: this clafs forms the moft intelligent and moft accurate of hufbandmen. The fourth and laft clafs is equal in number nearly to all the other claffes conjoined, and is compofed of perfons who have been originally bred to farming, and have continued to employ themfelves in the fame occupation.

The arable lands in Middlefex are chiefly fpread out in common fields, not above one-fourth of the whole being inclofed. This department of hufbandry is much lefs underftood than thofe divifions of it already noticed. Ploughing is, for the moft part, conducted upon an injurious and expenfive plan. The ploughs, as well as the carts, are much too clumfy, requiring an unneceffary number of cattle to drag them. Fallowing is feldom practifed, becaufe the farmers regard the introduction of green crops, at certain intervals in the rotation of crops, as rendering this mode of recruiting the ground altogether unneceffary; and it muft be confeffed, the idea derives fome confirmation from experience, for in the parifh of Hefton, where the beft wheat in the county is grown, that practice is wholly excluded. The

corn

corn chiefly raised here is wheat and barley, rye and oats being cultivated only in very small quantities. The whole extent of land cropped with wheat in Middlesex is about 10,000 acres, and new grain recently threshed is mostly preferred for seed. About 4000 acres are laid down in barley; 3000 acres are appropriated to beans; and nearly the same amount to peas. The remainder of the arable lands is occupied by a variety of other green crops, as turnips, cabbages, white and red clover, ray-grass, (usually cut green,) and tares for the food of cattle; together with turnips, potatoes, carrots, parsnips, &c. for the use of man. Liquorice and hops are likewise among the saleable commodities cultivated in a few fields in the vicinity of London.

The number of live stock kept in this county is smaller, even in proportion to its extent, than in any other in England, with the exception of the cows appropriated for the supply of London with milk. These cows, which are of a large size, are commonly distinguished by the appellation of the Holderness breed, from a district of that name in Yorkshire; but they have long since ceased to be confined to that particular kind. The total number kept in Middlesex, for the purpose above-mentioned, is stated by Mr. Foot, in his Agricultural Report, at 7200. The mode of treating these cattle is as follows. During the night they are confined to their stalls, and about three o'clock in the morning each is provided with half a bushel of grains. From four to half past six they are milked by the retail dealers, and as soon as that operation is finished, each cow receives a bushel of turnips, and not long afterwards a small portion of soft meadow hay. These several feedings are commonly finished by eight o'clock in the morning, when the cattle are turned into the cow-yard. At twelve, they are again confined to their stalls, and are served with the same quantity of grains which they had in the morning. The milking recommences about half past one, after which follows again the turnips and hay. This mode of feeding continues from the month of September to May. During the other months they are fed with grains, cabbages, tares, and second cut grass, except when the weather is peculiarly fine, and then they are turned out to graze; but even in this case they still receive a portion of grains. One bull is the usual proportion to a stock of thirty cows. The net profit of the cow-keeper, upon every cow, is estimated at 6*l.* annually. Calves are generally disposed of at one, two, or three days old. Many, however, are likewise suckled for eight or ten weeks, when they become fat, and are thought to furnish the best veal.

The Middlesex sheep are not of any particular breed, the farmers either directly or indirectly purchasing their stock from almost every county in England. Such ewes, however, as are kept for the supply of the London markets with house-lambs, are all of the Dorsetshire breed. This last branch of farming is, perhaps, the most profitable of any in the county. Early-lambing ewes, of which those of a large size with white noses are preferred, are sought for with great diligence, the prices varying from forty to fifty shillings. Early grass-lambs are likewise an object of importance with the farmers of Middlesex; and for supplying these, the Dorset ewes are chiefly selected, but the South-down breed is occasionally preferred. The feed both of the ewes and lambs is principally turnips and second crop hay. The lambs are usually sold fat in the months of April, May, and June, at from thirty shillings to two guineas each.

The number of horses kept in this county amounts to between thirty and forty thousand, but very few of them are bred in it. Such as are employed in agricultural operations, as well as those used by the brewers, distillers, and carmen of London, are mostly bred in Leicestershire and the adjoining counties. The coach and saddle-horses are principally brought from Yorkshire. No horses can surpass the draught horses of the brewers, coal-masters, &c. in strength and figure. Hogs are kept in considerable numbers, but chiefly by the malt-distillers, for whom they are purchased lean at a large market held on Finchley Common, to which there are vast numbers brought from Shropshire and other distant counties. The fattened hogs are bought for the hog-butcheries about London; and the bacon cured here is reckoned very little inferior to that of Wiltshire and Yorkshire. A great supply of poultry is reared in Middlesex, chiefly, however, for home consumption. Many pigeons and rabbits are also bred, particularly in the neighbourhood of London, by the poor people and journeymen tradesmen. The only regular warren in the county is that on Uxbridge Common; so that a great proportion of the rabbits sold by the poulterers in London are of the house-breed.

Middlesex, considering the proximity of every part of it to the British metropolis, cannot boast of such good roads as might be expected. For, notwithstanding the immense sums raised to keep them in repair and proper condition, it is a fact, that even the great roads which branch off immediately from the city, as from a centre, are frequently suffered to remain in the most neglected state, especially during the winter months. This arises, in a great measure, from the inappropriate means employed in cleansing them, and from the inadequacy of the materials employed in their construction and repair, to sustain the continued pressure of the immense loads which are constantly drawn along them. It must be confessed, however, that many improvements in this respect have been made within these few years, and that even as they are, they would be accounted excellent in every other part of Europe, except in the neighbourhood of London. The parish highways, as they are denominated, are usually kept in excellent order; but the same remark cannot be applied without considerable limitation to the streets of London, which, in the carriage-ways, are usually paved with Scotch granite. The canals which intersect Middlesex are the Grand Junction canal, and the Paddington canal. The former, striking off from the Thames at Old Brentford, passes the grounds at Sion Hill and Osterley, and running through a rich corn district near Hanwell, Norwood, Harlington, West-Drayton, Cowley, Uxbridge, and Harefield, leaves this county near Rickmansworth. This canal, which is navigable for vessels of sixty or seventy tons burthen, has fourteen locks to Harefield Moor, where the level is 114 feet two inches above that of the river Thames. From its numerous cuts, side branches, and collateral streams, it is, beyond doubt, the most important inland navigation in the kingdom, as it affords a direct water communication to all the various manufacturing towns of Warwickshire, Staffordshire, Lancashire, Derbyshire, and several other counties. The general breadth of this canal is thirty feet, but at the bridges it is contracted to fifteen. The Paddington canal branches off from it near Cranford, and is continued on a level from thence to the dock at Paddington, the sides of which are occupied with yards and warehouses, for the reception and security of merchandise. The advantages derived to the metropolis and the country at large from this canal, are likewise various and important. A third canal, called the Regent's Canal, stretching from the Thames, west of London, to join that river near Limehouse, has been lately projected, and is now carrying into execution. Though there are no streams of any consequence which take their rise in this county, several considerable

derable ones water it in different directions. Of these, the most important, not only in Middlesex, but in England, is the Thames, which serves as the boundary between this county and Surrey, as already mentioned. See THAMES.

The other principal rivers of Middlesex are the Colne, the Brent, and the Lea; all of which discharge their waters into the Thames. The Lea, which joins it at Bow Creek, is navigable as high as Ware and Hertford. All of these waters are covered at different points with mills, and other machinery, employed in the various departments of manufactures and the arts. Besides these streams there are several others, which, though of trivial size, have some claims to attention. Fleet Brook, which is now enclosed from the view in its passage through London, was formerly navigable for barges. It takes its rise among the high grounds at Hampstead Heath and Caen Wood, from whence it proceeds by Kentish Town, Pancras, Bagnigge Wells, Mount Pleasant, and Saffron-hill, crossing Chick-lane, and running under Fleet-market and Bridge-street, where it enters the Thames. The New River is an artificial stream, formed by the collected waters of several small springs issuing from the vicinity of Chad-well, in Hertfordshire. (See NEW RIVER.) Several mineral springs rise in the immediate vicinity of London; and some of them were formerly of much repute, though they are now but seldom used. The Spa fields, north of London, derive their name from the number of chalybeate springs that rise within them, of which that at Islington Spa, called also New Tunbridge Wells, is the principal. At Bagnigge Wells are springs both chalybeate and cathartic. The other springs of note are St. Chad's Wells, near the bottom of Gray's-inn-lane road, Kilburn Wells, Acton Wells, and several more situated at Hampstead, and in the parishes of St. Pancras and Shadwell.

Middlesex, as containing London, is the principal seat of commerce and manufactures in Great Britain. While its traders visit the most distant parts of the known world, its artificers at home produce almost every variety of articles which any district in the country can furnish. The chief portion of these, as may be presumed, is manufactured in London and its suburbs: but many important manufactories are likewise spread over the county; most of them, however, the property of individuals established in the town.

The maintenance of the poor in this county is too important a branch of its civil economy to be passed over unnoticed, even in a general account like the present. According to the returns made to parliament on this subject, in the year 1804, the number of persons maintained in workhouses, from the 20th of April 1802 to the 12th of April 1803, was 15,186; and the number of those relieved out of work-houses, 47,987. The total annual expence, incurred in supporting the former, was 224,048*l.* 2*s.* 1½*d.*; and the expence of relieving the latter, 121,901*l.* 12*s.* 3*d.*; making in all, the sum of 364,034*l.* 0*s.* 10½*d.*, or 5*l.* 15*s.* 3*d.* for each parishioner. Besides these, however, there were 32,506 persons, not parishioners, who had received occasional relief, to the amount of 3250*l.* 12*s.*: so that the whole sum expended for the benefit of the poor, during that year, was 367,284*l.* 12*s.* 10½*d.* The amount of the rates, for the same period, was 490,144*l.* 1*s.* 7¼*d.*; an average of 10*s.* 10½*d.* *per* head on the whole resident population, then computed, as has been seen, at 818,129 persons. Eight persons in the hundred, according to this calculation, were relieved by the poor's rate. Independent of these parochial burthens, there were then 1132 friendly societies, of which 54 were stated to be female societies, and 750 to have been enrolled at the quarter-sessions, pursuant to the acts passed in the 33d and 35th years of his present majesty. The total number of persons belonging to these societies is stated at 72,741, (of whom 3754 were females,) being nine in a hundred of the resident population.

The Romans seem to have had only two stations in this county: Londinum or Augusta, now London; and Sullonicæ or Brockley hills, near Elstree, on the borders of Hertfordshire. Roman remains, however, have been discovered at many other places. The Roman roads appear to have concentrated in London, and to have branched off from that city in different directions, as from a common centre. The Watling-street, running from Dover, is presumed to have entered Southwark at the point now called Dowgate, and, keeping along the present Watling-street, to have quitted the city at Aldersgate. After this, its precise direction cannot be easily determined; but it probably turned westward at the end of Old-street, and continuing along Wilderness-row and Clerkenwell, crossed the Fleet Brook, and ascended the hill at Portpool-lane; thence pursuing a north-westerly direction, it fell into the tract which now forms the high road to St. Alban's, and approaching the station of Sullonicæ, passed on through Elstree to Verulamium. The Ikenild-street, taking an easterly direction up Old-street, and over Bethnal Green, went on by Old Ford to Camalodunum or Colchester. The Ermin-street led northwards through Islington, Stoke Newington, and Hornsey, to Enfield: then turning off near that town, it passed Clay-hill, and entered Hertfordshire. A fourth Roman road led into Surrey and Berkshire, by the towns of Brentford, Hounslow, and Staines, along the course of the present turnpike; and there seems every reason to believe that a fifth took the direction of Essex, through Whitechapel and Stratford-le-Bow. Several camps of British and Roman construction are dispersed throughout the county, but none of them are peculiarly interesting: and in general it may be remarked, that, except in London and Westminster, there are few remains of antiquity in Middlesex, which have any claims to the particular notice of the antiquary.

Middlesex is divided into six hundreds, exclusive of the cities and liberties of London and Westminster, and the Tower Hamlets. The total number of parishes, places, precincts, and extra-parochial places, in the whole county, as returned under the population act, was 234. All of these, with the exception of the city and liberties of Westminster, which are governed by the dean and chapter of Westminster, are included in the diocese of London. It contains nine market-towns, distinct from the metropolis, namely, Barnet, Southall, Finchley, Uxbridge, Brentford, Hounslow, Edgeware, Staines, and Enfield. Uxbridge market is principally for corn; and at Hounslow there is always a very considerable show of fat cattle, for the supply of the London butchers. Beauties of England and Wales, vol. x. by E. W. Brayley. Camden's Britannia, by Gough, fol. vol. ii. Stukeley's Itinerary, fol. Agricultural Survey of Middlesex, by Middleton, 8vo.

MIDDLESEX, a county of America, in Massachusetts, bounded north by the state of New Hampshire, east by Essex county, south by Suffolk, and west by Worcester county. It is nearly of a square form; its greatest length being 52, and its greatest breadth 42 miles. It has 42 townships, containing 46,928 inhabitants, and was made a county in the year 1643. It is watered by five principal rivers, *viz.* Merrimack, Charles, Concord, Nashua, and Mystick, besides some smaller streams. The chief towns are Charlestown, Cambridge, and Concord. The southern and northern sides of the county are hilly, but none of the hills exceed 100 feet in height; and they are either covered with

with wood, or cultivated to the summit. The air is generally serene, and the temperature mild. The soil in some parts is rich black loam, but in others it is light and sandy. It produces the timber, grain, and fruit, which are common throughout the state, either by natural growth or cultivation.—Also, a maritime county of Connecticut, bounded north by Hartford county, south by Long Island sound, east by New London county, and west by New Haven. It is divided into six townships, containing 13,874 inhabitants, of whom 72 are slaves. The chief town is Middleton.—Also, a county of New Jersey, bounded north by Essex, north-west and west by Somerset, south-west by Burlington, south-east by Monmouth, east by Rariton bay, and part of Staten island. It contains 17,890 inhabitants. From the mouth of Rariton river to Brunswick, the land on both sides is generally good, both for pasture and tillage, and produces considerable quantities of every kind of grain, and of hay. The chief town is New Brunswick.—Also, a county of Virginia, on the south side of Rappahannock river, on Chesapeak bay, about 35 miles long, and 7 broad, containing 1687 free inhabitants, and 2516 slaves. The chief town is Urbanna.

Middlesex, one of the three counties into which the island of Jamaica is divided; the two others being Cornwall and Surry. This county is composed of eight parishes, one town, *viz.* St. Jago-de-la-Vega, or Spanish Town, the capital of the island, and thirteen villages.

Middlesex, *Bill of*, in *Law*. See Bill.

MIDDLETON, *Sir* Hugh, in *Biography*, a public-spirited man, was the sixth son of Richard Middleton, esq. governor of Denbigh castle, in the reigns of Edward VI., Mary, and Elizabeth. The subject of this memoir settled in London, as a goldsmith; but in early life he had engaged in mining speculations in his own country, and worked a copper-mine in Cardiganshire, which brought him in a considerable income. During the reigns of Elizabeth and James I., the citizens of London obtained a power to bring a new supply of water to the city, from certain streams or springs in Middlesex or Hertfordshire. Various attempts were made; but they were all abandoned, on account of the difficulty and expences attached to so vast a concern. At length the city made over to Mr. Middleton, and his heirs, all the powers and rights conferred by an act of parliament; and he began the business in the year 1608. Two springs, one rising near Ware, and the other at Amwell, in Hertfordshire, were united for the supply of an artificial river, which was conducted to the metropolis. The expences of the undertaking were so great, that they exhausted the fortune of the projector, who, having in vain applied to the corporation of London for assistance, procured it from the king, to whom a half-share of the concern was made over, in consideration of his taking an equal share in the expences. This great work was completed in 1613; and on Michaelmas day, the water was let into the reservoir of Islington with great solemnity. Mr. Middleton was rewarded with the honour of knighthood; but his profits were so small, that he was under the necessity of engaging in the business of a surveyor, or what is now denominated a civil engineer, and in that capacity rendered essential services to his country, by various schemes of mining, draining, &c. In 1622 he was created a baronet, and he died in the year 1631; since which, the value of the shares in this New River, as it is still called, have advanced so much as to create large fortunes to the heirs of the original holders. A hundred pounds share, some years since, sold as high as fifteen thousand pounds. Of late, however, there have been several acts of parliament passed in favour of other projects, which will be noticed under the article Water-*Works*, and which have reduced the value of the New River shares full one half. It is the fashion now to decry the company as extravagant in their charges for supplies of water; but it should be remembered, that the shares of this corporation, like those of other commercial companies, are perpetually changing their masters; and it is probable that the majority of share-holders, when their value was even at the highest, had paid their full price, so as to gain only a moderate interest upon their purchase money. Biog. Brit.

Middleton, William, a Welsh poet, was born at Gwernsnog in Denbighshire, and died about 1600. He served in the armies of queen Elizabeth, and afterwards commanded a ship of war; and when at sea, turned the book of Psalms into Welsh verse. This work was finished in the West Indies, in 1595. He was also the author of a Grammar, and Art of Poetry, published in 1598.

Middleton, Conyers, a celebrated divine of the church of England, was born in the year 1683 at Richmond, in Yorkshire, where his father was minister. At the grammar-school of that town he was educated, and from a very early period he gave fair promise of future excellence. At the age of seventeen he was sent to Trinity-college, Cambridge; and in 1702 was chosen a scholar upon the foundation, and took his degree of B.A. In a short time afterwards he entered into deacon's orders, and officiated as curate to one of the senior fellows of his college, at Trumpington, a village near Cambridge. In 1706 he was elected fellow of his college, and in the following year he proceeded M.A. Soon after his election to the fellowship, he took an active part in the measures which were concerting in opposition to Dr. Bentley's imperious conduct, as master of the college; and he united in a petition to the bishop of Ely, which charged the doctor with many misdemeanors. For his zeal in this business he was considered by the doctor as his most determined and dangerous enemy. While this discussion was carrying on, Mr. Middleton married a lady of large fortune, and was obliged to vacate his fellowship; but he still resided at Cambridge, till he was inducted to a living in the Isle of Ely. To this he removed, but finding the situation unhealthy, he left it in about a year, and returned to Cambridge, where he was when George I. paid a visit to the university. On this occasion he got his name inserted, with those of several others, in the royal mandate for the degree of doctor of divinity, which he accordingly received from the hands of Dr. Bentley, the regius professor. Dr. Middleton on this occasion resisted the fees, for the ceremony called creation, which led to a controversy, that run out to a considerable extent, and which was carried on with great bitterness. The addition made to the public library at Cambridge, by a present from the king of bishop More's books, which had been purchased at the expence of six thousand pounds, induced the university to pass a decree for erecting a new senate-house, that a suitable place might be provided for the reception of his majesty's donation. This decree was accompanied with a vote for a new office in the university, *viz.* that of principal librarian, which was conferred upon Dr. Middleton. Such a promotion was no more than what was justly due to his literary merit. To shew how well qualified he was for that appointment, he published, in 1723, a little piece, entitled "Bibliothecæ Cantabrigiensis ordinandæ Methodus quædam; quam Domino Procancellario Senatuique considerandam et perficiendam, Officii et Pietatis ergo proponit." Soon after the doctor had completed the arrangement in the new library, his health requiring a change of climate, he applied for leave of absence from the university; and having obtained a

special

ſpecial grace for that purpoſe, though not without difficulty, he ſet out for the continent, in company with lord Coleraine, a nobleman of conſiderable learning, who, upon their arrival at Paris, introduced him to the celebrated Montfaucon. Here Dr. Middleton ſeparated from his lordſhip, and travelled by the direct route for Rome, where he arrived early in the year 1724. After reſiding in this city about twelve months, Dr. Middleton returned through France to England, and arrived at Cambridge in the latter end of the year 1725. Almoſt immediately after his return he publiſhed a tract, entitled "De Medicorum apud Romanos veteres degentium Conditione Diſſertatio; qua contra Viros celeberrimos Jac. Sponium, et Ric. Meadium M.D.D. ſervilem atque ignobilem eam fuiſſe oſtenditur." Dr. Mead had juſt before this publiſhed an oration, in which he had defended the dignity of the medical profeſſion, and endeavoured to vindicate it from the reproach of its having been held in ſuch low eſtimation by the ancient Romans, as to be left in the hands of ſlaves and the meaneſt of the people. In defence of the opinion of the learned phyſician, a work was publiſhed under the title of "Ad Viri Reverendi Con. Middletoni, S.T.P. de Medicorum apud Veteres Romanos degentium Conditione, &c. Diſſertationem Reſponſio." This was publiſhed without any author's name, but it was ſoon found to be the production of profeſſor Ward, who had been engaged by Dr. Mead to write it; and at his expence it was printed and publiſhed. Dr. Middleton replied in a very ſpirited defence both of his character and argument, entitled "Diſſertationis de Medicorum Romæ, &c. Defenſio." With this the doctor finiſhed his part of the debate; and through the whole progreſs of it, he did not fail on every occaſion to expreſs a proper regard for Dr. Mead's real merit: and this literary altercation did not prevent them from living afterwards upon very good terms with each other. While our author was at Rome, he had the advantage of beholding popery in the full pomp and diſplay of its pageantry, which he compared rather to the ſolemn acts of idolatry of old Rome, than to any thing recommended by the plain and ſimple precepts of Chriſtianity. He examined it very accurately; and with the view of tracing the ſimilarity, he made notes and obſervations while he was in Italy; and, after his return home, kept up an epiſtolary correſpondence with his friends and acquaintance there. From theſe materials he drew up, and publiſhed in 1729, "A Letter from Rome, ſhewing an exact Conformity between Popery and Paganiſm; or, the Religion of the preſent Romans derived from that of their heathen Anceſtors." This performance was exceedingly well received by the public, and went through ſeveral editions in a very ſhort ſpace of time. While, however, the author was entitling himſelf to the thanks of the Proteſtant world, by expoſing the corruptions and impoſtures of the Romiſh church, there were ſome, even of the church of England, who took grievous offence at the book, pretending that he had attacked the Popiſh miracles with a gaiety that ſeemed to contemn all miracles, and particularly thoſe of our Saviour, by invalidating the force of certain rules which had been eſtabliſhed by ſome divines as the criterion of true miracles. Our author next made an attack upon Dr. Waterland's, "Vindication of the Scriptures, &c." which had been written in reply to Tindal's famous book, entitled "Chriſtianity as old as the Creation." This drew upon Dr. Middleton the charge of infidelity, and he narrowly and with much difficulty eſcaped academical cenſure. During the conteſt in which he had involved himſelf on this ſubject, he was appointed to the new profeſſorſhip of phyſiology at Cambridge, which had been founded in purſuance of the will of Dr. Woodward. He delivered, in the year 1731, a Latin inaugural oration, at his entrance upon the office, that did credit to the appointment of Dr. Woodward's executors. The duties of this poſt Dr. Middleton diſcharged with fidelity and reputation, till the year 1734, when he reſigned it. In the following year he publiſhed "A Diſſertation concerning the Origin of Printing in England, ſhewing that it was introduced and practiſed by William Caxton, at Weſtminſter, &c" About this time the doctor was introduced to the celebrated lord Harvey, by whoſe advice and encouragement he undertook to write "The Hiſtory of the Life of M. Tullius Cicero." This great work, which was well adapted to his taſte, and for which he was perfectly qualified, employed ſo much of his time and attention, that it was not ready for publication till the year 1741, when it appeared in two volumes, 4to. It was publiſhed by ſubſcription, and the profits enabled him to purchaſe a ſmall eſtate in the neighbourhood of Cambridge, at which he uſually ſpent the ſummer ſeaſon.

While Dr. Middleton was employed on the life of Cicero, a vacancy occurred in the maſterſhip of the Charter-houſe, and he was mentioned for it by ſir Robert Walpole, and came to London with the hope of obtaining it; but was diſappointed in his expectations, and returned to the compoſition of his favourite work. In the progreſs of this work, he engaged with Mr. Tunſtall in a controverſy reſpecting the authenticity of Cicero's letters to Brutus, and of thoſe of Brutus to Cicero. He alſo, about the ſame period, publiſhed "Germana quædam Antiquitatis eruditæ Monumenta, quibus Romanorum veterum Ritus varii tam ſacri, tam profani, tum Græcorum atque Ægyptiorum nonnulli illuſtrantur, Romæ olim maxima ex Parte collecta, ac Diſſertationibus jam ſingulis inſtructa." This work, which conſiſted of the figures of thoſe curious remains of antiquity that he had purchaſed at Rome, and other places, with a diſſertation on each, was followed, in 1747, by "A Treatiſe on the Roman Senate, in two Parts," which terminated Dr. Middleton's labours in profane literature; and he now proceeded to the publication of a treatiſe, which laid the foundation of another fierce controverſy with his clerical brethren. It was publiſhed in 1747, and was "An introductory Diſcourſe on the miraculous Powers ſuppoſed to have ſubſiſted in the Chriſtian Church from the earlieſt Ages, &c." To this numerous anſwers were written, which, however, did not prevent him from proceeding with his plan; and in 1749 he produced the larger work, to which the former was, as it aſſumed to be, only an introduction. This was entitled "A free Inquiry into the miraculous Powers, &c." The main object of the *Inquiry* is to ſhew, that there is no ſufficient reaſon to believe that any miraculous powers did ever actually ſubſiſt in any age of the church, after the times of the apoſtles. The publication of this piece raiſed up againſt him a hoſt of adverſaries, who charged him with the moſt pernicious deſigns. He had, however, the ſatisfaction of knowing that the truth of his argument was generally admitted by almoſt all enlightened and diſintereſted readers. The author ſet about preparing an "Anſwer to all the Objections made againſt the free Inquiry;" which, however, he did not live to publiſh. A few months after his death, the greater part of what he had written was given to the world, under the title of "A Vindication of the free Inquiry, &c." In the ſpring of 1750 he publiſhed "An Examination of the Lord Biſhop of London's Diſcourſes concerning the Uſe and Intent of Prophecy." The deſign of the biſhop's diſcourſes was to ſhew, that there is a manifeſt connection between the prophecies of every age, from the beginning of the world to the commencement of the gospel of Jesus Christ; which chain of prophecies, delivered at different times, and reaching through several thousand years, is yet manifestly subservient to one and the same administration of Providence. Dr. Middleton denied the principle, and laboured to refute the theory of the prelate; maintaining that the authority of the gospel, as far as it is grounded on prophecy, rests on those single and independent predictions, which are delivered occasionally in the law and the prophets, and not on any fanciful scheme of prophecy deduced from Adam and the antediluvian world. Within a few months of the publication of the last-mentioned work, our author's constitution began to give way; and on the 28th of July 1750, he departed this life. His character has been drawn with great accuracy, by the writer of his article in the General Biography, from which we shall extract a few sentences. "That Dr. Middleton was a very learned and ingenious divine, will not be disputed by any one. That he was an ardent lover of truth, as well as steady and disinterested in the pursuit of it, may be fairly concluded from the circumstances of his life above related, the sacrifices which he must have made by adopting and avowing sentiments that at once cut off all his hope of preferment, and the firmness with which he encountered the utmost rage and malice of fierce bigots and hypocritical zealots. That he was a sincere believer in the Christian religion, his own express and repeated declarations sufficiently prove, as well as his concise and admirable exposure of one of its most artful and malignant enemies, in his "Letter to Dr. Waterland," and his devoting many of his learned inquiries to its service. His faith he acknowledges was not of that kind which can easily digest incredibilities, but only a principle grounded on the perception of truth, and claiming no other merit than that of being a slave to his reason, to whose dictates it paid an absolute and unreserved submission. Confined within these just limits, however, it produced the noblest fruits, in a life spent in habits of temperance, study, and the search after truth; and which, in other respects, likewise, was as exemplary and agreeable to the rules of the gospel, as that of the most zealous of all his orthodox opponents." There were found among his papers, after his death, materials for a life of Demosthenes, correspondent to that of Cicero. In 1752, his "Miscellaneous Works" were published in four volumes, 4to. of which a second edition was published in five volumes, 8vo.

MIDDLETON, in *Geography*, an interior township, in Essex county, Massachusetts, incorporated in 1728, and containing 598 inhabitants; 20 miles N. of Boston.—Also, a city, post-town, and port of entry of Middlesex county, pleasantly situated on the western bank of Connecticut river. Its public buildings are a Congregational church, an Episcopalian church, a court-house, and naval office. It contains about 500 houses, and carries on a considerable trade.

MIDDLETON, a post-town of the county of Cork, Ireland, which was a borough before the union, and which, from its proximity to Cork harbour, has some business, chiefly carried on at the village of Ballinacurra, about a mile distant. Here are an endowed school, a barrack, two bolting mills, and a brewery. The parish, from a union made several years ago, is one of the most valuable in Ireland, being above 3000*l. per annum.* Middleton is 121 miles S.W. from Dublin, and 12 miles E. of Cork, on the road to Youghel.

MIDDLETON, a market-town and parish in the hundred of Salford, and county palatine of Lancaster, England, was first constituted a town in the year 1791, since which time it has been gradually increasing in extent and population. The market is held on Friday every week, in a very commodious market-place, laid out by lord Suffield, who is lord of the manor. The government of the police here is confided to two constables, who are chosen annually at the court-leet. In the church, a venerable pile of building, are several monuments of the Assheton family, who for many centuries were resident in this parish. The side aisles of this edifice are embattled; and in the windows appear some stained glass of shields, and other devices. A carved screen of seven compartments divides the chancel from the choir. It is ornamented with a great profusion of armorial bearings of the Asshetons, Radcliffes, Grosvenors, and Stanleys. The living is a rectory. Here is a free grammar school, which was founded by Dr. Alexander Nowel, dean of St. Paul's, and principal of Brasen-nose college, in 1572. This is now a most respectable establishment, and frequently contains between 150 and 200 scholars. Dean Nowel was educated at this place. See Charton's interesting Life of Nowel, 8vo. 1809.

The chief support of this town is derived from its cotton manufacture; but there are likewise a considerable twist manufactory, and some bleaching works. The population here, in 1801, according to the parliamentary returns of that year, amounted to 3265 persons. Beauties of England and Wales, vol. ix. by J. Britton.

MIDDLETOWN, a township of America, in Strafford county, New Hampshire; about 40 miles N. by W. of Portsmouth.—Also, a township of Rutland county, Vermont; 39 miles N. of Bennington.—Also, a township in Delaware county, New York; 40 miles W. of Catskill.—Also, a township in Newport county, Rhode island, containing 931 inhabitants. In the town, situated on the island which gives name to the state, about two miles from Newport, is a large cavity in the rocks, called "Purgatory."—Also, a town of about 60 or 70 houses in Berkley county, Virginia, near the North mountain: it has two churches, one for Presbyterians, and one for Baptists.—Also, a small post-town in Newcastle county, Delaware, on Apaquinimy creek; 21 miles S.S.W. of Wilmington.—Also, a township in Monmouth county, New Jersey, which contains two places of worship, one for Baptists, and one for the Dutch Reformed church, and 3226 inhabitants. The salt-works are in North river, which divides this town from Shrewsbury. Here is an academy of 40 or 50 students. The light-house on the point of Sandy-beach is in this township. The high lands of Navesink, which are on the sea-coast near Sandy-beach, are 600 feet above the level of the water, and are the lands first discovered by mariners in this part of the coast.—Also, a flourishing post-town in Dauphin county, Pennsylvania, on the north-west side of Swatara creek, which discharges itself into the Susquehannah, two miles below: it contains a German church, and more than 100 houses, and carries on a brisk trade with the farmers in the vicinity. It is estimated that 200,000 bushels of wheat are brought down the river annually to the landing-place, two miles from the town; 92 miles W. by N. from Philadelphia. N. lat. 40° 12′. W. long. 76° 44′. There are also two other townships of the same name in this state; one in Delaware county, and the other in that of Cumberland.—Also, a post-town in Frederick county, Maryland; nearly 8 miles W.N.W. of Frederickstown.—Also, a town in Dorchester county, Maryland; 8½ miles N.W. of Cambridge.

MIDDLEWICH, a considerable market-town in the hundred of Northwich, and county of Chester, England, is situated at the conflux of the rivers Croco and Dane, about 6 miles from Northwich, 22 from Chester, and 167 from London. Its name was derived from its centrical situation between the Wiches, or Salt Towns, of which there are three in the county; and its origin has been supposed to be as remote as the time of the Romans; the road to it from Northwich being mentioned by Camden, as raised with gravel to such a height as to be readily known for a work of that people. The church is a spacious structure, and includes two chapels. On the south side is a college, founded by Thomas Savage, archbishop of York. The government of the town is vested in a bailiff and burgesses, annually chosen. Under the population act of 1800, the number of houses was returned as 268, occupied by 1190 persons. Considerable employment is derived to the inhabitants from the manufacture of salt, which has been carried on in this town from a very early period; very valuable brine springs being found in the town and its vicinity. A cotton manufactory has been recently established here. A grammar school was founded at Middlewich about the end of the 17th century: the school-house was given by Ralph Lowndes. Markets are held on Tuesdays and Fridays, and two fairs annually. The parish of Middlewich is very extensive, and comprises 15 townships. One of these, Kinderton, has been decided by Mr. Whitaker to be the Condate of the Romans. Lysons's Magna Britannia, vol. ii. Beauties of England and Wales, vol. ii.

MIDDLING-Teeth, in the *Manege*, are the four teeth of a horse that come out at three years and a half, in the room of other four foal-teeth, seated between the nippers and the corner-teeth; from which situation they derive the title of *middling*. There is one of them above, and one below, on each side of the jaws. See Teeth.

MIDERFELS, in *Geography*, a town and castle of Bavaria; 12 miles N.E. of Straubin.

MID-FEATHER, in the English *Salt-works*, the name given to a sort of partition placed in the middle of the furnace, over which the pan is set for boiling the sea-water or brine into salt.

This partition divides the body of the furnace into two chambers. See Salt.

MID-HEAVEN, *Medium cœli*, in *Astronomy*, is that point of the ecliptic which culminates, or is in the meridian. See Culmination.

MIDHURST, in *Geography*, a market-town in the hundred of Eastbourne and county of Sussex, England, is pleasantly situated on an eminence, surrounded by several small hills, and watered by the river Arun. The petty sessions for the hundred, and a weekly market on Thursdays, are held here. In the town is a free grammar school. The church is in the patronage of lord Montague. According to the parliamentary returns of 1801, this town contained a population of 1073 persons, of whom thirty-one only were engaged in agriculture, and 194 in different departments of trade.

Adjoining to the town is a plot of ground, called the *borough* of Midhurst, which has the privilege of sending two members to parliament; though, like the borough of Old Sarum, not a single house stands within its limits. The situation of the burgage tenures, however, is distinctly marked by large stones set up for that purpose. This place possesses its privileges as a borough by prescription, having been the scite of a town of considerable importance previous to the Norman conquest. The governing officers here are a steward and bailiff, who are chosen annually at the court leet of the manor, and exercise jurisdiction over the town.

Gale and Stukeley regard Midhurst as the Miba of Ravenna, from a tortuous etymology of its name; but Camden considers the opinion of these antiquaries on this subject as wholly devoid of probability, all the MSS. being against them.

In a park, at a short distance from the town, stand the ruins of Cowdray house, which was formerly the seat of the ancient family of Montague. This noble edifice was destroyed by fire in 1793, when most of the furniture and valuable paintings which it contained were consumed. It was an immense building, of a quadrangular form, with a court in the centre, which was ornamented with a fine reservoir of water. An account of this house, with views of it, were published in the Vetusta Monumenta, by the Society of Antiquaries; but it is to be regretted that the history of the town has never been laid before the public. Our chief authority for this article is Hay's History of Chichester, 8vo. 1804, which is very unsatisfactory.

MIDIAH, a town of European Turkey, in Romania, on the Black sea; 69 miles E. of Adrianople.

MIDIAN, *Land of*, or *Midianitis*, in *Ancient Geography*, a country inhabited by the Midianites, who were the descendants of Abraham by Keturah, and who were seated on the N. of the Amalekites; having the Dead sea on the W., the Ishmaelites on the E., and the Moabites and Reubenites on the S.; the river Arnon parting them from this last tribe. Their country was hot, sandy, and in many parts of it quite desert; yet it abounded with cattle, particularly with camels, which were useful beasts of burden for their caravans, with which they traded into Egypt in the time of the patriarch Jacob. The land of Midian was divided into a kind of pentarchy, or five kingdoms, in the time of the Exodus; so that the Israelites, in the war which they waged with the Midianites, are said to have slain its five kings, whose capitals are supposed to have been situated near the Dead sea. They had also a famous metropolis, called after the name of their progenitor, often mentioned in the prophetic books of scripture, as well as by other authors; particularly by Josephus, who places a town of that appellation near the Red sea, not far from the spot where Ptolemy places that of Madiana. (See Madian.) Besides these towns, there were in this country Dibon-Gad, a large town on the river Arnon, and Almon-Diblathaim, not far from it, Beeroth, so called from its many wells, and some others, placed by geographers within the Midianitish territories. As to the city of Midian, it is probable that they rebuilt it, after the havock committed upon them by the Israelites, because Eusebius and St. Jerom, who place it on the river Arnon, eastward of the Dead sea, and south of Ar, or Areopolis, inform us, that in their time some remains of it were visible.

MIDIANITES, in *Ancient History*, derived their origin and name from Midian, the fourth son of Abraham by Keturah. He, as well as the rest of his brethren, having received a portion from their father, were sent into the East country, that they might be at a proper distance from Isaac. The Midianites, in early times, were confounded with the Ishmaelites (see that article); and many ages afterwards they are mentioned in conjunction with the Nabatæans and Kadarenes, the posterity of Nabioth and Kadar, the sons of Ishmael. We also find them so incorporated with the Moabites, that Moses seems to have regarded them as almost one nation. Their religion was the same, and they acted in the strictest concert together against him and the Israelites. They were likewise united by ties of blood with these nations, as on the one side they were descended from Abraham, and on the other from Lot; and, moreover, as they happened to live in the northern and southern parts of their country, they joined either the Moabites or the Ishmaelites. The Midianites were a very numerous race, and

and may be diftinguifhed into two claffes, *viz.* fhepherds and merchants. The fhepherds moved here and there in tents, and drove their cattle before them; even when they went to war. The merchants alfo travelled from place to place in companies or caravans, as the merchants of thofe parts do at this day, and left the care of their cattle to the women. The former had probably no fixed habitations, except fome ftrong holds near their borders; the merchants alfo had few or none but marts or ftations, in places convenient for their trade. Thefe, by exchanging their gold and jewels with their brethren for their cattle, enriched the fhepherds with precious ornaments. Their manners refpectively differed according to their mode of life; but they are in general reprefented as being very fumptuous in their apparel. (See Judg. viii. 26.) From the book of Job (ch. xix. 23, 24.) we learn, that the ufe of writing was known at an early period in thofe parts among the defcendants of Abraham; and the Midianites being of the number, we may reafonably fuppofe, could not have been unacquainted with it. They muft alfo have had fome knowledge of arithmetic, and alfo of fhip-building; fo that we may extend the circle of their fciences beyond writing and arithmetic, and allow them a competent fkill in geography, geometry, and aftronomy. The Midianites varied in religion as much as in their manner of life. In the north of Midian they appear in the days of Mofes to have been addicted to all the abominations of the Moabites; but in the fouth we find that they were attached to a rational and fublime fyftem, long after their brethren had funk into the groffeft corruption. The government of the Midianites is reprefented rather as ariftocratical than monarchical. Their chiefs, however, are ftyled kings. The moft ancient account of this nation that occurs, after what we have already ftated, is that of their war with Hadad the Horite, when Midian was fmitten by him in the field of Moab. The next is that of their purchafing Jofeph from his brethern for twenty pieces of filver, and carrying him away with them into Egypt. See the article Joseph.

Many years after this event there lived in Midian, near the Red fea, a prieft or prince of the fouthern Midianites, called Jethro; whofe daughters were molefted by fome fhepherds, and prevented from procuring water for their father's flocks. On this occafion Mofes, who in his flight from Pharaoh had arrived in Midian, interpofed on behalf of thefe females, and caufed the fhepherds to retire. In confequence of this feafonable act of kindnefs, Mofes was invited to the houfe of Jethro, who gave him one of his daughters in marriage, and kept his fon-in-law with him forty years. (See the article Moses.) When Mofes overcame Sihon the Amorite, the Midianites were at enmity with Ifrael; at leaft thofe who bordered upon the Moabites; and they feem about this time to have been very active in feducing the Ifraelites from the worfhip of God to idolatry. The Jewifh lawgiver, however, made preparation for invading their country, and they fortified their caftles and combined all their ftrength in order to refift the enemy. Their efforts were unavailing; as they were defeated with great flaughter, and all their cities and caftles were laid in afhes, and their country plundered and defolated. About 150 years after this flaughter of the Midianites, two kings, named Zebah and Zalmunna, appeared as their conductors in a war againft the Ifraelites; and they were joined by the Amalekites and Arabians. The deftruction occafioned by thefe combined forces continued for feven years; and the Ifraelites were compelled by the ravages of the plains and by want of fuftenance, to retire to the mountains, and fhelter themfelves in caves and fortreffes. Gideon, however, exerted himfelf for the refcue of his country; and his efforts were fo fuccefsful, that the Midianites never afterwards prefumed to contend with Ifrael. They were, however, a powerful nation many ages after this event, as well as famous for their induftry, riches, and the magnificence of their tents; but in the firft century of the Chriftian era their name funk into difufe, and was fwallowed up by that of the more powerful people of Arabia. Between 3 and 400 years ago there was a ruined city, which bore the ancient name, in the neighbourhood of which they pretend to fhew the place where Mofes watered his father-in-law's cattle. Abulfeda calls it Medyan, and Mofes's father-in-law, Shoaib; and the place is ftill one of the ftations in the pilgrimage from Egypt to Mecca, under the name of Shoaib's cave. Anc. Un. Hift. vol. ii.

MIDNAPOUR, in *Geography*, a river of Hindooftan, fituated partly in Bengal, and partly in Oriffa; bounded N. by Burdwan and Pachete, E. by Biffunpour and Hoogly, S. by Mohurbunge, and W. by Allahabad, about 110 miles long, and from 30 to 40 broad. The capital of the fame name is a town of Bengal; 60 miles W. of Calcutta. N. lat. 22° 28′. E. long. 87° 27′.

MIDNIGUNGE, a town of Hindooftan, in Oude; 25 miles N. of Allahabad.

MIDNOI. See Copper *Ifland.*

MIDNYPOUR, a town of Hindooftan; 35 miles N.E. of Benares.

MIDONNO, a town of Japan, in the ifland of Niphon; 85 miles N.N.W. of Jedo.

MIDRIFF, in *Anatomy*. See Diaphragm.

MIDSAMA, in *Geography*, a town of Japan, in Niphon; 12 miles N.E. of Tomu.

MIDSHIP, is a term of diftinction, applied by fhipwrights to feveral pieces of timber which lie in the broadeft part of the veffel, called the *midfhips*, although it is not in the middle of her length with regard to the breadth; it is a fuppofed line from the ftem to the ftern-poft.

Midship-*Beam*, is the beam upon which the extreme breadth of the fhip is formed, and which is fituated in the midfhip frame, nearly in the middle of her length, ferving as a ftandard from whence the dimenfions and proportion of the maft and yards are to be taken. See Beam.

Midship-*Frame*, is a name given to that timber, or combination of pieces, formed into one timber, which determines the extreme breadth of the fhip, as well as the figure and dimenfion of all the inferior timbers.

Midship-*Men*, are officers on board a fhip of war, whofe ftation, when they are on duty, is, fome on the quarter-deck, others on the poop, &c.

Their bufinefs is, to mind the braces, to look out, and to give about the word of command from the captain, and other fuperior officers. They all affift, on occafion, both in failing the fhip, and in ftowing and rummaging the hold; and in performing the neceffary bufinefs of the veffel, either aboard or afhore. The number of midfhip-men, like that of all other officers, is always in proportion to the fize of the fhip to which they belong. Thus a firft-rate man of war has twenty-four, and the inferior rates a fuitable number in proportion. No perfon can be appointed a lieutenant, without having previoufly ferved two years in the royal navy in this capacity, or in that of mate, befides having been at leaft four years in actual fervice at fea, either in merchant fhips, or in the royal navy.

MIDSUMMER-Day, is the feftival of St. John the Baptift, held on the 24th of June. See Quarter-*Day*.

MIDWAY, in *Geography*, a town, or rather a village, of America, in Liberty county, Georgia, 10 miles N.W. of Sunbury.

Sunbury. Its inhabitants are descendants of emigrants from Dorchester, near Boston, who migrated in 1700.—Also, a township of Rutland county, Vermont; E. of and adjoining Rutland.

MIDWIFE, a woman employed in assisting women in child-birth. Johnson supposes it to be derived from a Saxon word, meaning mead, or reward. As the practice of midwifery was entirely confined to women, until very lately, we have no term by which to denominate a male practitioner, but the barbarous compounded one, man-midwife. Had a more significant term been found for the women, we might have used it as we have the word author, from which we have made authoress, a female writer; though we think Johnson neither admits that word, nor the word man-midwife into his dictionary. The Romans, entertaining, perhaps, a more favourable opinion of the capacities of women, have the word autrix, a female writer, from auctor, which seems to justify us in the use of the word authoress. The French, more fortunate, call a midwife an accoucheuse, from the verb accoucher, to put to bed, and the male practitioners, accoucheurs; a term which we have now pretty generally adopted.

MIDWIFERY is the art of delivering women of their young. It must be nearly coeval, as a practice, with the creation. At first it was very simple, and consisted solely in the knowledge of the method of dividing the navel-string. Animals usually bite it asunder with their teeth. Women, probably, first made use of the sharp edge of a stone, or of a shell, for the purpose, which is the mode still practised in barbarous countries. As difficulties would occasionally occur, either in the exclusion of the fœtus, or of the placenta, or after birth, some female friend, or relative, would be called upon to give assistance. If the placenta happened to be detained beyond the usual time, which is one of the most ordinary accidents in labours, the assistant would naturally attempt to draw it away by the funis, which she would find hanging from the pudenda. If a leg or arm of the fœtus presented, instead of the head, she would, doubtless, take hold of the presenting part, and endeavour by that means to draw the child from its confinement. In these attempts, if it should be one of the lower limbs that presented, her exertions would generally be crowned with success; but as the obstacle making assistance necessary, supposes a relative disproportion between the birth and the passage through which it is to pass, the child would usually be dead born. On the other hand, if an arm presented, the same success would attend the exertions of the midwife in a few cases only; as in premature birth, or where the child happened to be remarkably small. It would more commonly happen, that all attempts to bring the child in that posture would fail; but the uterus persisting to exert itself, or, in other words, the labour-pains continuing, they would sometimes thrust down the feet, or the breech of the child, the head and shoulders gradually receding, and rising upwards, and it would at length be forced into the world in that position. In these cases, though the child would be dead, the woman would frequently recover. It would more often happen, that this evolution would not take place, and that the woman, exhausted by long continued and fruitless exertions, bruised and injured by the pressure of the fœtus, and tormented by the distention of her bladder, no egress being allowed to the urine, would fall a sacrifice to the pressure of so many accumulated evils.

Some of the earliest means made use of in tedious and difficult labours, appear to have been, anointing the pudenda with oils, and putting the woman into warm baths, as we find it recommended by Hippocrates, Avicenna, and other ancient writers; by these means they hoped to relax the parts, and render them more easy of distention, and thence to procure a freer passage for the fœtus. This continued to be the practice for many ages.

From examining the little that has been written by the ancients on the subject, it is evident they had no knowledge of that species of obstacle to the birth of the child, which is occasioned by the mal-conformation of the bones of the pelvis of the woman. They attributed the whole of the difficulty to a rigidity of the muscles, or of the ligaments connecting the bones of the pelvis together, which they hoped by these means to loosen.

Hieronymus Mercurialis, who flourished about the middle of the sixteenth century, tells us, it was not unusual to put women on a course of bathing and anointing several weeks before they attained to the period of parturition. Speaking of what is to be done, prior to the labour, he says, "Utatur balneis aquæ dulcis, in quibus herbæ laxantes et emollientes coquantur. Inungatur etiam eodem tempore, dorsum, et pecten, similiter loca muliebria iis linimentis, quæ possunt emollire, et lenire." (De Morb. Mul. lib. ii.) Another custom which was probably only practised among the common people, was placing the parturient women in an erect posture, that they might profit by the weight of the fœtus, and shaking them strongly; thinking, probably, that the child would drop down, as fruit falls from the tree.

"Alii," Moschiou says, (Harm. Gynæc. p. 11.) "ad scalas ligabant, et sic pendere jubebant; alii infinitum deambulare et salire cogebant; alii scalas ascendere; alii autem, manibus sub axillis missis, a terra sublevabant, et diutius exagitabant." Hippocrates had long before, and probably with the same view, recommended in cases where the head of the child presented, but on account of the straightness of the passage was detained above the brim of the pelvis, to anoint the parts, and to put the woman into a bath of warm water. These methods failing, the head of the child was to be opened with a scalpel, and then to be extracted with a strong iron pincers, or hooks. "Caput gladiolo dissectum. Instrumento quod constringat comminuto, et ossicula per ossium volsella extrahito, aut unco attractorio ad claviculam uti firmiter adhæreat immisso, non confestim, sed paulatius remittendo, et rursus adurgendo, extrahito." (Hip. Oper. Om. Fœsio. p. 618.) Celsus recommends a similar practice, (lib. vii. cap. 29. De Medicina.) Avicenna mentions a kind of fillet that was used in these cases. (See the article **Fillet.**) This contrivance, although it had a few favourers, was never in general use; the more common method in tedious and difficult births was to diminish the bulk of the child, or of the part nearest to the external surface, with scalpels, or other cutting instruments, and then to draw it away with iron hooks, pincers, or forceps, armed with teeth. Those who wish to see the forms of these instruments, or a more particular account of the methods of applying or using them, may consult Albucasis's Methodus Medendi, lib. ii. and Ruett, De Conceptione et Gen. Hominis, in which many of them are particularly delineated and described.

As cases of such difficulty as to render the use of instruments necessary are rare, not occurring oftener than once in five or six hundred labours, and as the practice of midwifery was for many ages, indeed so late as to the end of the sixteenth century, almost exclusively in the hands of women, it is not to be wondered at, that little improvement was made in the method of assisting women in the only cases that would come under the care of the surgeon, until a very late period. Hippocrates having learned that in ordinary births the child presented with its head to the orifice of the womb, thought that in all cases, when it offered in a different posture,

posture, it ought to be pushed back, in order to bring down the head. This he attempted to do even when the breech or the feet came first. If an olive, he says, comes into the neck of a bottle across, and you attempt to bring it through in that posture, you will either crush the olive, or break the glass; but as it is of little consequence which of the ends of the olive comes first, he should have seen, that it is nearly equally immaterial which end of the child comes first. This, however, does not seem to have occurred to him, and as his name was of great authority in every thing relating to medicine, his rules continued to be followed until the middle of the sixteenth century. Ambrose Parey, who flourished about that time, first recommended turning the child and bringing it by the feet in all cross presentations. This may be considered as the first material improvement that had been made in the practice of midwifery. The rule was further explained and extended by his pupil Guillemeau, and afterwards by Mauriceau, Le Motte, Peu, Puzos, and other French writers, and it has long since been adopted by the practitioners in the art in every part of Europe, not only in cross-births, but in all cases of flooding, in whatever posture the child may present, also when the funis umbilicaris comes down before the head of the child, and by some surgeons, as we shall see by and by, in cases where the forceps or lever are now ordinarily used.

A few years before Ambrose Parey's book appeared, Eucharius Rhodion, a physician of Frankfort, published the first popular work that we are acquainted with on the subject. As it was intended for the instruction of the midwives, it was printed at first in the German language. In 1532, it was translated into Latin, under the title of "De partu hominis," and in a few years after, into French, English, and other modern languages. The practical rules recommended by him, are such as he had learned from Hippocrates, Avicenna, and other ancient writers. In cross presentations, the midwife was to endeavour to bring down the head; when this could not be effected, if the breech, or feet, were next the uterine orifice, the child was to be allowed to come into the world in that posture, taking, however, especial care, he says, that the hands should be brought down, and placed one on each side of the body of the child, a rule which could not possibly be followed, and which shews that the writer had never practised the art. The same censure may be passed upon almost every regulation, that had been hitherto promulgated on the subject. Nearly all of them tending rather to mislead, than to inform the practitioner, and to increase rather than diminish the pain, difficulty, and danger of the labour.

We have two translations of Rhodion's book into our language. The first by Richard Jones, who dedicated it to Katherine, queen to king Henry VIII. It was printed in the year 1540, and is decorated or illustrated with some indifferent engravings on copper, which, however, are esteemed, as being the first specimens of the kind executed in this country. In 1545, Thomas Raynold, physician, published a second translation. This has passed through several editions, under the title of "The Birth of Mankind," and was nearly the only manual used by the midwives until the year 1672, when Dr. Hugh Chamberlen gave a translation of Mauriceau's "Treatise on the Art of Midwifery," in which the first dawning of a rational practice of the art appears. In the preface to the translation, Dr. Chamberlen announces an invention, "known only," he says, "to his father, brothers, and himself, with which they were enabled to terminate the most difficult labours, without injuring either the mothers or the children." Though he gives no intimation by which it could be discovered what were the means used for the purpose, yet it was in time found out to be the forceps. The merit of the invention consisted in making the blades of the instrument separable, and capable of being locked, or united together, after being introduced into the vagina, and placed one on each side of the head of the child. (See the article FORCEPS, in *Midwifery.*) A most invaluable discovery, and which has deservedly immortalized the inventor. (See CHAMBERLEN, HUGH.) But he at first very much overrated their power, imagining that they were applicable in all cases, where the head of the child was "enclavée," or fixed in the pelvis, not having met with a case, we may suppose, where the bones forming that cavity were considerably distorted. Accordingly he undertook to deliver a woman whose pelvis was so contracted and narrow, as to render it impossible that the head of a full grown fœtus should pass through it undiminished. The operation, or trial, which was performed at Paris, where he went with the view of selling his secret, failed. Mortified at the check he received, he left the country, and went to Amsterdam, where he is said to have sold the secret to Roonhuysen, a surgeon in great practice in that city, who has the credit of having invented the lever which bears his name. See that article.

About the same time Deventer, an eminent surgeon of a town in Holland of that name, acquired considerable fame by his practice in the obstetric art. As the form, as well as the manner of using the forceps and lever were kept secret by the proprietors of those inventions, or only disclosed to persons who would pay a large sum of money for them, Deventer declaimed violently against the use of instruments, affirming he could terminate the most difficult labours with his hand alone. He contended that the greatest obstacle to the birth of the child arose from the oblique position of the uterus, its fundus falling too much forward, or to one side of the abdomen of the mother. The head of the child was therefore forced by the pains, ether against the sacrum, or against one of the sides of the pelvis, instead of being directed into the centre of that cavity. In all cases of difficulty, if the head of the child was not forced down so low as to render it impracticable, he passed his hand into the uterus, turned the child, and delivered it by its feet. When that could not be done, he introduced his left hand into the back part of the vagina, and gradually pushed back the bones of the coccyx, so as to give space sufficient for the head of the child to pass. In cases where the pelvis was distorted, he must necessarily have failed in his attempt, for the same reason that Chamberlen failed with his forceps, but as such cases would only occur once in five or six hundred labours, that small number of exceptions would give little check to his fame, which was continued to his name for many years after his death. This doctrine and practice, which have long since been exploded, were patronized in this country by Mowbray, sir Richard Manningham, and Eaton, who were all averse to the use of instruments.

The construction and use of the forceps being at length made public by Mr. Butter in the third volume of the Medical Essays in 1732, and more fully by Chapman in 1734, and that of the lever by M. Preville, in his translation of Smellie's Midwifery into French, published at Paris, in 1754, the teachers of the art were careful in instructing their pupils in the method of employing those instruments, which have entirely superseded the rude practice of Deventer. The *perforator* and *crotchet* (see those articles) came into use about this time, and continue to be employed in the few cases that require such assistance, in the place of the scalpel, and the forceps with teeth.

Practitioners in the art being now possessed of such powerful

erful affiftants, it was to be feared they might be induced to have recourfe to them for the purpofe of accelerating the labour, in cafes where there were only fuch obftacles as in a moderate fpace of time would be overcome by the pains. Cautions againft this fafcinating practice are found in all the late treatifes on the art. Smellie, who had a larger fhare of practice, and who inftructed a greater number of pupils than any other profeffor in his time, is frequent in his admonitions againft ufing art, other than in aid of nature, where fhe is abfolutely and decidedly incompetent to the completion of the labour. How feldom alfo this happens, he is careful to inform them. He very much fimplified the form of the forceps, and that they might not be ufed before the head of the child had defcended fufficiently low in the pelvis, he confiderably reduced them in length; he alfo contrived a method of locking them, much more convenient than had been before ufed. Before he retired from the practice, in which he introduced feveral valuable improvements, he publifhed, in 1752, "A Treatife on the Theory and Practice of Midwifery," which contained the fubftance of every thing that was ufeful, that had been printed on the fubject, as well as the refult of his own extenfive practice. This was followed by a fet of plates, in large folio, correctly drawn and well engraved, illuftrating his practice. Soon after he publifhed two volumes of cafes, arranged in claffes, referring to his treatife, and fhewing the efficacy of the rules he had there inculcated.

While Smellie was making large ftrides toward improving every part of the practice of midwifery, and bringing it to perfection, Levret, and various other writers on the continent, were exerting themfelves in a fimilar manner, and with perhaps equal felicity. In the mean while, hofpitals and other inftitutions were formed, for the reception of parturient women. As the management and care of thefe were under the immediate direction of the phyficians and furgeons, and the opportunity which for fo many ages had been wanting, of acquiring an exact knowledge of the procefs of a natural labour, and of the obftacles that occafionally obftructed its progrefs and completion, was now obtained. To this alfo, the change that had been taking place, within fomething more than a century, in the opinions and manners of the public had contributed. Several phyficians and furgeons had, in the courfe of that time, applied themfelves to the practice of midwifery. Hence we find, Mauriceau, Deventer, Ruyfch, Roonhuyfen, our countryman Dr. Chamberlen, and others, enjoying a confiderable portion of practice in the art.

The cuftom of employing men in the place of women, originated among the ladies of the higheft rank in France, and gradually defcended to the middling and lower claffes of the people. The advantages derived from the change, both in the manner of conducting the labour, and in the management of the woman and child after the labour, became fo obvious, that the practice has by degrees fpread over all Europe. That the poor who could not, and a few who from prejudice ftill refufed to employ men, might reap the benefit of the improvements that have been made in the practice of the art, no women are now allowed to engage in the bufinefs, who have not been previoufly inftructed by fome public teacher, and who do not obtain from him certificates of their qualifications. The confequence of thefe arrangements has been, that every part of the art has been inveftigated with the greateft care, and fuch has been the zeal of the profeffors, or perfons engaged in the practice, that the works on the fubject of midwifery, which have been publifhed within lefs than a century, are fufficiently numerous to form of themfelves no inconfiderable library. Thus this art, which was fo late in being cultivated, has already attained a degree of perfection, that puts it on an equality, at leaft, with any other branch of medicine. Of this great mafs of publications, many of them excellent, it may be fufficient to mention, among foreign productions, Puzo's "Traitè des Accouchmens," Baudelocque's "Art des Accouches," Crant's "De Re Inftrumentaria," and the "Opufcula" of Roederer, and of Plenk, which embrace the whole circle of the art. Among our own writers, White "On the Management of Pregnant and Lying-in Women," and Rigby "On Uterine Hemorrhage," have each in their way given directions that are calculated to abide the teft of time. "Obfervations on human and comparative Parturition," publifhed in 1794, may be added, as containing a number of curious and ufeful facts not generally known or attended to. The late Dr. William Hunter's fplendid plates of the human gravid uterus, and not more fplendid than correct, places before our eyes the fœtus at different periods of its exiftence, fhews the pofture in which it lies in the uterus, and the manner in which it is connected with that vifcus; and laftly, Dr. Denman's "Introduction to the Practice of Midwifery," which has already paffed through feveral editions. For comprehenfivenefs and exactnefs, it holds the fame rank now that Smellie's Treatife did at the time when it was publifhed, embracing and explaining, in a luminous and judicious manner, every thing, we believe, that is known on the fubject.

MIEDNIKI, in *Geography*. See MEDNIKI.

MIEDZIAL, a town of Lithuania, in the palatinate of Wilna; 52 miles S. of Breflaw.

MIEDZINECZE, a town of Poland, in the palatinate of Brzefk; 25 miles W. of Brzefk.

MIEDZIRZECZKA, a town of Poland, in the palatinate of Volhynia; 52 miles N.N.W. of Zytomiers.

MIEDZYRZECZ, a town of Lithuania, in the palatinate of Novogrodek; 44 miles W.S.W. of Novogrodek.

MIEDZYRZYCZ, a town of Ruffian Poland, in the palatinate of Kiev; 32 miles W.S.W. of Czyrkafy.

MIEGIA, in *Botany*, appears to have been named by Schreber in honour of two Swifs anatomifts and botanifts, who flourifhed in the beginning and middle of the laft century. Moft probably they were father and fon, but we are not fufficiently acquainted with their hiftory pofitively to affert this. John Rodolph Mieg publifhed his inaugural Differtation on *Chamæmelum leucanthemum* at Bafil, in 1721, which was reprinted two years afterwards. Achilles Mieg publifhed a work in 1751, at the fame place, which he calls *Specimen obfervationum anatomicarum atque botanicarum*, and in this are defcribed fome rare graffes, as well as the genus *Montia*. Schreb. 786. Willd. Sp. Pl. v. 1. 311. Mart. Mill. Dict. v. 3. (Remirea; Aubl. Guian. 44. Juff. 34. Lamarck Illuftr. t. 37.)—Clafs and order, *Triandria Monogynia*. Nat. Ord. *Gramina*.

Gen. Ch. *Cal.* Glume fingle-flowered, of two, ovate, concave, ribbed valves; the upper fhorter and obtufe; the lower fomewhat longer and rather acute. *Cor.* of two, fwelling, ribbed valves; the outer ovate, obtufe, within the lower calyx-valve, and longer than it; the inner oblong, compreffed at the top, rather acute, with folded margins, longer than the outer, within the upper calyx-valve. Nectary of one leaf, ovate, gibbous at the back, flightly compreffed, acute, fmooth, thick, corky, thinner at the tip and margins, fhorter than the corolla, oppofite to its inner valve, enclofing the germen. *Stam.* Filaments three, capillary, longer than the corolla; anthers oblong, acute. (Aubl.) *Pift.* Germen oblong, nearly triangular, within the nectary; ftyle fimple, capillary, longer than the corolla; ftigmas two, capillary. *Peric.* none. *Seed* folitary, oblong, triangular, approaching

approaching to globose, wrapped up in the nectary, and inclosed by the permanent calyx and corolla.

Eff. Ch. Calyx of two opposite valves, single-flowered. Corolla of two valves. Nectary of one leaf, enveloping the germen.

Obs. The above generic character was made by Schreber, from the parts of fructification as they were found by him in a dried specimen. The nectary he observes is remarkable. Aublet's character of *Remirea* is very different from that of Schreber's *Miegia*.

1. M. *maritima*. Willd. n. 1. (Remirea maritima; Aubl. Guian. t. 16.)—A native of the sea shores of Cayenne and Guiana, flowering and bearing seed at various times of the year.—*Root* perennial, creeping, long, branched, knobbed, solid. *Stems* about six inches high, branched at their summits, leafy and scaly below. *Leaves* oblong, narrow, rigid, striated, acute, rough at the margin, sheathing at the base. *Flowers* crowded together into a nearly sessile, terminal, short and thick panicle. The *roots*, when bruised or masticated, afford a grateful, aromatic smell, shewing an affinity to the genus *Cyperus*, from which indeed this plant seems to differ chiefly in its solitary florets, and corky nectary.

MJEIBOW, in *Geography*, a town of Lithuania, in the palatinate of Novogrodek; 58 miles W.S.W. of Novogrodek.

MIEKOW, a town of Austrian Poland, in the palatinate of Cracow; said to have been built after the model of Jerusalem by Gripsius Jaxa, after his return from a pilgrimage to that city; 12 miles N. of Cracow.

MIEL, Jan, in *Biography*, a painter, known in Italy by the name of Giovanni della Vite, probably because he chose to disregard the grand style of art in which at first he practised with Andrea Sacchi, and paint common nature and living objects.

He was born in Flanders in 1599, and first learnt to paint under Gerard Segers; but he soon left him, and went to Italy, where he studied the antique and the works of the best masters with great success, and was employed to paint pictures as large as the life for several of the churches in Rome. He had the honour to study in the academy of Andrea Sacchi, then in great repute, and was invited by him to assist in a large picture he was then engaged upon; but they soon disagreed, and Miel left his master in disgust, piqued with a satiric expression of Sacchi concerning his talent for painting *bambocciate*, or scenes of merriment, drolls, &c. his imagination principally leading to such subjects.

In consequence, he set himself afresh and with increased diligence to study the grand style, and rival Sacchi; but after a time gave it up almost altogether, and painted those subjects for which nature appears to have designed him, with a portion of talent nearly equal to Bamboccio himself. His success was fully equal to his skill, and he filled the cabinets of the nobility of Rome, Florence, and other places, with his ingenious performances.

The lustre of his fame induced Charles Emanuel, duke of Savoy, to invite him to Turin, where he arrived in 1659, and was received by his highness with great respect, and engaged to paint for him several pictures relative to the chase, in which he introduced an immense number of small figures of persons of all ranks, horses, dogs, different species of game, &c. all which he finished so much to the satisfaction of the duke, that he honoured Miel with knighthood, and besides paying him handsomely for his pictures, presented him with a cross ornamented with diamonds of great value.

He remained at Turin six years, during which time he painted a great number of pictures, and at the end of it died of a slow fever, or rather consumption, brought on, Baldinucci asserts, by his uneasiness at not obtaining his patron's permission to revisit Rome.

MIELAN, in *Geography*, a town of France, in the department of the Gers, and chief place of a canton, in the district of Mirande; 6 miles S.S.W. of Mirande. The place contains 1403, and the canton 10,221 inhabitants, on a territory of 272½ kiliometres, in 29 communes. N. lat. 43° 25'. E. long. 0° 23'.

MIELEC, a town of Poland, in the palatinate of Sandomirz; 56 miles S.W. of Sandomirz.

MIELNICK, a town of Poland, in the palatinate of Bielsk; 44 miles S.W. of Bielsk.

MIEN, a town of China, of the second rank, in Setchuen; 56 miles W. of Pao-king. N. lat. 51° 28'. E. long. 104° 29'.

MIEN-TAM-KEOU-TOUKA, a town of Chinese Tartary. N. lat. 41° 1'. E. long. 119° 42'.

MIEN-YANG, a town of China, of the second rank, in Hou-quang. N. lat. 30° 12'. E. long. 112° 49'.

MIER-CHAS-KUN, a town of Persia, in the province of Farsistan, containing about 400 houses and several bazars, the ruins of Persepolis; 40 miles N. of Schiras.

MIERIS, Francis, in *Biography*, a most admirable painter of the Flemish school, who was born at Leyden in 1635. He acquired the principles of the art under Gerard Dow, who honoured him with the title of prince of his disciples, and this praise he justly merited, for he more nearly approached the purity and delicacy of Dow than any other man has ever done: indeed, in some respects he became viceroy over that king of high and minute finishing, being more agreeable in his designs, and having more correctness in drawing.

He painted portraits with great delicacy, but his general subjects were conversations, persons performing on musical instruments, doctors with their patients, and such like: these he treated with great ingenuity in composition and execution; painting his draperies with so much minuteness, that all the peculiarities of their different textures are visible. Silk, velvet, stuff, carpets, &c. all were not only marked with their general characteristic appearances, but the threads of their texture were made as visible as in nature, and rendered completely deceptive. It is this attention to minutia, united to breadth and truth, which give so much value to his works; which are very rare, and very costly of course. His own valuation of his time was a ducat an hour: and for one picture of a lady fainting, with a physician attending her, and applying remedies, he was paid at that ratio, so large a sum as fifteen hundred florins. The grand duke of Tuscany is said to have offered 3000 for it, but was refused. One of the most beautiful of the works of Francis Mieris, in this country, where they are not very common, is in the possession of Mr. P. H. Hope, and is known by the appellation of the "Shrimp Man." He died in 1681, and is called by connoisseurs the Old Mieris, to distinguish him from his son,

Mieris, William, who of course is called the Young. He was born at the same place as his father, and learned from him the art of painting, till he arrived at the age of 19; when, his father dying, he was left to follow the dictates of his own mind, which happily led him to study nature, and in that study he made a considerable progress towards obtaining an equal reputation with his father.

At first he painted the same subjects as his father, but afterwards, ambitious of a nobler fame, he attempted higher subjects, but not being prepared with proper studies, he did not succeed so happily as his adventurous spirit deserved. He sometimes painted landscapes and animals, and also modelled his figures with very considerable skill. Probably this

this divifion of his time and ftudies operated to prevent his arriving at the fame degree of excellence in minute finifhing as his father: certain it is, that his works will not bear the comparifon, being poor and thin, and wrought by a lefs full, and more timid pencil. He died in 1747, aged 85, and left a fon, Francis Mieris, born at Leyden in 1689, who not having the talent of originality, employed himfelf in copying the works of his father and grandfather; and it is moft likely, that nine out of ten of the works diftributed at fales under the name of Mieris, are the fecond-hand productions of this, the younger Francis.

MIES, or MIZA, in *Geography*, a town of Bohemia, in the circle of Pilfen; 14 miles W. of Pilfen. N. lat. 49° 43'. E. long. 13° 6'.

MIETOU, a town of Sweden, in the government of Abo; 14 miles N.W. of Abo,

MIEZA, a town of Spain, in the province of Leon; 42 miles W. of Salamanca.

MIFFLIN, a county of Pennfylvania, in America, furrounded by Lycoming, Franklin, Cumberland, Northumberland, Dauphin, and Huntingdon counties; containing 1851 fquare miles, 1,184,960 acres, and divided into eight townfhips. The mountains of this county abound with iron ore, and feveral forges have been erected for working it. It is well watered by the Juniatta and other ftreams; it has feveral mineral fprings, and abundance of lime-ftone. This county and Center contain 13,609 people. The chief town is Lewiftown.—Alfo, a fmall town in the above county, on the E. fide of the Juniatta; 12 miles E. of Lewiftown.—Alfo, a fort on a fmall ifland, at the mouth of Schuylkill river; about fix miles S. of Philadelphia.

MIFFLINBURG, a poft-town of Northumberland county, Pennfylvania; 218 miles from Wafhington.

MIGLERE, LA, a town of Italy, in the department of the Po, on the Stura; 24 miles N.N.W. of Turin.

MIGLIAJO, in *Commerce*, a weight and meafure by which oil is fold at Venice: the weight = 40 miri, each being 25lb.: the meafure = 1210lb., or 40 miri, each = $30\frac{1}{4}$lb.: fo that fuch a miri correfponds to about $4\frac{1}{4}$ Englifh gallons.

MIGLIANICA, in *Geography*, a town of Naples, in Abruzzo Citra; 7 miles E. of Civita di Chieti.

MIGLIANO, a town of Naples, in Principato Ultra; 15 miles N.N.E. of Conza.—Alfo, a town of Italy, in the department of the Lower Po; 15 miles E. of Ferrara.

MIGLIAVACCA, GIOVANNI AMBROSIO, in *Biography*, counfellor of legation, and opera poet to the elector of Saxony, king of Poland, author of an opera intitled "Solimano," and of many cantatas performed at Vienna and Drefden. This poet endeavoured to imitate the elegant and natural ftyle of the amiable Metaftafio.

MIGLIONICO, in *Geography*, a town of Naples, in Bafilicata; 9 miles S.W. of Matera.

MIGNANO, a town of Naples, in Lavora; 11 miles N. of Sezza.

MIGNARD, PETER, in *Biography*, an hiftorical and portrait painter, born at Troyes, in Champagne, in 1610. He was the difciple of Vouet, but quitted his fchool at an early period of his life, and went to Rome, anxious to fee and ftudy the works of Raphael, Michael Angelo, and the Caracci. He there lived with Du Frefnoy, and they ftudied together the noble works of art which that city prefented to them; they alfo travelled together to Florence and Venice, that they might leave no fource of improvement unfought which the extraordinary talents of their great predeceffors had prepared and left for their ftudy and imitation.

The refidence of Mignard at Rome, which he prolonged for 22 years, and the ftyle he acquired of compofition and drawing by the imitation of the Roman mafters, together, obtained for him the appellation of the Roman; but to judge candidly, one would imagine that the former was the principal caufe of that denomination; for his ftyle of defign favours too much of the flutter of the French fchool, inftead of the chafte fimplicity of Raphael and the beft of the Romans.

Mignard enjoyed a full fhare of favour and fortune during his life. He painted portraits of the popes Urban VIII. and Alexander VII., together with thofe of many of the nobility of Rome.

Louis XIV., hearing of his fame and abilities, fent for him to Paris, and is faid to have fat to him for his portrait ten times. Almoft all the illuftrious nobles of the French court followed the example of their fovereign, and were painted by Mignard. His ftyle of execution in thefe portraits is wrought up with all the falfe tafte and pompous parade which diftinguifhed that vicious period of the French nation; when parade paffed current for true fplendour; what was only fpecious or fubtle, was received as ufeful and learned; and bombaft affumed the ftation due only to true dignified fimplicity. His pictures are all flutter; every thing feems in motion; even when the fcene is laid in a clofe room, the draperies are flying about as in a high wind. The actions of his figures are in affumed airs, like pompous, and not unfrequently bad actors, and the colouring of his pictures, though frefh and vigorous, is not true, but teinted, and reminds the obferver of the pallette. With thefe defective points in his character as an artift, Mignard is not unworthy of regard. His drawing is correct: his arrangement of parts is ingenious: and his invention fertile. He contrived to make his pictures ornamental, and is the beft portrait painter of the French fchool.

His patron, Louis, ennobled him; and, after Le Brun's death, appointed him his principal painter, and the director of the manufactories of Seve and the Gobelins. He lived to the age of 85, dying in 1695. He had an elder brother, whofe name was Nicholas, a fkilful painter, but who never rofe to equality with him.

MIGNATRICE, LA, *Ital.*, a miniature paintrefs in 1770, the late Mrs. Corri, whofe family name was Bicchelli, then a young and beautiful woman, a profeffed miniature paintrefs, and a brilliant and very pleafing finger at the Academie, or private concert of the nobility and gentry at Rome, where no females are allowed to appear on the ftage, was beft known by the title of La Mignatrice. After her marriage with her finging-mafter, Corri, fhe came with him to Edinburgh in 1772, to fing at the concerts in that city, where he was engaged to direct the concerts, and give inftructions in mufic. They remained at Edinburgh till about the year 1787, when they removed to London, where Mrs. Corri, mother of the accomplifhed Mad. Duffec, died in 1802, much lamented by her family, friends, and all who had heard her fing in the early part of her life.

MIGNONETTE, in *Botany*. See RESEDA.

MIGNOT, STEPHEN, in *Biography*, a learned French ecclefiaftic, a native of Paris, was born in the year 1698. He was brought up to the church, and was admitted to the degree of doctor by the faculty of the Sorbonne, and rendered himfelf eminent for his acquaintance with the facred fcriptures, the fathers, ecclefiaftical hiftory, and canon law. When upwards of fixty years of age, he was elected a member of the Royal Academy of Infcriptions and Belles Lettres. He died in the year 1771, leaving behind him numerous works, of which the following feem moft worthy of notice: *viz.* "A Treatife on Commercial Loans," in four volumes; "The Rights of the State and of the Prince, with Reference to the Eftates of the Clergy," in fix volumes; "The

"The History of the Contest between Henry II., and St. Thomas of Canterbury;" "The Reception of the Council of Trent, in Catholic Countries;" "A Paraphrase on the New Testament," in four volumes; "A Memoir relating to the Liberties of the Gallican Church."

MIGRATION, or TRANSMIGRATION, the passage or removal of any thing out of one state or place into another; particularly of colonies of people, birds, &c. into other countries.

The migration of the souls of men into other animals after death, is the great doctrine of the Pythagoreans, called the *metempsychosis*.

The migration of birds, as the swallow, quail, stork, crane, field-fare, woodcock, nightingale, and other birds of passage, is a very curious article in natural history, and furnishes a notable instance of the powerful instinct impressed by the Creator. Dr. Derham observes two things remarkable in this subject; the first, that these untaught, unthinking creatures, should know the proper times for their passage, when to come, and when to go; as also, that some should come when others go? No doubt, the temperature of the air, as to cold and heat, and their natural propensity to breed their young, are the great incentives to those creatures to change their habitation. But why should they at all change their habitations? and why is not some certain place to be found, in all the terraqueous globe, affording them convenient food and habitation all the year round?

The second, that they should know what way to steer their course, and whither to go. What instinct is it that moves a poor foolish bird to venture over vast tracts of land and sea? If it be said, that, by their high ascents up into the air, they can see across the seas; yet what should teach or persuade them, that another land is more proper for the purpose than this? that Britain, for instance, should afford them better accommodation than Egypt? than the Canaries? than Spain? or any other of the intermediate countries? Physico-Theol. p. 349.

Lud. de Beaufort remarks, that birds, in their migration, observe a wonderful order and polity: they fly in troops, and steer their course through vast unknown regions, without the compass. (Cosmol. Divin.) It is to be added, that the birds of passage are all peculiarly accommodated, by the structure of their parts, for long flights.

Naturalists are divided as to the places whither birds of passage retire when they leave us. Mr. Willughby thinks the swallows fly into Egypt and Ethiopia.

Olaus Magnus says, they lurk in holes, or under water; which is confirmed by Etmuller, who assures us, that he saw a bushel of them taken out of a frozen fish-pond, all hanging together, head to head, feet to feet, &c. in one cluster. (Dissert. ii. c. 10.) Olaus adds, that this is a common thing in the northern countries; and that such a cluster being carried accidentally by some boys into a stove, the swallows, after thawing, began to fly about, but weakly, and only for a little time.

A farther confirmation of this account was given by Dr. Colas, a person very curious in such things, to the Royal Society. Speaking of the way of fishing in the northern parts, by breaking holes, and drawing their nets under the ice, he related, that he saw sixteen swallows so drawn out of the lake of Samrodt, and about thirty out of the king's great pond at Rosineilen; and that at Schlebitten, near a house of the earl of Dohna, he saw two swallows just come out of the waters that could scarcely stand, being very wet and weak, with their wings hanging on the ground. He added, that he had often observed the swallows to be weak, for some days after their first appearance.

Some of our own countrymen have given credit to the submersion of swallows; and Klein patronises this doctrine in his Hist. Av. 205, 206. But they assign no reason, why these birds are capable of enduring so long a submersion without being suffocated, or without decaying in an element so unnatural to them; when we know that the otter, the cormorant, and the grebes soon perish if caught under ice, or entangled in nets; and it is well known, that these animals will continue much longer under water than any others to whom nature hath denied that particular structure of heart, necessary for a long residence beneath that element? Mr. John Hunter, having dissected many swallows, found nothing in them different from other birds as to the organs of respiration; whereas all those animals which he had dissected, of the class that sleep during winter, such as lizards, frogs, &c. had a very different conformation in those organs. He farther adds his opinion, that these animals breathe in their torpid state; and, as far as his experience reaches, he knows they do; and he, therefore, esteems it a very wild opinion, that terrestrial animals can remain any long time under water without drowning.

There is another more probable opinion, with respect to the disappearance of swallows, which has high antiquity to support it. Aristotle and Pliny assert, that these birds do not remove very far from their summer habitation, but winter in the hollows of rocks, and during that time lose their feathers. We have had many instances of some species of swallows having been discovered in a torpid state, on the cliffs of the Rhine, in old dry walls and sand-hills in Scotland, in the chalky cliffs of Sussex, in hollow trees, and lead mines, &c. These several places are supposed to be the lurking habitations of later hatches, or of those young birds that are incapable of distant migrations; where they generally continue insensible and rigid, though, like flies, they may sometimes be re-animated by an unseasonable hot day in the midst of winter. From these facts, it is reasonable to conclude, that, though one part of the swallow tribe migrates, others may have their winter-quarters nearer home. If it should be asked, why swallows alone are found in a torpid state, and not the many other species of soft-billed birds, which likewise disappear about the same time? the following reason, says Mr. Pennant, may be assigned. No birds are so much on the wing as swallows; none fly with so much rapidity and swiftness; none are obliged to such sudden and various evolutions in their flight; none are at such pains to take their prey: and none exert their voice more incessantly; whence they suffer a great expence of strength and spirits, and acquire such a texture of blood, as other animals do not experience; and become thus disposed to a more lasting repose than other birds. But notwithstanding this concession, it is most probable that swallows in general, as well as other birds, migrate from colder into warmer climates, in search of proper food, a sure asylum from man during the time of courtship, incubation, and nutrition, and a temperature of air suiting their constitutions.

The generality of birds that remain the winter with us have strong bills, or are enabled to feed on what they can find at that season; those which leave us have usually very slender bills, and their food is the insects of the fly kind; which disappearing towards the approach of winter, compel them to seek them in regions where they may be found; and the length of the wings of the generality of these birds, enables them to prey flying, if there be food for them

them in their way, and to continue a long time on the wing without reft.

The various conjectures about the places to which they retire, are owing to want of ocular teftimony; but if we confider the vaft tracts of land yet unknown to us, we cannot doubt but there may be many places for them, in which we can have had no opportunities of finding them. But the moft probable conjecture feems, that the places to which they retire lie probably in the fame latitude in the fouthern hemifphere, as the places from whence they depart; where, the feafons reverting, they may enjoy the like agreeable temperature of the air. And, if thefe places are fuppofed to be divided from them by too large feas, why may not fome other parts of the fouthern hemifphere, which are lefs diftant, ferve their turn?

This, certainly, feems much more reafonable than that they fhould remain on our fide of the northern tropic, within a few degrees of which, at the winter folftice, it is fo cold as frequently to produce fnow; which, by difperfing fuch infects as birds that feed upon the wing fubfift on, muft make them perifh, were they not to remove to thofe warmer climates where they may ftill find food. The fwallows, as they cannot fubfift fo long in cold feafons as fome other birds of paffage, which feed, after the difappearance of flies in the air, on what infects they find in their receffes, vifit us later, and depart from us fooner, than the reft. The nightingales, and fome other birds, which leave us for the winter, are feen, fometimes, a month after the fwallows; and from the whole it feems natural to infer, that the fwallows pafs the tropic of Cancer, though it is not yet known to what place they at length retire.

The manner of the birds of paffage journeying to their fouthern abode may vary, according to the different ftructure of their bodies, and their power of fupporting themfelves in the air. Thofe birds with fhort wings, fuch as the redftart, blackcap, &c. though they are incapable of fuch long flights as the fwallow, or of flying with fo much celerity, yet may pafs to lefs diftant places, and by flower movements. Swallows and cuckoos may perform their paffage in a very fhort time; but there is for them no neceffity for fpeed, fince every day's paffage affords them an increafe of warmth, and a continuance of food.

Providence, which has guided the defencelefs animals in many other inftances to the fafeft methods of performing their neceffary works, may have inftructed many of thefe birds which have fhorter paffages to make, or places to ftop at by the way, to fly only in the night, that they may be fecure from the birds of prey; and Mr. Catefby gives a proof that fome fpecies do fo, from his own obfervation; for, lying on the deck of a floop on the north fide of Cuba, himfelf and the whole company heard fucceffively, for three nights, flights of rice birds, which are eafily diftinguifhed from all other birds by their notes, and which were paffing over their heads northerly; which is their direct way from Cuba, and the fouthern continent of America, from whence they get to Carolina, annually, about the time that rice begins to ripen, and from whence they return fouthward again, when it is gathered, and they are become fat.

That this is the cafe alfo with fome fpecies of fwallows, has been proved beyond contradiction by M. Adanfon, Hift. de Senegal, p. 67. We often obferve them collected in innumerable flocks on churches, on rocks, and on trees, previous to their departure hence; and Mr. Collinfon proves their return here, perhaps, in equal numbers, by two curious relations of undoubted credit; the one communicated to him by Mr. Wright, mafter of a fhip, and the other by the late fir Charles Wager; who both defcribed to the fame purpofe what happened to each of them in their voyages. "Returning home," fays fir Charles, "in the fpring of the year, as I came into foundings in our channel, a great flock of fwallows came and fettled upon my rigging: every rope was covered; they hung on one another like a fwarm of bees; the decks and carving were filled with them. They feemed almoft famifhed and fpent, and were only feathers and bones; but being recruited with a night's reft, took their flight in the morning." This apparent fatigue proves that they muft have had a long journey, confidering the amazing fwiftnefs of thefe birds; fo that in all probability they had croffed the Atlantic ocean, and were returning from the fhores of Senegal, or other parts of Africa.

The fhort-winged birds are fuppofed little qualified for long flights, particularly the quail, which is a bird never feen long together on the wing, or making any long flights; its not doing this frequently is, however, no proof that it is not able to do it; nor does the ftructure of its body at all befpeak its inability; and Bellonius affirms, that he faw them in great flights paffing over, and repaffing, the Mediterranean fea, at the very feafons when they leave us, and they return again. The fame inftinct that directs thefe birds to depart to diftant countries, doubtlefs alfo directs them to the fhorteft way, and fends them to the narroweft cuts, not the wider feas, to crofs.

Among the birds of paffage, we have fome alfo which come to us in the autumn, at the time when the fummer birds are leaving us; and go from us again in the fpring at the times when thefe return: thefe, however, are only four kinds; the field-fare, the redwing, the woodcock, and the fnipe; and of thefe the two laft often continue with us through the fummer, and breed; fo that the two firft feem the only kinds that certainly leave us at the approach of fpring, retiring to more northern parts of the continent, where they live the fummer, and breed; and, at the return of winter, are driven foutherly from thofe frigid climes, in fearch of food, which there the ice and fnow muft deprive them of. There are many others alfo, particularly of the duck, or wading kind, that breed and make their fummer abode in the defolate fenny parts of our ifland; and when the feverity of our winters deprives them of their food, neceffity forces them to retire towards the fea in numerous flights; where they find water unfrozen, and where they remain till the return of fummer; but thofe cannot properly be called birds of paffage.

It feems pretty evident from the whole, that the fummer birds of paffage leave us only in fearch of a more warm climate, and a greater plenty of food; both which advantages they procure to themfelves by their alternate change of climate; but the migration of the winter birds of paffage is not fo eafily accounted for, fince there is no fuch apparent neceffity for their leaving us, either on the fcore of food or climate. The place of the fummer retirement of thefe birds is Sweden, and fome other countries in that latitude; but as they would find thofe places too cold and deftitute of provifion, were they to haften immediately to them on their departure from us, they journey along gradually, and prolong their paffage through the more moderate countries of Germany and Poland; by which means they do not arrive at their northern habitations, where they are to pafs their fummer, and where they breed, till the feverity of the cold is fo far abated as to render it pleafing to them, and there is proper food for them; and when they revifit us the following

following winter, their journey is performed in the same leisurely manner.

Sweden and the other countries whence they come to us, seem the proper home of these birds; since there they were bred; and the journey they take to us being only for a warmer climate, and plenty of food, it is no wonder that, when these benefits are to be expected again in their native place, they return to it.

The principal food of these birds, while with us, is the fruit of the white-thorn, or haws, which hang on our hedges in winter in prodigious plenty; but where they breed, and seem to live most at ease, as in Sweden, &c. there are no haws, nor, indeed, in many of the countries through which they journey in their way; so that it is evident they change their food in their passage. And upon the whole it appears, that Providence has created birds, &c. with constitutions and inclinations adapted to their different degrees of heat and cold; which, to them, are most agreeable, and to which they will travel from places which to other animals might seem more agreeable: by this means no part of the globe is without its inhabitants. Phil. Trans. vol. xliv. p. 435, &c. vol. li. p. 459, &c. Pennant's British Zoology, vol. i. p. 406, &c. vol. ii. p. 709, &c.

MIGREEVO, in *Geography*, a town of Russia, in the government of Novgorod; 36 miles S. of Tcherepovetz.

MIGU, a town of Arabia, in the province of Oman; 140 miles S.W. of Julfar.

MIGUEL-ESTEVAN, a town of Spain, in New Castile; 40 miles S. of Huete.

MIGUEL-*Turria*, a town of Spain, in New Castile; 4 miles S.E. of Civdad Real.

MIGUEL, *St.*, a town of Mexico, in the province of Guatimala; 50 miles E. of Cuzcatlan.—Also, a town of S. America, in the kingdom of Grenada; 85 miles E. of Santa Fé de Bogota.—Also, a town of Spain, in the province of Seville, between the rivers Guadiana and Odier, near the coast of the Atlantic.—Also, a town of S. America, in Popayan; 90 miles E.S.E. of Pasto.—Also, a town of Paraguay; 360 miles E. of Assumption.—Also, a town of Mexico, in the province of Nicaragua, on the N.W. coast of Amapalla bay; 100 miles S.E. of Leon. N. lat. 13° 35'. W. long. 88° 56'.—Also, a town of Mexico, in the province of Mechoacan; 80 miles N. of Mechoacan. N. lat. 21° 20'. W. long. 102° 26'.—Also, a town of S. America, in the province of Chiquitos.—Also, a town of S. America, in the province of Quito; 50 miles S.W. of Quito.—Also, a town of S. America, in the audience of Quito; 15 miles N.W. of St. Josef de Huales.—Also, a mission of Spanish monks in New Albion, near the coast of the Pacific ocean. N. lat. 31° 58'. E. long. 243° 42'.—Also, a small island in the N. Pacific ocean, called also "St. Bernardo," the most westerly of the range which forms the western boundary of the canal of St. Barbara. N. lat. 34°. E. long. 240° 3'.—Also, a river of Brasil, which runs into the Atlantic, S. lat. 10° 8'.—Also, a town of Brasil, in the government of St. Paul; 15 miles E. of St. Paul.—Also, a town of Congo, and capital of the province of Ovando; 150 miles S.S.E. of St. Salvador. S. lat. 7° 45'.—Also, a town of Mexico, in the province of Culiacan, on the Ciguatlan; 30 miles S.E. of Culiacan. N. lat. 24° 6'. W. long. 107° 52'.—Also, a town of New Mexico, in the province of Cinaloa; 70 miles W.N.W. of Cinaloa.—Also, a town of New Mexico; 60 miles S. of Santa Fé.

MIGUEL, *St.* See MADEIRA.

MIGUEL *Archangel, St.*, an island in the Pacific ocean, discovered by Quiros in the year 1606.

MIGUEL *d'Ibarra, St.*, a town of South America, and capital of a jurisdiction of the same name, in the audience of Quito, containing about 10,000 inhabitants. The houses are built of stone, and tiled. The suburbs are inhabited by Indians, in mean cottages. The parish church is a large, elegant, and well-ornamented building. Here are convents of Franciscans, Dominicans, and Fathers of Mercy, a college, and a nunnery of the order of the Conception; 45 miles N.N.E. of Quito. N. lat. 0° 25'. W. long. 77° 40'.—Also, a jurisdiction of S. America, in the government of New Grenada, and audience of Quito. The temperature of the air is different in all the villages of this jurisdiction, but generally warm, on account of their low situations. Most of the farms have plantations of sugar-canes, and mills for extracting the juice, of which they make large quantities of white sugar. Some farms are planted with fruits, common in a hot climate, and in others they only cultivate cotton, which is obtained in the greatest perfection. In those farms that are situated in a less hot part of this jurisdiction are sown maize, wheat, and barley. Here are also large multitudes of goats, but not many sheep. The Indians weave a considerable quantity of cloth and cotton. This jurisdiction has several mines of salt, which supply the countries that lie to the north of it. Near a village, called Mira, there is a great number of wild asses.

MIGUEL *de Piura, St.* See PIURA.

MIGUEL *de Ribera, St.*, a town of Peru, in the diocese of Arequipa; 62 miles W.S.W. of Arequipa.

MIGUEL *de Tucuman, St.*, a town of S. America, in the province of Tucuman; the see of a bishop, containing several monasteries. Its situation is elevated and agreeable, and in its vicinity are fertile fields, and several silver mines: some mules are bred; but the chief traffic is in a kind of cars, or covered waggons, which pass to Buenos Ayres and Jujuy, and which the inhabitants are enabled to build by their abundance of wood; 200 miles E. of Copiapo. S. lat. 27° 25'. W. long. 66° 30'.

MIGUEL *Bay, St.*, a bay on the E. coast of the island of Luçon. N. lat. 14° 12'. E. long. 123° 40'.

MIHALY, a town of Hungary; 10 miles N. of Zutmar.

MIHAU, a small island in the English Channel, near the coast of France; 15 miles W. from the island of Bas. N. lat. 48° 47'. W. long. 3° 30'.

MIHEL, a district of the archduchy of Austria, between the Danube and Bohemia.

MIHIEL, ST., a town of France, in the department of the Meuse, and chief place of a canton, in the district of Commercy, situated on the Meuse, in a valley surrounded with mountains. It has six gates and three fauxbourgs. The place contains 5022, and the canton 14,010 inhabitants, on a territory of 255 kiliometres, in 28 communes. N. lat. 48° 54'. E. long. 5° 37'.

MIHIRA, a name, in the Sanscrit, for the sun. See SURYA.

MIHLACK, in *Geography*, a town of Austria; 18 miles S.W. of Freystadt.

MIJARISIMA, one of the small Japanese islands. N. lat. 34° 10'. E. long. 139° 45'.

MIJAS, a town of Spain, in the province of Grenada; 10 miles N.E. of Marbella.

MIJASKA, a river of Russia, which runs into the Iser, in the government of Tobolsk.

MIJAVARA, a town of Japan, in the island of Niphon; 12 miles S. of Awasi.—Also, a town of Japan, in the island of Ximo; 28 miles S.E. of Ikua.

MIJO, a town of Peru, in the diocese of La Plata; 70 miles E.S.E. of Lipes.

MIIT Demsis, a town of Egypt, on the east branch of the Nile; 35 miles N. of Cairo.

Miit *Gera*, a town of Egypt, on the east branch of the Nile; 12 miles S. of Mansora.

Miit *Harun*, a town of Egypt, on the east branch of the Nile; 2 miles N.W. of Miit Demsis.

Miit *el Koli*, a town of Egypt, on the east branch of the Nile; 10 miles N.N.E. of Mensora.

Miit *Lassi*, a town of Egypt, on the east branch of the Nile, opposite to Miit Demsis.

Miit *Naser*, a town of Egypt, on the east branch of the Nile; 3 miles S. of Semennud.

Miit *Kamer*, or *Miet Ghamer*, called by Savary *Mit Khamr*, a town of Egypt, on the east branch of the Nile; 24 miles N. of Cairo. This town, though small, is populous and commercial. The market places are narrow, and badly lighted; the streets are crooked and dirty. Here is a mosque, with a square tower, which seems to have served as a church for the Christians, before the Arabian conquest. Through all Egypt there is not a similar minaret; all being round, narrow, and lofty.

MIKALIDI, or Maarlich, a town of Asiatic Turkey, in the province of Natolia, situated on a river, the ancient Rhyndus, which runs into the sea of Marmora. It has a port about two miles from the town, whence they send silk, wool, grain, and fruit to Smyrna, Constantinople, &c.; 35 miles W. of Bursa. N. lat. 40° 10'. E. long. 28° 22'

MIKANIA, in *Botany*, a genus separated by Willdenow from the Cacalia and Eupatorium of Linnæus; see those articles; and named by him in honour of professor Joseph Mikan of Prague, of whose botanical performances we find nothing mentioned, except a mere catalogue of plants, an epitome of the 13th edition of the Linnæan *Systema Vegetabilium*, with some new species of Jacquin superadded, published at Prague in 1776; an octavo of 403 pages.—Willd. Sp. Pl. v. 3. 1742.—Class and order, *Syngenesia Polygamia-æqualis*. Nat. Ord. *Compositæ discoideæ*, Linn. *Corymbiferæ*, Juss.

Gen. Ch. *Common Calyx* oblong, simple, of from four to six erect, equal, oblong, channelled, unarmed, permanent scales. *Cor.* compound, uniform, discoid; florets mostly equal in number to the scales of the calyx, all uniform, perfect, fertile, monopetalous, funnel-shaped, with a regular, four or five-cleft, spreading border. *Stam.* Filaments five, capillary, short; anthers united into a cylindrical tube. *Pist.* Germen minute; style thread-shaped, mostly rather longer than the corolla, deeply divided; stigmas slender, spreading. *Peric.* none, except the permanent, somewhat expanded calyx. *Seeds* solitary to each floret, oblong, angular; down sessile, simple, longer than the calyx. *Receptacle* small, naked.

Ess. Ch. Receptacle naked. Calyx of from four to six equal leaves, containing as many florets. Seed-down simple, sessile.

Section 1. *Stem climbing.*

1. M. *Houstonis*. Willd. n. 1. (Eupatorium Houstonis; Linn. Sp. Pl. 1172. Swartz. Obs. 300.)—Stem twining. Leaves ovate, entire. Flowers spiked.—Native of bushy places at Vera Cruz. *Houston.* In Jamaica, but rare. *Swartz.* The *stem* is twining, shrubby, round, smooth, with widely spreading branches. *Leaves* opposite, stalked, ovate, pointed, entire, ribbed, shining. *Spikes* opposite, spreading almost horizontally, many-flowered. *Flowers* minute, white, inodorous. *Calyx* of four scales. *Florets* four.

2. M. *hastata*. Willd. n. 2. (Eupatorium hastatum; Linn. Sp. Pl. 1172. Swartz. Obs. 299. Kleinia? scandens; Browne Jam. 316. t. 34. f. 3.)—Stem twining. Leaves hastate, somewhat heart-shaped, acute, slightly toothed, smooth. Flowers spiked.—Native of thickets on the hills of Jamaica. *Stem* shrubby, climbing, round, striated, purplish, slightly downy. *Leaves* opposite, hastate, acutely pointed at each lobe, from one to near three inches long, three-ribbed, smooth, except a slight downiness on the ribs or veins; heart-shaped at the base; obscurely toothed or serrated at the margin. *Footstalks* about as long as the leaves, sometimes much shorter, slender. *Spikes* axillary and terminal, about the ends of the branches, downy, bracteated, near two inches long, obscurely whorled. *Flowers* usually four in a whorl, white, smelling like *Cacalia suaveolens*. The whole plant has a bitter taste. *Sw.*

3. M. *scandens*. Willd. n. 3. (Eupatorium scandens; Linn. Sp. Pl. 1171. Jacq. Ic. Rar. v. 1. t. 169. Conyza scandens, solani folio angulofo; Plum. Ic. 86. t. 99?)—Stem twining. Leaves heart-shaped, taper-pointed, wavy and toothed; lobes spreading. *Flowers* corymbose.—Native of Virginia, in a watery soil. This was introduced into the English gardens about 100 years ago, and is a hardy perennial, flowering in August and September, but of no remarkable beauty. The *stem* is rather herbaceous than shrubby, climbing, smooth, or downy. *Leaves* on long stalks, one and a half inch long, roughish, veiny, three-ribbed at the base. *Flowers* white, in axillary, stalked, leafy, more or less compound corymbs. *Seed-down* tawny; not white, as mentioned by Willdenow. *Florets* four.

4. M. *volubilis*. Willd. n. 4. (Eupatorium volubile; Valh. Symb. v. 3. 93. E. cordatum; Burm. Ind. 176. t. 58. f. 2.)—Stem twining. Leaves heart-shaped, crenate, acute, lobes rounded, approximated. Corymbs panicled.—Native of the East Indies. The *stem* in our's is very nearly smooth, much less downy than in the last. Willdenow mentions the reverse. *Leaves* much larger, exactly heart-shaped, acute, nearly smooth, bluntly crenate; occasionally entire, as figured by Burmann. *Corymbs* compound, on long stalks. *Seed-down* blush-coloured, or purplish.

5. M. *denticulata*. Willd. n. 5. (Eupatorium denticulatum; Vahl. Symb. v. 3. 93.)—"Stem climbing, angular. Leaves heart-shaped, bluntish, finely toothed, rough. Flowers corymbose."—Native of Surinam. "*Branches* with five prominent angles. *Leaves* two inches long, stalked; paler and slightly downy beneath; sometimes entire. *Florets* and *calyx-scales* four. *Seed-down* purplish." Of this we have seen neither specimen nor figure.

6. M. *tomentosa*. Willd. n. 6. (Eupatorium tomentosum; Lamarck Dict. v. 4. 410.)—Stem twining. Leaves alternate, heart-shaped, finely toothed, somewhat angulated, cottony beneath; the upper ones ovate. Spikes panicled.—Native of the Isle de Bourbon. One of Commerson's specimens was given by Thouin to Linnæus. It is said to have the scent of lilac. The *stem* is very long, slender, twining, round, cottony when young. *Leaves* alternate, stalked; smooth, or slightly cottony, above; clothed with snow-white dense pubescence, like a white poplar, beneath. *Spikes* of flowers numerous, alternate, composing axillary leafy panicles. *Calyx* smooth. *Seed-down* white.

7. M. *amara*. Willd. n. 7. (Eupatorium amarum; Vahl. Symb. v. 3. 93. E. parviflorum; Aubl. Guian. v. 2. 797. t. 315.)—Stem twining, roughish. Leaves ovate, entire; rough beneath. Flowers corymbose. Bracteas spatulate, at the base of the smooth calyx.—Native of the banks of rivers in Guiana, flowering in August. Communicated by E. Rudge, Esq. The *stems* are ten feet long, branched, twining, round, rough with short, dense, rigid pubescence. *Leaves* opposite, stalked, three inches long; nearly smooth above; rough and harsh beneath. *Flowers* in

in corymbose, leafy, axillary panicles, three together sessile at the end of each partial stalk, with two or three short, spatulate, stalked, leafy *bracteas*. *Florets* and *calyx-scales* four. When wounded, the *stem* and *branches* discharge a yellowish, viscid, aromatic fluid.

8. M. *latifolia*.—Stem twining, smooth. Leaves ovate, taper-pointed, nearly entire, smooth. Flowers corymbose. Bracteas lanceolate, at the base of the roughish calyx.—Native of the island of St. Lucia. Very near the last, but differing in the above characters. The *leaves* are dark green above, and very smooth; pale, scarcely roughish to the touch, beneath. *Inflorescence* as in *M. amara*, but the *bracteas* are much smaller, sessile, lanceolate or elliptical, minutely roughish. *Calyx* also roughish. *Florets*, and rufous *down of the seed*, half as long again as the calyx; whereas in the last species they are much shorter, and concealed within it.

9. M. *chenopodifolia*. Willd. n. 8.—"Stem twining. Leaves ovate, somewhat triangular, pointed, wavy, five-ribbed, smooth. Flowers corymbose."—Native of Sierra Leone. *Stem* with smooth striated branches, apparently climbing. *Leaves* opposite, stalked, triangular-ovate, slightly hastate, smooth on both sides. *Corymbs* dense, stalked, terminal. *Calyx* smooth, of four scales, with as many florets. *Down* reddish. *Willd.*

10. M. *auriculata*. Willd. n. 9. (Eupatorium auriculatum; Lamarck Dict. v. 2. 411. E. scandens; Thunb. Prodr. 142?)—Stem twining, angular, smooth. Leaves alternate, triangular, somewhat hastate, toothed, smooth. Stipulas rounded. Flowers corymbose.—Gathered by Sonnerat at the Cape of Good Hope; and Willdenow well conjectures that it is probably the *E. scandens* of Thunberg, with whose short definition it seems to agree. The *stem* has many angles, and is much branched, twining and zigzag. *Leaves* small, with a pair of clasping *stipulas* at the base of their stalk, and sometimes a pair of similar auricles. *Calyx* of five or six scales, with as many florets. *Lamarck.*

11. M. *stipulacea*. Willd. n. 10. (Eupatorium stipulaceum; Vahl. Symb. v. 3. 94.)—Stem twining, round, smooth. Leaves opposite, hastate, acute, somewhat toothed, smooth. Stipulas oblong. Flowers corymbose.—Gathered by Commerson in Brasil. *Stem* twining, slender, finely striated. *Leaves* stalked, much like those of some hastate *Chenopodium*; rather glaucous, and obscurely downy, beneath. *Stipulas* recurved, small, oblong, acute. *Flowers* in many axillary, opposite, stalked, often compound corymbs. *Calyx* roughish at the base, membranous upward, of four scales, with as many florets. *Down* purplish, rough, projecting, with the florets, much beyond the calyx.

12. M. *rubiginosa*. (Cacaliæ cordifoliæ varietas, foliis integris; Linn. Suppl. 352.)—Stem twining, downy. Leaves opposite, heart-shaped, pointed, wavy, finely downy. Panicles axillary, cymose. Bracteas spatulate. Native of South America? Of this we have seen but an imperfect specimen in the Linnæan herbarium, on which there is no mark to indicate its native country. By its resemblance to many of the foregoing species only, can we judge of its being a climber; for we have but an inch and a half of the *stem*, with a pair of opposite stalked *leaves*, each two inches long, with an axillary stalked corymbose *panicle*, accompanied by a pair of small leaves, to each. Every part is clothed with extremely short, dense, soft, rusty, velvet-like pubescence. The surface of the *leaves*, on both sides, sparkles with excessively minute golden resinous dots. *Flowers* not very numerous. *Bracteas* as long as the calyx, spatulate or obovate, obtuse, with or without a small point, and tapering at their base. *Scales* of the calyx very much like them in shape and size, and both are equally downy externally. *Seed-down* reddish, scarcely extending beyond the calyx. This is certainly very distinct from the following, with which the younger Linnæus, who found the specimen here described in his father's herbarium, marked *Eupatorium*, confounded it.

13. M. *cordifolia*. Willd. n. 11. (Cacalia cordifolia; Linn. Suppl. 351.)—Stem twining? angular, roughish. Leaves opposite, heart-shaped, pointed, toothed, rough. Panicles axillary? cymose, leafy. Bracteas ovate, pointed, shorter than the calyx.—Gathered by Mutis in New Spain, South America. By its near agreement with the last species, we judge this also to be a climbing plant. The Linnæan specimen consists of only a large compound corymbose *branch* of flowers, accompanied by small opposite leaves, as usual in this section of the genus, but whether it may have been axillary or terminal, we cannot determine. With it are two separate *leaves*, not unlike those of a *Helianthus*, each three inches long, of a very broad heart-shaped figure, oblique or unequal, minutely but distantly toothed, with a short taper point. They are rough on both sides, with minute harsh pale bristles, their ribs, which are three in the middle, and two at each side, clothed with rusty down. *Footstalks* two inches long, or more, rusty. *Panicle* many-flowered, with roughish angular stalks. *Bracteas* scattered, stalked, gradually smaller upwards, ovate, pointed, entire, bristly at the edges; those which are close to the flowers sessile, shorter than the calyx. *Scales* of the calyx four, elliptic-lanceolate, acute, ribbed, concave; the two outermost roughish, especially upward; the innermost only being smooth as described in the *Supplementum*. *Seed-down* reddish, rough, longer than the calyx, as are also the *florets*.

14. M. *laurifolia*. Willd. n. 12. (Cacalia laurifolia; Linn. Suppl. 351.)—Stem twining? Leaves opposite, elliptic-ovate, triple-ribbed, very smooth and shining. Panicles dense, terminal, downy.—Native of Mexico. *Mutis.* This has all the appearance of a climbing *shrub*, though Willdenow could have no reason, from the Linnæan description, to suspect it. The *branches* are much twisted, forked, round, smooth, leafy at their extremities. *Leaves* one and a half or two inches long, near an inch wide, almost elliptical, obtuse, entire, slightly revolute, rigid, smooth; varnished as it were on the upper side; thickly dotted beneath; their lateral ribs springing from the middle one at a good distance from the base, besides a pair at the very bottom. *Panicle* three inches long, dense obtuse, with hairy corymbose stalks. *Bracteas* small, oblong. *Scales* of the calyx four, linear, hairy, (by no means smooth as in the *Suppl.*), rather dilated and feathery at the tips. *Seeds* furrowed, angular, rough, nearly as long as the calyx. *Florets* and *down* much longer. *Styles* greatly protruding, with long, narrow, purplish stigmas.

Section 2. *Stem erect.*

15. M. *melissæfolia*. Willd. n. 13. (Eupatorium melissæfolium; Lamarck. Dict. v. 2. 411.)—Stem erect. Leaves opposite, ovate, crenate, sessile, downy beneath. Flowers corymbose, terminal.—Gathered by Dombey in Peru. *Stem* about two feet high, round, slightly downy, panicled above. *Leaves* sessile, and even somewhat embracing the stem, oval, coarsely crenate, green, about two inches or more in length, and one inch and a half wide. *Flowers* purplish. *Calyx* of five straight scales. *Florets* five. *Down* rough.

16. M. *satureifolia*. Willd. n. 14. (Eupatorium satureiæfolium; Lamarck Dict. v. 2. 411.)—Stem erect, branched. Leaves opposite or scattered, linear, obtuse, entire,

entire, downy. Flowers corymbose.—Gathered by Commerson at Monte Video. The *stem* seems scarcely shrubby, round, alternately branched, downy, leafy. *Leaves* mostly scattered, the lower ones only being often opposite, sessile, linear, or linear-lanceolate, obtuse, nearly or quite entire, tapering at the base, thickly dotted, minutely hairy; paler beneath. *Flowers* large, purple, a few together in tufts on terminal, corymbose, downy stalks. *Calyx* downy, but half the length of the florets and rough brownish *seed-down*. *Corolla* five-cleft, slightly hairy.

Commerson gathered at the same place a slender variety, with much smaller *leaves*, and only one or two *flowers* at the top of a few of the branches. We agree with him that, though very different in appearance, the specimen displays no distinctive specific character. Indeed we have an intermediate variety, which leaves the matter without any uncertainty. We make no apology for correcting the barbarous construction of the specific names of this and the foregoing. S.

MIKELSBURG, in *Geography*, a fortressed town of Transylvania, with a depôt of arms for the principality; 6 miles S.E. of Hermanstadt.

MIKLOS, St., a town of Transylvania; 12 miles N.N.W. of Medies.

MIKLOSVAR, a town of Transylvania, on the river Alaut; 16 miles N. of Cronstadt.

MIKOLAIOW, a town of Austrian Poland, in Galicia; 28 miles S.S.W. of Lemberg.—Also, a town of Poland, in Volhynia; 24 miles W. of Lucko.

MIKULINOZE, a town of Poland, in Podolia; 56 miles N.N.W. of Kaminiec.

MILA, a town of Thibet; 222 miles S.W. of Latac.—Also, a town of Tunis; 30 miles S. of Constantina.

MILAGRO, a town of Spain, in the province of Aragon, at the confluence of the Arga and Aragon; 5 miles E. of Calahorra.

MILAN, *Duchy of*, a country of Italy, bounded on the north by the Grisons, on the east by the Venetian states, on the south by the states of Piedmont and Parma, and on the west by Piedmont and Savoy. Its greatest breadth from north to south is upwards of 100 miles, and its greatest length from east to west 108 miles. This fertile duchy is said to contain, on 2432 square miles, a population of 1,116,850 persons; and it has formerly produced to the king of Spain a revenue of above two millions of dollars. According to Mr. Young's statement, the soil is chiefly strong loam, or loamy sand; and the climate has a singular circumstance belonging to it, that the northern mountainous tracts are mild and warm, but the plains are cold. Orange and lemon trees flourish in the open air, on the western sides of the lake of Como, though bounded by the high Alps, which to the north are covered with perpetual snow; while, in the plain of Lombardy, even to the Apennines, these trees require shelter. The Boromean isles also, in the Lago Maggiore, are covered with these delicate trees. The lands in this duchy are mostly enclosed; but its agriculture can never prosper, while the present system continues, which is that of the landlord's paying taxes and repairs, and the tenant's providing cattle, implements, and seed, and then their dividing the produce between them. For the irrigation of the country, they have canals, subsisting as early as the 11th century, some of which are more than 30 miles long, and nearly 52 feet wide. The arable lands produce the usual kinds of grain and fruits, and the pastures are excellent, affording means for breeding cattle in abundance, and for making cheese that has been every where held in estimation. The wine is good, and the mulberry trees, for the culture of silk, are numerous. Its sheep are but few and bad. Its mines have not been much explored: however, there are are some of copper and lead above the lake of Como, and the mountains; and the Boromean isles present flesh-coloured granite, and lapis ollaris is plentiful near Como. In this duchy are manufactures of wool and silk, though its silk is not equal to that of Piedmont; and it has numerous workmen in gold, silver, embroidery, and steel, as well as in crystal, agate, aventurine, and other stones. The trade of the Milanese is considerable; but its imports generally exceed its exports. Its stuffs are mostly consumed at home; its silks, stockings, gloves, and handkerchiefs, are exported.

After the fall of the kingdom of Lombardy, Milan became subject to the emperors of the West. After the contests between the emperors and the popes, it lost its form of a republic, and became subject to the archbishop: in 1277, Otto Visconti, the archbishop, was declared lord of Milan. His family long possessed this rich principality. After two or three changes it was seized, in 1535, by Charles V., as a fief of the empire, and he gave it to his son Philip; whose successors, as kings of Spain, retained the Milanese till the year 1706, when it became an appanage of Austria, though a considerable part of it had been transferred to the house of Sardinia. Its revenues have been lately estimated at about 300,000*l.* When the Cisalpine republic was formed, the Milanese was divided into four departments, *viz.* Olona, Verbano, Lario, and Delle Montagna. Milan was appointed the capital of the whole republic; and the same establishment still respects the kingdom of Italy.

Milan, a city, and capital of the lately established kingdom of Italy, and, before the revolution in France, the capital of the duchy above described. Including its gardens, it is said to be ten miles in circumference, and it is chiefly defended by a wall and rampart, together with a citadel having six bastions at some distance, so that it has been reputed a strong place. It has some straight and broad streets, among many that are narrow and crooked; but its paper windows, or those of glass and paper intermixed, give it a mean appearance. It has 12 gates, 230 churches, 90 convents, 100 religious fraternities, 120 schools, and about 120,000 inhabitants. It is the see of an archbishop, and its nobles are numerous. Its cathedral is a large but irregular building, constructed of marble, and ornamented with marble statues: its treasury, among other valuable articles, contains an invaluable coffin of rock-crystal, in which are deposited the remains of St. Charles Boromeo, cardinal and archbishop of Milan. The chief church for antiquities is that of St. Ambrose; and the Ambrosian college, in the centre of the town, was founded by Frederic Boromeo, and has sixteen professors, who communicate their instructions gratis. The fine library which he began was finished by cardinal Gelbert Boromeo, and is said to contain more than 40,000 printed volumes, and some thousands of MSS. In this college are also an academy of painting, and a museum. The seminary for sciences, where students are both taught and maintained, and the college of the nobles, are stately buildings, but inferior to the Helvetian college, founded for a number of Swiss. Here is also a mathematical academy. The great hospital is a fine building, and liberally endowed by duke Francis Sforza IV.; and its income is said to be between 90 and 100,000 rix-dollars. This hospital, which has several others dependent upon it, admits not only sick persons, but also foundlings and lunatics. The large lazaretto is only used in time of contagion. Among the civil buildings is the old and spacious regency-house, and the new and stately town-house, where is an equestrian statue of Philip II.

This city was founded by the Gauls about 584 years B.C.; but has undergone many sieges, and particularly that by the emperor Frederic I. in 1162, who, after a siege of seven months, destroyed the gates, ramparts, and edifices, leaving only a few churches, and sowed salt on the ruins. However, it recovered from these disasters; and it still maintains many manufacturers and artisans; and by means of several rivers and canals, carries on a considerable trade. In 1800 it was taken by Bonaparte; and when the Cisalpine republic was established, it became the capital of the department of Olona and of the whole republic, and it maintains the same rank in the kingdom of Italy; 132 miles W. of Venice, 65 N. of Genoa. N. lat. 45° 26′. E. long. 9° 11′.

MILAPOUR, a town of Hindoostan, in Mysore; 22 miles E. of Colar.

MILASA, or MARMARA, a town of Asiatic Turkey, in Natolia; anciently called Mylassa. In this place are the remains of three temples, and of a column, called Meander's pillar; 16 miles S.W. of Mogla. N. lat. 37°. E. long. 27° 50′.

MILATIA, a town of Poland, in Volhynia; 44 miles S.W. of Lucko.

MILAVERAM, a town of Hindoostan, in the circar of Condapilly; 14 miles N. of Condapilly.

MILAY, a town of Bohemia, in the circle of Leitmeritz; 16 miles S. of Leitmeritz.

MILAZZO, CAPE, a cape of Spain, on the W. coast of Galicia. N. lat. 38° 20′. E. long. 15° 23′.

MILBANK'S SOUND, an inlet in the North Pacific ocean, between Point Day and Cape Swaine.

MILBORNE-PORT, a borough-town and parish in the hundred of Honethorne, and county of Somerset, England. The former stands on one of the branches of the river Parret, at the distance of ten miles from Ilchester, and two from Sherborne, in Dorsetshire. This place is of great antiquity, having been a borough of considerable importance prior to the Conquest; after which event it lost much of its consequence, though it retained all its former privileges till the reign of Edward III., by whom it was deprived of the right of sending members to parliament. In the reign of Charles I., however, that franchise was restored; and it now returns two representatives, who are chosen by the inhabitants paying scot and lot. The government of this town is vested in the owners of nine bailiwicks, who are lords thereof, assisted by two deputy bailiffs, two constables, and several other inferior officers. Besides these there is likewise an association within the borough, consisting of nine persons, two stewards, and seven assistants, who are privileged to hold property in their corporate capacity, for the benefit of the poor.

The buildings of Milborne-Port are chiefly disposed in four streets, the principal one of which, called High Street, is of considerable width, but extremely irregular. In this street stands the guild-hall, an ancient edifice, having a door-case partly of Saxon and partly of Norman architecture. The old market-house is now converted into warehouses, and there is no regular market now held. The church, an ancient structure, built in the form of a cross, is surmounted by a very massive quadrangular tower, supported by two pointed and two semi-circular arches. In the north aisle are several handsome monuments, in honour of the Medlycot family. On opening a plot of ground near the church-yard, for the purpose of building, sixty bodies of men and women were discovered, arranged in regular rows, which, from the want of coffins, are supposed to have been buried at the time of the great plague.

Besides the borough, the parish of Milborne-Port contains two considerable villages, called Kingsburg-Regis and Milborne-Wyke. The former has land-tax and parochial assessments peculiar to itself; and there is held here an annual court-baron, wherein the lords' rents are paid, presentments made, and a constable, tything-man, and hayward appointed. The lands in this vicinity are mostly arable, and in a high state of cultivation and fertility.

According to the parliamentary returns of 1801, the total population of this parish amounted to 953 persons, 440 males and 513 females; of which number 577 were engaged in different branches of trade, and 200 in agriculture. Collinson's History and Antiquities of Somersetshire, vol. ii. 3 vols. 4to. Maton's Western Counties, vol. ii. 8vo.

MILBOURN, LUKE, in *Biography*, an English divine, was the son of Mr. Luke Milbourn, a nonconformist minister, who was ejected from the living of Wroxhall, in Warwickshire, in 1662, and died at Newington in 1667. His son received a good education, became master of arts, and obtained the rectory of St. Ethelburg in London. He published sermons and theological tracts, 2 vols. 8vo.; a poetical version of the Psalms; and several poems, for which Pope gives him a place in the Dunciad. He died in 1720.

MILCE, in *Geography*, a town of Poland, in Volhynia; 34 miles N.N.W. of Lucko.

MILDEN. See MOUDON.

MILDENHALL, a market-town and parish in the hundred of Lackford, and county of Suffolk, England, is situated on the river Lark, at the distance of 12 miles from Bury, and 70 from London. The parish is of great extent, from the dispersed arrangement of its streets, which in fact form a series of little villages. That part of the town called the Borough, or High-town Mildenhall, is its principal division, and contains both the church and the manor-house. The former is a very large and handsome structure, and has a rich roof of carved work, and a lofty tower, and contains a variety of monuments in honour of the family of the Norths. This church is supposed to be of very ancient foundation, and is much admired for its architecture. The manor-house, likewise an old edifice, but greatly altered and repaired of late years, constitutes the family residence of sir Thomas Charles Bunbury, bart., who was one of the representatives for the county in the last parliament. The ancient mansion of the Norths here has a gallery in front, extending the whole length of the house. This town was much injured by a fire, which broke out on the 17th of May 1507, and in a few hours consumed 37 dwelling houses, besides barns, stables, and other appurtenances.

Mildenhall is the chief town of the hundred, and, according to the parliamentary returns of 1801, contained a population of 2283 persons, 1095 males and 1188 females; of which number 390 were returned as engaged in agriculture, and 147 in different branches of trade and manufactures. The petty sessions are held here, as well as a weekly market on Friday. This town has furnished London with two lord mayors, Henry Barton and William Gregory; the former of whom held that honourable office in 1428, and the latter in 1451.

The vicinity of Mildenhall presents to the view a flat, open country, wholly devoid of any interesting features, except a few family-seats, the chief of which are Ickworth, Rushbrook, and Culford. Ickworth is distinguished for its noble park, which is no less than ten miles in circumference. Kirby's Suffolk Traveller, 8vo. 1764. Carlisle's Topographical Dictionary.

MILDEW, in *Agriculture*, a disease frequently destructive to corn, pulse, and other crops.

M. Duhamel ftates, that "it attacks the blades and ftems of corn, which it covers with a powder of the colour of ruft of iron, when at the height of their vegetation. This fubftance does not adhere ftrongly to the blades; for he has feen the hair of white fpaniels full of this powder, after they have run through a field attacked with this difeafe. It is likewife known, that if the infected wheat is wafhed by a plentiful rain, the ruft difappears almoft entirely, and the grain fuffers little from it. The French give it the name of ruft, from the colour of the powder, and it feems to be the fame diftemper, which the Roman writers term *rubigo*. He adds, that the caufe of this diftemper is ufually faid to be dry gloomy weather, happening while the corn is at the height of its vegetation; and in effect, he has many times obferved, that when a hot fun has fucceeded fuch dry hazy weather, corn was rufted within a few days afterwards. It is not common in clear, dry, hot years: but when the fpring is wet, the fineft fields of wheat run great hazard of being deftroyed by it, which generally appears upon the breaking out of the fun in the morning, after clofe and fultry weather, during which there has not been any dew. The rufty powder then gathers upon the blades in fuch quantities as to cover the earth around. M. de Chateauvieux cut off the mildewed blades, and found the trial anfwer: the fame plants produced new blades, and throve much better than thofe on which this operation had not been performed, but this cannot be done, except when the corn is very young. It is very fatal; as the fineft wheat is fuddenly brought almoft to nothing, when it is entirely attacked with it.

"If it attacks the plants while they are young, and before their ftems begin to rife, the mifchief is fometimes not very great, provided there comes on a feafon favourable to their farther growth. In this cafe they are only weakened, as if they had been fed or mowed. They fhoot out anew, and produce ears; though their ftraw is fhorter, and thofe ears are fmaller than they would otherwife have been. But if both blades and ftalks are mildewed at the fame time, the further growth of the plant is ftopt and the grain gets fcarcely any more nourifhment; fo that the crop is exceedingly diminifhed."

It was obferved that, "in the autumns of 1753 and 1754, when the corn was rufted, the fecond crop of hay was fo likewife. The grafs turned from a fine green to the ugly rufty colour of the corn: it was covered with the fame kind of powder, and its quantity diminifhed fenfibly every day; and as the whole of a field of corn is not ufually affected at the fame time, fo this diftemper extended only to fome parts of the meadow."

"The caufe of this diftemper is undoubtedly the fame in corn and in grafs; but its effect is not exactly fimilar. It may deftroy annual plants, fuch as corn, entirely; but in perennials, like grafs, it deftroys only the leaves or blades. May not the prefervation of thefe laft be owing to the taking off thofe leaves or blades, when they are cut for hay? But this is only conjecture; for it is confeffed, that he has not yet made any obfervation on this head.

It may be noticed that thefe caufes are far from being fatisfactory; but it is a difficult enquiry, and one which has lately, efpecially by botanical writers, been confidered in a very different point of view. The facts that have been lately prefented to the public on this fubject, fhew that it is not much influenced by foil, fituation, or the nature of the climate. The anfwers that have been given to different enquiries on this matter, may probably lead to fome ufeful conclufions. On this fubject Mr. Chatterton ftates, in the 44th volume of the Annals of Agriculture, that "1. From what he has feen, and heard from others, it appears that all foils in his neighbourhood, Yorkfhire, have had mildewed crops upon them; but as far as he can judge, the heavy clays, which had a good fallow, have efcaped the beft." But it is afterwards obferved, that though "this was the cafe in fome parifhes about him, yet, for the moft part, in the Eaft Riding they fuffered more feverely than any others, upon whatever foil: the reafon feems to be, that in general they were more luxuriant, and laid fome time before they were ripe. And he alfo underftands that crops on all foils (where thrown down) were the moft affected with the difeafe, if it may be fo called; from which it fhould feem not to arife from any previous caufe, fuch as the feafon of fowing, the difference of feed or manure, &c., but from fome uncommon bad ftate of the atmofphere not long before harveft, which moft affected the ftraw that refted in an horizontal pofition. He has further learned from a perfon, who fays he cut a field of wheat, which was affected with the mildew, while in a green ftate (but not before the grain had arrived at a good degree of folidity), and that it is much better corn than others which were fuffered to ftand till ripe. On the fea fide, there appeared juft before reaping time, but little (in comparifon) damaged in the vicinity of the beach; yet two or three miles from the fea, it feemed as bad as in other places at a greater diftance; and he has known, when all the gardens have been ruined by frofts in the fpring, at a diftance from the fea, while thofe upon the edge of the cliff have not fuffered at all."

And it is afterwards obferved, 2. That "both early and late fown crops have fuffered; but which have fuffered moft is hard to afcertain.

3. "That it is not eafy to fay, what fituations have been moft affected with mildew; it may be faid all are nearly the fame: he has obferved upon the wolds in Yorkfhire a great deal that would not pay for thrafhing; fo bad was it, that hens would prefer fhelling oats for their broods, rather than pick up the wheat that lay about them; and in the low lands at the foot of the wolds, both on ftrong and light foils, much of the ftraw appeared black in many fields.

4. "It is fuppofed, that both thick and thin fown crops have been equally affected.

5. "He imagines, from what he has heard, that old or new feed had no effect.

6. "That this fubject feems to be enveloped in myftery, as feveral perfons in this neighbourhood have had two fields of wheat adjoining each other—fituations and foils alike—management fimilar in every refpect, only not all fown at the fame time—yet both may be faid to have been fown in good feafon: the one field entirely efcaped the mildew, the other fo much damaged, that it was not worth thrafhing. Something might here be advanced on earlier or later fowing; but, perhaps, not any thing that could in the leaft guide the farmer in his future management, as feafons are fo various.

7. "That the crops of both kinds of land have fuffered feverely, and in fome places both have efcaped; without a general furvey, it is hard to decide.

8. "But he has not heard of any difference in crops arifing from difference of manure; he has not, however, inquired much into this matter.

9. "He has not heard of the different kinds of feed being different in regard to mildew."

And the refults of the inquiries of another writer in the fame work are, that in Lincolnfhire the foils moft liable to it, are 1. "In general light, loamy, and rich ones. 2. Late fown crops. 3. That there is very little difference in fituations, but if any, high ones have the advantage. 4. That the quantity of feed has little or no advantage; but drilling the

the feed has, on account of the greater and uniform depth. 5. That he never knew any difference between old and new feed, with regard to the mildew in wheat. 6. That he attributes the fole caufe of the mildew in wheat to mild winters, and to the inflammation of oxygen gas at the eve of harveft. 7 That fallow crops on ftrong clay foils have been leaft affected. 8. That all kinds of manures difpofe wheat to mildew in fuch feafons; lime in fome degree prevents it. 9. That he has no knowledge of the barberry having any effect at all upon wheat. 10. That no kind of wheat that he knows of, is exempted wholly from the mildew. 11. That early cutting from early fowing, has the greateft advantage, but not before the milk in the grain is completely coagulated."

It is alfo ftated, 1. "That in Staffordfhire Dr. Lewis made fome obfervations on the difeafe, and means of preventing it.

2. "That he does not think it of confequence to the queftion, at what time of the feafon wheat is fown, becaufe the period of the approach of the mildew cannot be even conjectured, as it has ever been variable. In this neighbourhood it fo happened, that the wheat which was fown in September and November 1803, fuffered in general more from the mildew, than that of October.

3. "That high and confequently ventilated fituations are doubtlefs more likely to receive a remedy to the difeafe, than low and fheltered ones; but he believes they were all equally affected.

4. "That it has not appeared, that any particular mode of fowing has been a prefervative to the crop. That drilled corn, rather than broad-caft, is more eafily cured, muft be granted, if the drill be wide enough to admit of a perfon to fet his foot between the rows, becaufe with a long pole, which, by means of ftraps, might be fufpended from his fhoulders acrofs his breaft to a proper height, he might brufh off the greater part of the dew, as he walked up and down, to the extent of three yards on each hand: and indeed, in a field of broad-caft, the fame means might economically be purfued, as it would furely anfwer to deftroy a part of the difeafed grain, which if left to itfelf would be good for but little, to fave the remainder. Thofe crops which were ftrong and thick, fuffered, in general, confiderably more than thofe which were thinner. 5. That it does not appear to him, that either new or old feed is of confequence to the queftion. 6. That the caufe exifts in the atmofphere, as he has already faid. He has no doubt, and he thinks, we may fairly conclude its being of that kind, which is termed phlogifticated; that particularly in the fummer it is fo loaded with the putrid effluvia of animal and vegetable fubftances, as to be incapable of attaining the height neceffary to undergo the chemical procefs of purification by the action of the vitriolic, nitric, and muriatic particles with which the air of the higher regions is charged; and that, therefore, it defcends in that undepurated and unwholefome fluid which we term mildew. It has frequently been obferved, that in thofe feafons, which have been preceded by a fevere winter, the air is more pure than when the winter has been mild; but whether the mildew has been more prevalent after a hard or temperate winter, has not yet made a part of his obfervation. Late frofts and fogs are generally reckoned inimical to vegetation, though he never heard it fuggefted, that they are in any degree connected with the fucceeding mildew. That crops on fallows and thofe on layers have fhared an equal fate. 8. Nor has there been any difference in confequence of different kinds of manure. 9. That the barberry tree is of fuch rare growth in this parifh, that if it had any effect upon wheat, it could not but have been afcertained long fince, beyond controverfy; but, when once an idea has gone abroad, every inftance in favour is deemed a proof, while the many in contradiction are never advanced. He hefitates not to pronounce, that it has *no effect* on wheat. Mr. Barker of Congreve had laft year, within 50 yards of his barberry tree, one of the beft crops of wheat in this neighbourhood; while Mr. Keeling, his next neighbour, at 200 yards diftance from the fame tree, and near no other, had a crop as bad as Mr. Barker's was the contrary. He knows not of five barberry trees in this parifh, but there were more than 50 times as many bad crops; which proportion he dare venture to fay, will be found to bear throughout England. How then can it be concluded, that the tree is fo peculiarly pernicious in this inftance? Since writing the above, he has received an acconnt of Mr. Makerell, who lives in the parifh of Brewood, having had a fine piece of wheat, not in the leaft affected by the mildew, though immediately in the vicinity of a hedge almoft entirely compofed of barberry bufhes. 10. He has never either feen or heard of any exception in favour of wheat of the bearded kind, nor indeed of any other; nor yet that any one fort fuffered particularly. 11. That as the mildew totally prevents thofe ears, which it affects, from coming to any perfection, it does not ftrike him, that the period of its being reaped can be of any confequence, and if not it muft be beft to let it ftand till the ftraw has received its full benefit."

And the ftatements of Mr. Lumbert on this fubject are, "1. That no foil is peculiar to the mildew. 2. That late fown crops have generally fuffered moft; but there have been inftances of the reverfe. 3. That low and fheltered fituations have fuffered moft; but this has been, perhaps, attributable to the wheat growing more luxuriantly, from its fituation, than the ftamina of the land could fupport when it was arriving at maturity: to this may be added a want of ventilation. 4. That a huge crop may be confidered a caufe of mildew; for an unkind feafon, or want of ftamina in the land, may check the vegetable mucilage before the corn is completely filled, and thereby produce a predifpofition to mildew. 5. That no difference is obferved in new and old feed, where the fituations have been fimilar. 6. That the firft caufe of mildew is a predifpofition in the wheat. This predifpofition is created by a decreafe of mucilage in the ftraw, which allows the watery particles to infinuate themfelves, and ftill further check the circulation of the juices in the ftem that are neceffary to the perfection of the grain, and had before become languid from the unkindnefs of the feafon, or the feeblenefs of the foil. When the watery particles have infinuated themfelves, the ftraw becomes difcoloured, and he has no doubt but a complete putrefaction would immediately fucceed it, if it were not prevented by a circulation of air. At all times during its growth, barley and oat ftraw appears to have fufficient mucilage in itfelf to refift the effects of the watery particles; but when it is cut it becomes like the ftubble in the fields, and cannot much longer refift it. 7. That fallows and layers have been equally liable. 8. He has obferved, that an over luxuriant growth in the fpring is favourable to the mildew, and has noticed that that luxuriance may be produced by particular manure, fuch as green vetches ploughed in, &c. which feem to caufe a confiderable fermentation in the foil, and produce a rapid vegetation for a fhort time. 9. That early cutting and laying down is moft clearly beneficial; and if the wheat is feverely affected, it is almoft impoffible to cut it too foon."

And farther, the facts collected by profeffor Balfamo in

Sicily,

Sicily, and detailed in the fame work, lead to the fame conclufions. For he ftates it as "evident that the mildew was common to the grain of all Sicily, without exception of kind, of foil, expofition, or other circumftances. It attacked, in different degrees, the barley, oats, and the plants of meadows; almoft all plants, whether fpontaneous or cultivated: and this confideration proves to him that the opinion which attributes the diftemper to fogs and dews, is erroneous; nor is it at all probable, that any meteor fhould, *at one time*, be the caufe, in places which, from the vicinity of mountains, rivers, and a multitude of other circumftances, had a very different climate from each other; and from the obfervations regiftered at the Royal Obfervatory, it appears, that, as every one knows, the fogs were rather heavier and more frequent in April and May 1803, when no mildew enfued, than in the fame months in 1804, when the great mifchief followed. And many cafes have occurred to him of fpots peculiarly given to fogs, and from which the countrymen argued a ruinous mildew, yet bright and clear crops were produced, while fpots more free from fogs have been attacked." The fame reafoning may "be applied to dews; thefe are more frequent and copious in the vicinity of rivers and ftagnant waters, than in other places; and it is true, that in many of thefe laft, and in more than one of the firft, the grain better refifted the mildew. Brucato is a humid diftrict, wafhed by rivers, and chequered by marfhes, which render the air infalubrious; yet it produced this year of mildew a reafonable crop of grain. And he obferved at Margana, that the wheat upon a farm fituated on the banks of a river, and very humid, with a bad air, was generally better than in the neighbouring country of Vicari, notably more dry from its fituation. Grain that is thin upon the ground, is more fubject to mildew than that which from thicknefs retains much more of the dew." It is ftated that the "Abbé Rozier, in his voluminous Dictionary, fays, that the mildew is caufed by the drops of water formed by fogs and dews when diffipated by a hot fun; but in Sicily, the fun in April, and much more in May and June, is always active; and our fogs in May are proverbial." And "in travelling in the beginning of fummer, through the country, it is vifible, that the mildew, in its various degrees, is connected with the foil, and the divers methods of cultivation; but the variety of effects is myfterious and inexplicable, on the fuppofition that the caufe is external to the plant."

After fome remarks on the nature of the difeafe, Mr. Marfhall fays, that a certain prevention of it would be a difcovery worth millions to the country. "Until this be made, let the grower of wheat, not only endeavour to fow early; but let him look narrowly to his crop, during the critical time of the filling of the grain; and whenever he may perceive it to be fmitten with the difeafe, let him lofe no time in cutting it: fuffering it to lie on the ftubble, until the ftraw be firm and crifp enough to be fet in fheaves, without adhering in the binding places: allowing it to remain in the field, until the grain fhall have received the nutriment which the ftraw may be able to impart. Where wheat has been grown on 'lammas land,' and the ground obliged to be cleared by the firft of Auguft, crops have been known to be cut, 'as green as grafs,' and to be carried off and fpread upon grafs land to dry. Yet the grain has been found to mature; and always to afford a fine fkinned beautiful fample. Rye-grafs that is cut, even while in bloffom, is well known to mature its feeds, with the fap that is lodged in the ftems. Hence there is nothing to fear, from cutting wheat or corn, before the ftraw be ripe." The opinion of Mr. Young is likewife the fame; he therefore advifes the farmer to be very attentive to his wheat crops in July, as "they are every where liable to this fatal diftemper, which admits but of one cure or check, and that is, reaping it as foon as it is ftruck. The capital managers in Suffolk, know well, that every hour the wheat ftands after the mildew appears, is mifchievous to the crop. It fhould be cut, though quite green, as it is found that the grain fills after it is cut, and ripens in a manner that thofe would not conceive who had not tried the experiment, which he has done many times; reaping fo early, that the labourers pronounced he fhould have nothing but hens'-meat. They were always miftaken, for the fample proved good, while others, who left it longer, fuffered feverely. The fact is now pretty generally admitted."

It is further ftated by the firft of thefe writers, "that the operation of this difeafe is carried on by the fungus tribe, evidently appears, from the ingenious and perfevering labours of botanifts," as lately fhewn by fir Jofeph Banks. (See Blight.) "But fungi, it is equally evident, are an effect, not the caufe of the difeafe. They are the vermin of the more perfect vegetables; and faften on them, whether in a dead, or in a difeafed ftate; but feldom while they are in full health and vigour. Their minute and volatile feeds may be faid to be every where prefent, ready to produce their kind wherever they may find a genial matrix. Such, at leaft, appears to be the nature of the fungus, or fungi, of wheat; for it may be liable to the attack of more than one fpecies. In a dry warm fummer, which is well known to be favourable to the health, vigour, and productivenefs of the wheat crop, the feeds of fungi are harmlefs, fo long as the fine weather continues. On the contrary, in a cold wet feafon, which gives languor and weaknefs to the wheat plants, few crops efcape, entirely, their deftructive effects. A ftanding crop not unfrequently efcapes, while plots that are lodged in the fame field, efpecially in pits and hollow places, become liable to their attack. And, by the facts above ftated, we plainly fee, that even ftrong healthy crops may, in a few days, or perhaps in a few hours, be rendered liable to be affailed; not progreffively, as by an infectious difeafe; but at once, as by a *blaft* or *blight*. In the ftate of the atmofphere we are to look for the caufe of the difeafe, in a *ftanding crop*: and nothing is fo likely to bring on the fatal predifpofition of the plants as a fucceffion of cold rains, while the grain is forming. The coolnefs neceffarily gives a check to the rich faccharine juices which are then rifing towards the ear; and the moifture may, at the fame time, affift the feeds of the fungi to germinate and take root. Thus reafon and facts concur, in pointing out the caufe, and the operation of the difeafe. There appear to be two reafons why corn which happens to be ftruck with this difeafe, in a dry warm fummer, is expofed to exceffive injury; as facts pretty evidently fhew that it is. The habits of the plants render them more fufceptible of injury, their rich juices more liable to be checked; and the feeds of fungi, it is probable, are more widely, if not more plentifully, diftributed, by fuch a ftate of the air; than they are by a cool moift atmofphere. The natural event is too well known: and it is the bufinefs of art to endeavour to prevent it."

Confequently "if by cutting down the crop, as foon as it is found to be difeafed, the operation can be ftopped, as experience, in different inftances, has fhewn it may, the remedy is eafy. It may be afked, in what manner the remedy is thus effected. But to the practical farmer, the fact is all that is required. To him, it is equally indifferent, to know the operation of the remedy, as the operation of the difeafe. Thofe who have profited by the remedy here recom-

recommended, believe, that it 'kills the mildew.' And if it shall appear that the fungus of wheat requires a free supply of air to keep it alive, or in a state of health and vigour, the effect of cutting down the crop will be explained. It will perhaps be found, by experience, that the closer it is allowed to lie upon the ground, and the sooner it is bound up in sheaves (provided the natural ascent of the sap to the ear be not interrupted), the more effectual and complete will be the remedy. Further, on the evidence of attentive observation, if wheat, which has been attacked by this disease, be suffered to remain in the field, with the ears exposed, until it may have received the ameliorating influence of dews, or moderate rain (to soften, relax, and assist the natural rise of the sap), the more productive it will probably become. And it may be still further added, that grain which is cut while under-ripe, is less liable to be injured in the field by moist weather, than that which has stood until it be fully or over-ripe." And a "probable mean of prevention is that of inducing early ripeness (for reasons above offered): either by sowing early; or by forcing manures; or by selecting and establishing early varieties, of wheat most especially; as early varieties of pease, and other esculent plants, are raised by gardeners: a work which only requires ordinary attention; and which, it is hoped, will, without delay, be set about and encouraged by every attentive grower of wheat, and every promoter of rural improvements, in the united kingdom." The method of raising and improving varieties of which will be afterwards noticed. See WHEAT.

MILDEW, in *Gardening*, is a vegetable disease, very hurtful to different kinds of trees and plants. It is supposed to proceed from different causes: some consider it as a kind of thick clammy moisture, which falls on, or rather transpires from, the leaves and blossoms of plants, which, by stopping up the pores, prevents perspiration, and hinders their growth. But the author of "The Philosophy of Gardening" suspects it to be a plant of the fungus kind, which grows without light or change of air, and with its roots penetrates the vessels of the vegetables to which it adheres, which are probably previously diseased, and thus deprives them of their due nourishment. But what is commonly denominated mildew, is an insect which is frequently found in vast numbers feeding upon the effused moisture. In a treatise upon this disease by M. Segar, it is conceived to be of a very sharp corrosive nature, and by its acrimony to hinder the circulation of the nutritious sap, in consequence of which the leaves begin to fade, and the blossoms and fruit to be greatly injured.

It is conceived by the first mentioned author, that the best method of removing it is by admitting more light and air, by proper thinning or pruning, so as to restore the natural vigour of the plants.

It is noticed by Mr. Forsyth, that, "contrary to the common opinion, trees are more liable to mildew on south and west walls, than on an east wall;" and that he has frequently removed such trees from a south or west wall, to a north or east wall, where they have frequently recovered.

It is advised, that "whenever danger is apprehended, to wash or sprinkle the trees well with urine and lime-water mixed; and when the young and tender shoots are much infected, to wash them well with a woollen cloth dipped in the following mixture, so as to clear them of all the glutinous matter, that their respiration and perspiration may not be obstructed.

"Take of tobacco one pound, sulphur two pounds, unslaked lime one peck, and about a pound of elder-buds; pour on them ten gallons of boiling water; cover it close, and let it stand till cold; then add as much cold water as will fill a hogshead. It should stand two or three days to settle, when the scum may be taken off, and it is fit for use.

And "there is a sweet saccharine substance found on the leaves of certain trees, which is generally but erroneously supposed to fall from heaven like dew. It is known by the title of *honey-dew*. There are supposed to be two kinds of it, one of which," Mr. Forsyth thinks, "transpires from the leaves of the trees where it is found; and the other is the excrement of a small insect called a vine-fretter, a species of the aphis. Bees and ants are very fond of both these kinds of honey-dew." As this exudation, "by its viscous quality, closes up the pores, and stops the perspiration of trees, it must of course be very hurtful to them."

This is a vegetable disease, which should, in his opinion, be treated in the same manner as the mildew, by washing at the same times.

The nature of mildew is more fully explained in speaking of it as relating to agriculture. See the preceding article.

MILDMAY, *Sir* WALTER, in *Biography*, the founder of Emanuel college, Cambridge, was surveyor of the court of augmentations in the reign of Henry VII., and privy counsellor, chancellor, and under treasurer of the exchequer in that of Elizabeth. He is celebrated for his uncommon merits in his private and public character. Sir Walter died in 1589.

MILDORFF, in *Geography*, a town of Austria; ten miles W. of Crems.

MILE', FRANCESCO, in *Biography*, born at Antwerp in 1644, was a very ingenious landscape painter, who made the heroic style of Nicolo Poussin his model, and succeeded to a very considerable degree in competition with him. In tones of colour he frequently surpasses him, and more nearly approaches Titian. He fails in the conception of scenery, and the composition of his forms.

He was poisoned, by some envious person, at the early age of 36 Had he been spared for a longer period, we may reasonably expect he would have completely rivalled his great predecessor.

MILE, in *Geography*, a long measure, whereby the English, Italians, and some other nations, use to express the distance between places. See MEASURE.

In which sense mile is used to the same purpose with league, used by the French and other nations.

The mile is of different extent in different countries. The geographical or Italian mile contains a thousand geometrical paces, mille passus, whence the term mile is derived.

The English mile consists of eight furlongs, each furlong of forty poles, and each pole of sixteen feet and a half: so that it is equal to one thousand seven hundred and sixty yards, or five thousand two hundred and eighty feet.

The mile employed by the Romans in Great Britain, and restored by Henry VII., was our present English mile. A degree of the meridian in England, N. lat. 52°, according to the late measurement of colonel Mudge, is 121,640 yards, or 69.114 miles. A geographical or sea-mile is the 60th part of such a degree, *i. e.* 2027⅓ yards; and three sea-miles make a league. A degree of the meridian in N. lat. 45°, as measured in France in 1796, is 57008 toises = 121512 yards = 69.092 English miles.

Casimir has made a curious reduction of the miles, or leagues, of the several countries in Europe into Roman feet, which are equal to the Rhinland feet generally used throughout the north.

The

		Feet.
The mile of Italy	——	50,000
of England	——	5,454
of Scotland	——	6,000
of Sweden	——	30,000
of Mufcovy	——	3,750
of Lithuania	——	18,500
of Poland	——	19,850
of Germany, the fmall		20,000
the middle		22,500

		Feet.
The mile of Germany, the largeft		25,000
of France	——	15,750
of Spain	——	21,270
of Burgundy	——	18,000
of Flanders	——	20,000
of Holland	——	24,000
of Perfia, called alfo parafanga		18,750
of Egypt	——	25,000

The following TABLE fhews the Length of Miles, Leagues, &c. Ancient and Modern, in Englifh Yards.

Ancient Roman mile	1610.348
Olympic ftadium = $\frac{1}{8}$th of an ancient Roman mile	201.2935
Stadium = $\frac{1}{10}$th of an ancient Roman mile	161.0348
Stadium = 1100dth part of a degree	111.2
Jewifh rifin, of which $7\frac{1}{2}$ = an ancient Roman mile	214.713
Gallic leuca = $1\frac{1}{2}$ ancient Roman mile	2415.522
German raft, or common league in France = 2 Gallic leuca	4831.044
Perfian parafang = 2 Gallic leagues	4831.044
Egyptian fchœne = 4 ancient Roman miles	6441.392
German league, or that of Scandinavia = 2 rafts	9662.088
The mile or league of Germany = 200 Rhenifh yards	8239.846
Great Arabian mile, ufed in Paleftine in the time of the crufades, rated at $1\frac{1}{2}$ ancient Roman mile	2415.713
Modern Roman mile	1628.466
Modern Greek mile of 7 Olympic ftadia	1409.0545
Modern French league = 2500 toifes	5328.75
Mile of Turkey, and the common werft of Ruffia, fuppofing it feven Olympic ftadia	1409.0545
League of Spain = 4 ancient Roman miles	6441.392
Large league of Spain = 5 ditto	8051.74

For other meafures of a mile, fee Tables under MEASURE.

MILE-*ftone.* This article is introduced folely for the purpofe of fuggefting an improvement under the title of *Mile-hut.* The comfort and convenience which travellers derive from mile-ftones is well known, and the dilapidations which they are fubject to, are very generally felt as a grievance. Inftead, however, of pointing out remedies for the evil (which might eafily be done), we wifh to fee them entirely fuperfeded by fubftituting mile-huts in the place of them. In every new act of parliament for a turnpike-road, or in any amended act, let it be a ftanding order that a claufe fhall be introduced, obliging the truftees to erect mile-huts on the whole line of road.

They fhould be uniform and cheap; the whole coft not to exift forty pounds: they fhould be lime-whitened in the manner of the buildings in South Wales. The door to be the place of meafurement, over which a painted board, with letters and figures very legible, denoting the place, thus, $\left\{\begin{array}{l}\text{London 5 ☜}\\ \text{Barnet 6 ☞}\end{array}\right\}$, and underneath the name of the cottager, "Jones," in a different character. Each hut fhould be furnifhed with hammers, a faw, a fcrew-wrench, nails, cords, twine, and fundry parts of harnefs to be paid for at low fixed rates by thofe requiring them, and the keepers to be under fimilar regulations for good behaviour as toll collectors. In winter each hut to have a lamp burning all night.

The advantages attending fuch a plan are more than can readily be conceived. It would infure a large fupply of cheap cottages all over the kingdom, and would be particularly convenient for the labourers who repair the roads, who would never be more than half a mile, when at work, from their home. The truftees would be fufficiently remunerated by an abatement in the wages, or an eafy rent to the occupier. Coaches, horfes, and every fort of travellers meeting with accidents, or needing affiftance, would always be within half a mile of help, and a certain knowledge of where it was to be had. But it is needlefs to enlarge, and all we wifh is, that fome member of parliament would endeavour to get the experiment tried upon fome one ftage, and we have no doubt it would foon come into general ufe.

MILECZA, in *Geography,* a town of Lithuania, in the palatinate of Wilna; 76 miles E. of Wilna.

MI-LEI, a town of China, of the fecond rank, in the province of Yun-nan. N. lat. 24° 34′. E. long. 103° 14′.

MILENT, a town of Pruffia, in the province of Pomerelia; 5 miles S.W. of Marienburg.

MILES, a Latin term, which, in its general import, fignifies *foldier.*

In our Englifh laws and cuftoms, miles is peculiarly appropriated to a knight, called alfo *eques.*

MILESARA, in *Geography,* a town of Afiatic Turkey, in the province of Diarbekir; 24 miles W. of Ourfa.

MILESBURY, a poft-town of America, in Mifflin county, Pennfylvania; 262 miles from Wafhington.

MILESIMO, a town of France, in the department of the Stura; 10 miles N.E. of Ceva.

MILETIN, a town of Bohemia, in the circle of Konigingratz; 12 miles N.N.W. of Konigingratz.

MILETO, a town of Naples, in Calabria Ultra, the fee of a bifhop; faid to have been built by the Milefians, after Darius

rius had destroyed their city. It was demolished by an earthquake in the year 1783; 22 miles S.S.W. of Squillace. N. lat. 38° 25'. E. long. 16° 25'.

MILETS, anciently *Miletus*, a town of Asiatic Turkey, on the W. coast of Natolia, once a celebrated city of Asia Minor, in Ionia. It was situated on the southern bank of the gulf into which the Meander discharged itself; but this river gradually accumulated its deposit in this gulf, that the town of Miletus was removed, in process of time, more than a league within the land. The town of Miletus was N. of the Posidæan promontory, S.E. of the promontory Trogilum, and W.S.W. of the town of Myus. This town was one of those which the Greeks conquered on their arrival in Asia. The mouth of the Meander, which was very distant from this town, was in the time of Pausanias under the walls of Miletus. This capital of Ionia was adorned with superb edifices, and was celebrated for its commerce, sciences, and arts. It had a grand temple of Ceres. The tomb of Nelleus, the son of Codrus, king of Athens, by whom the town was founded, might be seen near the walls, upon the way that led to the temple of Apollo Didymæus. This temple was burnt by Xerxes, but rebuilt by the Milesians on so large a scale, that, as Strabo reports, it was equal to a village in extent, whence it remained uncovered, but was surrounded by a thick grove, which was inhabited by the priests who served the temple. The citadel constructed by Tissaphernes, was situated on the isthmus which separated the ancient town from the new. The theatre, though built of stones, was cased with marble, and enriched with sculptures. Of all these superb edifices, there now remain merely mutilated marbles, half buried in the ground. Miletus was the native place of Thales, one of the seven wise men of Greece, and of Aspasia, the wife of Pericles. Venus had a temple at Miletus, and another in its vicinity. This city was anciently called Lelegeis, from the Leleges who inhabited it; afterwards Pitynda, from the quantity of pines which its territory produced; at a later period Anactoria; and last of all, Milesos, and in Latin Miletus. This town became illustrious by the number of colonies which proceeded from it. The Milesians, when free from a foreign yoke, were often reduced to a state of miserable vassalage by domestic tyrants. In the time of Antiochus II., king of Syria, we find that a person named Timarchus reigned in Miletus, and exercised great cruelties on the citizens, till he was driven thence by that prince, who, on that account, was honoured by the Milesians with the surname of Θεος, or God. This town lies at the distance of 64 miles S. of Smyrna. N. lat. 37° 22'. E. long. 27° 13'.

MILFOIL, in *Botany*, and the *Materia Medica*. See Achillea.

MILFORD, or Milford *Haven*, in *Geography*, a sea-port town situated in the parish of Stanton, hundred of Rhôs, and county of Pembroke, South Wales, is of very modern origin, having been founded since the year 1790, and raised to its present importance by the patriotic exertions of the honourable Mr. Greville, nephew to the late sir William Hamilton, on whose property it stands. Happening to be here with his uncle in 1784, the penetrating and scientific eye of Mr. Greville quickly perceived the many natural advantages which this situation offered for a naval and commercial establishment. He accordingly prevailed upon sir William to apply to parliament for an act to enable him to set out legal quays, establish markets, construct docks, and in general to do every thing necessary for insuring the prosperity of the intended town. This object being effected, the conduct of the undertaking was entirely committed to Mr. Greville, who immediately laid out the ground in allotments, according to a regular plan, and began his labours by the erection of a large inn or hotel. Numerous purchasers quickly appeared, so that in less than ten years the town had made considerable progress, and began to assume an air of neatness and consequence. Since that period Milford has continued gradually increasing in extent and importance. Many improvements have been made in the haven for the greater safety and accommodation of the shipping; and a dock-yard has been formed at the suggestion of lord Spencer, where several large vessels of war have been built and others repaired.

The situation of this town is most singularly beautiful, being seated on a small promontory, the sides of which descend gently to the water. The principal haven stretches itself to the south, and presents the appearance of a spacious lake. This harbour is one of the safest and most commodious in the world, and contains sixteen creeks, five bays, and thirteen roads, where upwards of a thousand sail may ride in perfect security. The town at present consists chiefly of three streets, with crossings, running in a direction from east to west, and parallel with the shore of the haven. At the extremity of the lower row of houses stands the church, an handsome edifice, consisting of a nave, chancel, and two side aisles. Several of the windows in this church exhibit escutcheons of painted glass, displaying the arms of Barlow, Hamilton, and Greville. In the chancel stands an ancient vase of red porphyry, brought from Egypt by the learned Dr. Pococke, and intended for the baptismal font, but that idea not coinciding with the religious feelings of a considerable part of the congregation, another of Derbyshire marble was fixed opposite to it for that purpose. Near the vase is placed a trunk of the mainmast of the L'Orient, the French admiral's flag ship, which was blown up at the battle of the Nile. At a short distance eastward from the church stands the old chapel of St. Catharine, formerly dependent upon Stanton, the mother church. It is a very ancient building, having the nave vaulted into a pointed roof; and since the erection of the new chapel has been converted into a powder magazine. The market-house is a very neat structure, as is likewise the custom-house; the collection for which takes in both sides of the haven from Milford town to the harbour's mouth, and round the coast of Bride's bay to St. David's. Two batteries for the defence of the town and haven have been lately erected, each of them mounting seven guns.

Milford is now the regular port for the mails from England to Waterford, for the conveyance of which five packets are stationed here, so that a daily communication is thereby kept up with Ireland. The chief trade of the town is its South sea whale fishery, which is carried on with great success by a colony of Quakers from the island of Nantucket, who were invited to settle here by Mr. Greville. They are, like most of their brethren, an industrious and well-disposed people, and have greatly contributed by their exertions to the progress of the new establishment. There is, likewise, some trade in wood and other stores requisite for the equipment or supply of his majesty's ships, or other vessels which may find it necessary to put in here for repair or safety. There are two quays for the landing of goods, and extensive storehouses for their reception, under the management of established officers. Two markets are held in this town during the week, on Tuesday and Saturday, but there are no fairs. The family of Philips derive from hence the title of baron. For the encouragement of the science of ship-building a boat-race was some years ago established here under the auspices of lord Cawdor and Mr. Greville. The prize for the winning boat of the first class of twenty feet keel, is a

cup

cup given by his lordship of the value of twenty-five or thirty pounds; and there is besides an inferior prize for boats of a second class from sixteen to eighteen feet keel.

The neighbourhood of Milford exhibits a well inclosed and highly cultivated country. Several elegant villas belonging to the merchants of Milford contribute much to its beauty. The old town of Haking stands on the W. side of the influx, call Priory Pill. Near it is an elegant observatory built by Mr. Greville, and, with the mathematical school contiguous to it, were placed under the direction of Mr. Firminger, who was for eight years sole assistant to Dr. Maskelyne. Here are likewise the ruins of the priory from whence the inlet derives its name. This religious establishment owed its foundation to Adam de Rupe, or de la Roche, who appears to have been a man of power and consequence in this district. It was dedicated to St. Mary and St. Buddoch for monks of the order of Tyrone, who in time forsook that strict rule and became Benedictines. A small portion of this edifice only now remains; most of the materials of which it was composed having been carried off within the memory of man, to assist in the erection of other buildings in the neighbourhood. The earl of Richmond, afterwards Henry VII., is said to have landed at this place, in his enterprise against Richard III., on the seventh of August, 1485. On the eastern side of the Pill, or influx, stands Castle Pill, which was formerly a fortification for its protection. In the reign of queen Elizabeth it was reckoned among the castles in Pembrokeshire; and is mentioned, in 1644, as one of the strongest posts which the royalists maintained in this part of the country. From the misconduct of the garrison, however, it was subsequently taken, after a short resistance, by a force apparently inadequate to the undertaking. The village of Stanton, which gives name to the parish in which Milford is situated, lies on the road between that town and Haverford-west. The church here was garrisoned during the civil wars by the troops of the parliament, with the view of interrupting the communication between Haverford-west and the fort already mentioned. According to the parliamentary returns of 1801, the whole population of this parish amounted to 1291 persons, a great proportion of whom resided in Milford. Fenton's Historical Tour through Pembrokeshire, 1 vol. 4to. Carlisle's Topographical Dictionary of Wales, 1 vol. 4to.

Milford, a township of America, in Mifflin county, Pennsylvania.—Also, a small town in Worcester county, Massachusetts, 18 miles from Worcester, containing 907 inhabitants.—Also, a post-town of the state of Delaware, pleasantly situated on the N. side of Maspilion creek, about 12 miles W. of its mouth in Delaware bay; containing more than 100 houses, inhabited by Episcopalians, Quakers, and Methodists.—Also, a town of Northampton county, Pennsylvania, laid out on the N.W. side of the Delaware, in an elevated situation, at Well's Ferry, 120 miles above Philadelphia. A paper-mill has been erected here by a Mr. Biddis, who has discovered the method of making paper and pasteboard by substituting a large proportion of saw-dust in the composition.—Also, a post-town of Connecticut, in Long-island sound, and in New Haven county, 13 miles S.W. of New Haven. The Indians call this town "Æopowage;" and it was settled in 1638. It contains an episcopal church, and two congregational churches.

Milford *Haven*, a deep bay on the coast of Nova Scotia, to the S.W., round the point of the strait of Canso.—Also, a bay on the N. coast of Virginia. N. lat. 37° 26'. W. long. 76° 20'.

MILHAU, a town of France, and principal place of a district, in the department of Aveyron, seated on the Tarn. In 1371, this town was taken by Edward III., king of England; 27 miles S.E. of Rodés. The place contains 6077, and the canton 10,443 inhabitants, on a territory of $297\frac{1}{2}$ kiliometres, in nine communes. N. lat. 44° 6'. E. long. 3° 10'.

MILHAUSEN, a town of the duchy of Stiria; 10 miles E. of Gratz.

MILI, a river of Sicily, which runs into the sea, seven miles S. of Messina.—Also, a town of Thibet; 45 miles N.E. of Tchiatam.

MILIANI, a town of Africa, in the kingdom of Algiers; 22 miles S.E. Shershell.—Also, a river of Africa, in the kingdom of Tunis, which runs into the Mediterranean, about 10 miles S.E. of Tunis.

MILIARENSIS, in *Antiquity*, a silver coin of the empire, substituted by Constantine in the room of the denarius; and so called because he fixed the price of the pound of gold at 1000 pieces of this new silver. But as he divided the pound of gold also into 72 solidi, each solidus really contained $13\frac{8}{9}$ miliarenses, though it passed for 14; which difference between the real and current value of the solidus, in relation to the miliarenses, must have occasioned disputes in the payment of small sums. To remedy this inconvenience, it was thought proper to alter the weight of the silver money, and having fixed the price of the pound of silver at five solidi, to coin sixty pieces out of it, which retained the name miliarenses, though the pound of gold was worth but 864. It does not appear how many miliarenses Constantine coined out of the pound of silver: but if the piece of gold was nearly the same in his reign, as when five solidi were worth a pound of silver, the pound must have been worth $14\frac{2}{5}$ pounds of silver; and 1000 divided by $14\frac{2}{5}$ gives $69\frac{4}{9}$ for the number of miliarenses coined out of the pound. Therefore it is probable, that Constantine's number was either 69 or 70. If the former, each piece should weigh $73\frac{8}{23}$ troy grains; if the latter, $72\frac{3}{16}$. According to the former estimate, the proportion of gold to silver was always $14\frac{1}{2}$ to 1; according to the latter, $14\frac{2}{7}$ to 1. Phil. Trans. vol. lxi. part ii. p. 513. See Follis.

MILIARES Glandulæ, in *Anatomy*, glandular bodies distinguished by their small size; such as the supposed glands of the skin, &c.

MILIARIUM, the name of a tall and narrow vessel, used in the bathing of the ancients, for heating water to any degree, to give warmth to the rest. See Mem. Acad. Inscript. vol. i p. 127.

MILIARY Eruption, in *Medicine*, an eruption of minute vesicles, appearing in persons confined to bed, in hot and close apartments, especially after profuse sweating. The term has been adopted from ancient times, from the resemblance of the vesicles in size and appearance to *millet* seeds.

Miliary *Fever*, a denomination given to fevers of every description, when accompanied by an eruption of miliary vesicles.

This is the light in which the more correct observation of our times has taught us to consider the *miliary fever*. The physicians of the seventeenth and the greater part of the eighteenth century describe the miliary fever, as a distinct eruptive fever, arising, like the small-pox, measles, &c., from a peculiar poison or acrimony, of the proper concoction and expulsion of which from the system the eruption was deemed evidence, according to the doctrines of the humoral pathology. Under this notion, the disease was described, by different observers, with a variety of titles, and no small degree of confusion arose from the misapplication of these titles to other diseases, which bore some resemblance to it. Thus,

Thus, it was called, the miliary disease (Morbus miliaris), the miliary fever, the vesicular fever, or simply *miliaria*, and *milliaris*, and others, confounding the vesicular appearances with the purple spots, or petechiæ of malignant fevers, or supposing them to be of a similar nature, applied the term *Purpura* to it; calling it Purpura alba, Purpura miliaris. Febris purpurata, &c. Again, another mistake, equally gross, was committed in places where the scarlet-fever was epidemic, in confounding the rash of this disease with the vesicular eruption of miliaria. This occurred particularly at Leipsic, where *scarlatina* was extremely prevalent and fatal, in the year 1652, and a history of which was published by Christ. Joan. Langius. (See his Prax. Med. part ii. cap. xiv. § 9.) This fever was extremely contagious, and spread over the greater part of the continent, and was called a miliary fever; it has been even considered by many writers as the prototype of all miliary fevers, and the first example of its appearance in Europe. See Macbride, Method. Introd. to the Theory and Pract. of Physic, part ii. chap. xvii. Hamilton de Febri Miliari. Allioni Tract. de Miliarium Orig. Progress. &c. J. Fordyce Hist. Febris Miliaris, &c.

These errors were corrected by De Haen (De Divis. Febrium, § 4.); and the true nature of the miliary eruption, as always secondary or symptomatic, and as the result of perspiration and of a continued heating regimen, in various febrile diseases (of which, indeed, Sydenham had long before expressed his belief), was satisfactorily shewn by Mr. White (in his Essay on the Management of Lying-in Women), and by Dr. Cullen (Nosol. Method. Gen. xxxii. *note*.) In truth, the occurrence of this eruption, and of the severe and often fatal symptoms of fever, with which it was accompanied, affords a lamentable proof of the mischief resulting from mistaken hypothesis on medical subjects, when carried to the bedside of the sick. For this *miliary fever* has been, at different times and places, not only produced, but actually rendered epidemic, by the mal-practice of individuals. Mr. White asserts, that a midwife at Manchester, who had very extensive practice among all ranks of women, and was tolerably successful in other respects, had a remarkable number of her patients seized with the miliary fever, during their accouchement, which proved fatal to many, particularly to the wives of several of the principal tradesmen. This disease "became so alarming and notorious, both in this neighbourhood and in distant parts of the country, as to acquire the name of the Manchester fever." While at the same time, other practitioners of the place, who pursued a different plan of treatment, met with no such fever. So that the sarcasm of Dr. Shebbeare was but too correct, when he recommended gentle means of supporting the vital heat, "otherwise the miliary eruption may be rather a symptom of the physician than of the disorder, as it is to be feared that some, through mistaken practice, have discovered a way of *making* miliary fevers, and may be called a kind of manufacturers of that disease." (Practice of Physic.) "Quid verò demum generi humano calamitosius," says De Haen, "quam quod et plebe et medicis conspirantibus, tot milleni quotannis ægri, ab ipso principio acutorum, in sudores symptomaticos agitentur, ac veluti fundantur, ut coacta omnino crisis, in plerisque aut letalis, aut periculosa saltem, producatur; interea dum salutaria naturæ molimina turbantur, confunduntur, ac penitus sufflaminantur. Faxit DEUS, ut demum sapiant Phryges!" Fe Febrium Divis. § 4. p. 84.

Hippocrates and the ancients have said little respecting this miliary fever, because they followed too steadily the dictates of nature in their practice to produce it. They do, however, mention a casual appearance of miliary vesicles, in febrile diseases. (See Hippocrates Epidem. lib. i. § 3. ægrot. 2. lib. ii. § 1. & § 3.) In like manner, those practitioners who have been conversant with the treatment of diseases during the last thirty years, have witnessed but casual and slight occurrences of these eruptions, and are totally unacquainted with the formidable miliary fever, described by the physicians of Leipsic, and subsequently very well known in this country.

It has been universally observed that women, during their puerperal confinement, although not exclusively, were the most frequently attacked by the miliary fever. This, no doubt, arose from the peculiar assiduity with which the hot and sweating regimen was enforced with puerperal women, of which Mr. White has given an impressive description. (Loc. cit. p. 6. et seq. 3d edit.) Under the suffocating heat and closeness of the room, in which was a large fire and a crowd of people, and every crevice, even the key-hole, closed; under an additional load of bed-clothes, from which the good woman was not allowed to put out her arm, or even her nose; and constantly supplied with heating liquors from the spout of a tea-pot to keep up the sweating; in such a situation, "a few days after delivery the patient is, perhaps, seized with a shivering fit, and the nurse is surprized, as she protests she has not had the least waft of cold; more clothes are heaped upon her; spirituous liquors and hot spices are given her, to throw off the cold fit, which most certainly increase the succeeding hot one. A warm room, plenty o clothes, and warm drinks are continued, to throw her into a sweat, but have frequently a contrary effect, by increasing and prolonging the burning fit; which at last terminates in a most profuse sweat, continuing many nights and days without giving relief." (Ibid. p. 13.) The tongue becomes dry and warm; the pulse quick, small, and creeping; and the patient complains of great anxiety and oppression about the præcordia, attended with sighings, lowness of spirits, lassitude, and extreme languor and debility. "If the hot regimen be continued," Mr. White proceeds to state, "with vinous spicy caudles, hot alexipharmic medicines, volatile alcalious salts and spirits, opiates, and a close room, so as to keep the patient in a perpetual sweat, vibices or petechiæ appear, or (miliary) eruptions, either of the white or red kind, or both, first upon the neck and breasts, afterwards extending themselves all over the body, one crop succeeding another till the patient is worn out; but they give no relief, are not in any way critical, nor is there indeed any crisis in this disorder, except the looseness." (P. 16.) In the miliary fever, which was epidemic among puerperal women at Leipsic, about the year 1650, many of the most violent symptoms, connected with malignant fever, concurred; such as extreme prostration of strength, restlessness, and delirium, tremors and convulsive motions of the limbs, dimness of sight, hæmorrhagies, &c. (See Gotofr. Welsch, Hist. Med. Nov. Morb. Puerp. qui *der Friesel* dicitur:—in Haller, Disput. Med. tom. v. § clxxiv.) The disease is said to have been called *der Friesel*, from the resemblance of the rough state of the skin, to a sort of cloth called *friess*.

The utmost irregularity seems to have prevailed, in respect to the period at which the miliary vesicles made their appearance. According to Welsch, it appeared as early as the second day after parturition, or within the first week: but other writers have not seen it before the fifth day, and others again on the seventh, eighth, tenth, or eleventh, on the fourteenth, sixteenth, and even twenty-eighth day. This difference would, of course, be expected to happen, in consequence of the different degrees of the hot regimen adopted in in different inſtances, and of the variety of ſeaſon and of individual conſtitution. It ſeems to be agreed, however, notwithſtanding the hypothetical notions of the ſalubrity of ſuch expulſions of ſuppoſed morbific matter from the body, that a favourable termination of the diſeaſe is not more certain from a copious eruption, or from its early appearance; but that, on the contrary, the fuller and earlier the eruption is, the greater is the danger.

The diſtinction that has been made by writers in general, reſpecting the two kinds of miliary veſicles, the *red* and the *white*, is futile; as theſe differences of colour are by no means ſpecific, but depend entirely upon the ſize of the veſicles, their tranſparency, and the degree of inflammation accompanying them: inſomuch that the eruption which is *red* in the beginning, when the veſicles are perfectly diaphanous, becomes *white* in a day or two, when the inflammation of the ſurface is leſs, and the lymph contained in the veſicles becomes of a milky opacity.

Mr. White obſerves, that "the diſeaſes, or rather the ſymptoms, which are ſaid to ſucceed the miliary fever, are hectic heats, loſs of appetite and of ſpirits, and ſwellings of the legs, feet, and thighs; but theſe are nothing more than what follow other putrid fevers. Thoſe who have had this fever are particularly liable to returns of it during their whole lives; owing moſt probably to the ſkin being over relaxed, and its tone deſtroyed, by a too hot and forcing treatment."

Miliary eruptions have been produced in conſequence of feveriſh complaints, which confined patients to bed, and occaſioned a ſweating condition of the ſkin, as well as in the puerperal ſtate. Thus it has ſometimes occurred in perſons who became feveriſh after ſome important ſurgical operation, or remained in bed in conſequence of ſome accident; it has occurred alſo in catarrhal and rheumatic fevers, where the natural tendency to ſweating is conſiderable, and in various other febrile complaints. Hence we may explain the obſervations of ſome writers on the ſubject, who ſpeak of the miliary fever as imitating or being diſguiſed under the character of other febrile diſeaſes; when, in fact, the eruption was ſecondary, and had ſupervened upon the hot and ſweating ſtate of the patient in thoſe other fevers reſpectively; ſuch as tertians, quartans, remittents, &c. (See Memoires de la Soc. Royale de Medecine, par M. Barailon, tom. i. p. 193.) Indeed there is ſcarcely any acute diſeaſe, with which the miliary eruption has not been deſcribed as combined, and with which it might be expected to be combined, while the mode of practice, which gave riſe to it, continued to be purſued: thus it has been conjoined with typhus, gout, pneumonia, meaſles, ſmall-pox, ſcarlet-fever, hooping-cough, the fever of dentition, aſthma, &c. See Allionius Tract. de Miliarium Orig. Progreſſ. Nat. et Curat. The Cure of the Miliary Fever, by a ſubject to Mithridates.

That excellent writer, Dr. Macbride, was miſled, like his leſs intelligent brethren, by the prevalent hypotheſis of the concoction and critical expulſion of morbid acrimony, and conſidered miliary fever as ſomething ſpecific, like the contagious eruptive fevers. He has accordingly deſcribed it, as occurring alone and uncombined, under the term *miliaris ſimplex*, ſeu *benigna*. "The febrile ſymptoms previous to the eruption," he ſays, "are not very high nor diſtreſſing; no great pain, thirſt, or ſickneſs; the pulſe rather depreſſed than hard; they increaſe, however, gradually till the third or fourth day, when the eruption ſtrikes out, chiefly on the neck, back, and breaſt, being preceded by a profuſe ſweat, of a ſouriſh ſmell, and a particular tingling ſenſation in the ſkin, eſpecially in the fingers, and an itching in thoſe places where the miliary puſtules (veſicles) are moſt plentiful. In about thirty hours the eruption is full out, and replete with ſerum, with a ſlight inflammation round the baſis of the little veſicles, occaſioning a fulneſs and tenſion of the ſkin. The febrile ſymptoms now ſubſide, the patient continues to ſweat plentifully, and makes higher-coloured urine, the pulſe gradually becomes full, ſoft, and equable, and by the end of the week the eruption dries up, and the cuticle falls off in ſcales." (Methodical Introd. to Theory and Pract. of Phyſic, part ii. chap. 17.) Sir Richard Blackmore gives a ſimilar account of the progreſs of the miliary eruptions, the drying of which, "in the more kindly ſort, is generally accompliſhed in ſeven days." (Treatiſe on the Plague.) But in the worſe ſorts, he ſays, the time is much protracted; and he avers, that he has ſeen the fever continue, and a ſecond, and even a third crop of the eruptions appear, and go through the ſame courſe. And Dr. Brockleſby mentions a caſe, in which the low pulſe, great proſtration of ſtrength, and other ſevere ſymptoms, continued *forty-ſix days*, in which time *four* ſucceſſive crops of miliary veſicles occurred. See his Paper on Seltzer Water, Med. Obſ. and Inquir. vol. iv. art. ii. p. 31.

Having ſtated theſe facts upon the authority of the beſt writers on the ſubject, it is ſcarcely neceſſary to enter into any detail of the diſcuſſion, relative to the origin of the miliary fever. The ſagacity of Sydenham detected their efficient cauſe in the hot regimen generally practiſed in his time, and long afterwards. "Licet ſua ſponte nonnunquam ingruant, ſæpius tamen *lecti calore* et *cardiacis* extorquentur." (Sched. Mon. de Nov. Febris Ingreſſu.) And his opinion has been ſubſtantiated, and the arguments and hypotheſis of thoſe, who denied its truth, practically refuted by the almoſt total diſappearance of the diſeaſe, even in puerperal women, ſince the rational method of ventilation and regimen, now practiſed, became generally prevalent among medical men.

It is ſcarcely neceſſary, therefore, to ſay any thing reſpecting the method of treatment. In all circumſtances, under which a perſon is confined to bed, the room in which he lies ſhould be as free from any diſagreeable ſmell or cloſeneſs as any other apartment in the houſe; which can be readily effected by the conſtant admiſſion of freſh air and by cleanlineſs: and his bed-clothes, whether he labour under fever or not, ſhould be as light as may be, provided the ſkin is not cooled below the natural ſtandard of temperature, and the patient experiences no actual ſenſation of chillineſs. Theſe rules ſhould be ſtrictly obſerved, even under a ſtate of perſpiration or profuſe ſweating; for, ſo long as no direct current falls upon the patient, coolneſs of the ſurrounding air will moderate, without ſuppreſſing, the cutaneous diſcharge. Even when the miliary eruption has appeared, in conſequence of previous improper management, coolneſs of the apartment and bed of the patient, with a free acceſs of freſh air, will be found the moſt effectual cordial, and will ſupport the ſtrength, and ſubdue the languor of body and mind more powerfully than "gallons of wine." Conſult Mr. White's able treatiſe above quoted, in which references to all the writers on the ſubject are given, and from which, as well as the Eſſay of De Haen, de Diviſione Febrium, the moſt ſatisfactory information will be obtained.

MILICIA, in *Geography*, a river of Sicily, which runs into the ſea; 10 miles E.S.E. of Palermo.

MILIEU HARMONIQUE, in *French Muſic*, is the name ſometimes given to the 3d of a common chord or triad, as being the mean or middle between the key note or fundamental baſe and its 5th.

MILILLO, in *Geography*, a town of Sicily, in the valley of Noto; 8 miles S.S.E. of Lentini.

MILIN, a town of Bohemia, in the circle of Beraun; 4 miles from Przibram.

MILIOLUM, in *Surgery*, a small tumour of the eyelids, so called, from its being of the size of a millet seed.

MILIQUEAN CREEK, in *Geography*, a river of Upper Canada, which, running northerly, discharges itself into lake Simcoe, now called "Holland's river."

MILIS, a town of Sardinia; 12 miles from Oristagni.

MILITANT, a term used of the body of Christians, while here on earth.

The Romanists divide the church into militant, patient, and triumphant: the militant is on earth; the patient, or passive, they place in purgatory; and the triumphant in heaven.

MILITARE ÆRARIUM. See ÆRARIUM.

MILITARIS TOGA. See TOGA.

MILITARIS *Via*. See VIA.

MILITARY, something belonging to the militia, or soldiery. Thus,

MILITARY *Architecture* denotes the art of fortification. See ARCHITECTURE, and FORTIFICATION.

MILITARY *Art*, is the art or science of making or sustaining war to advantage. See WAR.

MILITARY *Column*. See COLUMN.

MILITARY *Court*. See COURT *of Chivalry*.

MILITARY *Discipline*. See DISCIPLINE.

MILITARY *Estate* includes the whole of the soldiery; or such persons as are peculiarly appointed among the rest of the people for the safeguard and defence of the realm. Although the laws and constitution of this kingdom know no such state as that of a perpetual standing soldier bred up to no other profession but that of war, it has for many years past been judged necessary by our legislature, for the safety of the kingdom, the defence of the possessions of the crown, and the preservation of the balance of power, to maintain, even in time of peace, a standing body of troops, under the command of the crown, who are however *ipso facto* disbanded at the expiration of every year, unless continued by parliament; and if from experience past we may judge of future events, the army is now lastingly engrafted into the British constitution; with this singularly fortunate circumstance, that any branch of the legislature may annually put an end to its legal existence by refusing to concur in its continuance. (Bl. Com. b. i.) The military force of the kingdom comprehends regulars, including the royal marines, the militia, and volunteers. See MARINES, MILITIA, SOLDIER, and VOLUNTEERS.

MILITARY *Execution*, the delivery of a city or country up to be ravaged and destroyed by the soldiers, upon its refusing to pay the contribution money imposed upon it. It denotes also the punishment inflicted by the sentence of a court martial. See EXECUTION.

MILITARY *Exercises* are the evolutions or various manners of ranging and exercising soldiers. See BATTALION, EVOLUTION, EXERCISE, and MANUAL *Exercise*.

MILITARY *Feuds*. See FEE and FEUD.

MILITARY *Fever*, a kind of malignant fever frequent in armies, by reason of the ill food, &c. of the soldiers. See FEVER, and TYPHUS.

MILITARY *Government*, is the supreme command and disposal of all the military power of a nation, by land and sea.

MILITARY *Law*. See LAW *of Arms*, and MARTIAL.

MILITARY *Machine*. See MACHINE.

MILITARY *Merit, Order of*, in *Heraldry*, was instituted in France, in the year 1759, by Louis XV. in honour of those officers of his army who were Protestants. The marks of honour are the same as those of the order of St. Louis. The ensign of the order is also of the same form as that of St. Louis, with this difference, that on one side is a sword in pale; within this motto—PRO VIRTUTE BELLICA; and on the reverse is a chaplet of laurel; within this inscription, LUD XV. INSTITUIT 1759.

MILITARY *Music*, before the introduction of fire-arms, served to animate the soldiers in battles and assaults of places, as well as for purposes of signals for the different manœuvres and duties in camp and garrison; and, therefore there is no reason to doubt its having been used in our ancient armies. The common military instruments of music were the trumpet, drum, fife, and horns of different kinds. See an account of each under its proper title. In modern times, kettle-drums and trumpets have been chiefly appropriated to the horse. The dragoons long had the hautbois and side-drum, but about the year 1759 changed these for the trumpet: the infantry had only the drum, till the introduction of fifes. Since the introduction of light infantry, many of these companies have used the bugle-horn.

Of late years, in addition to the drums and fifes, each regiment of infantry has had its band of music. The instruments are chiefly hautbois, clarinets, French horns, bassoons, trumpets, cymbals, and in some the tabor and pipe. The band is usually composed of men borne upon the establishment of the regiment as privates, and allowed some additional pay from the non-effective fund of the field-officers and captains of companies. These officers also defray the charge for instruments, extra-clothing, music, &c. though in many corps the money paid for discharges has been applied to the support of the regimental band. Grose's Mil. Ant. vol. ii.

MILITARY *Order*. See ORDER, and KNIGHTHOOD.

MILITARY *Pyrotechny*. See PYROTECHNY.

MILITARY *Rewards*. See REWARDS.

MILITARY *Tenures*. See TENURE.

MILITARY *Testament*, among the Romans, was what we call a nuncupative will; or a testament made only by word of mouth, in the presence of two witnesses.

This was a privilege peculiar to the soldiery, and to them only when in the field; for at other times they were subject to the common laws in this respect. See SOLDIER.

MILITARY *Townships*, in *Geography*, townships of America, in the state of New York; deriving their appellation from the following circumstance. The legislature of the state granted $1\frac{1}{2}$ million of acres of land as a gratuity to the officers and soldiers of the line of this state. This tract, forming the country of Onondago, is bounded W. by the E. shore of the Seneca lake and the county of Ontario, N. by the part of lake Ontario near Fort Oswego, S. by Tioga county, and E. by Chenango county. This pleasant country is divided into 25 townships of 60,000 acres each, which are again subdivided into 100 convenient farms, of 600 acres, amounting in the whole to 2500 farms, well watered by a multitude of small lakes and rivers.

MILITARY *Ways*, *viæ militares*, are the large Roman roads, which Agrippa procured to be made through the empire, in the time of Augustus, for the more convenient marching of troops, and conveyance of carriages.

N. Bergier has wrote the history of the origin, progress, and amazing extent, of these military roads; which were paved from the gates of Rome to the extreme parts of the empire. See WAY.

MILITELLO, in *Geography*, a town of Sicily, in the valley of Demona, on the N. coast; 16 miles S.W. of Pati.

MILITES CANDIDATI. See CANDIDATI.

MILITIA, a collective term, understood of the body of soldiers, or persons who make profession of arms.

The word comes from the Latin *miles, a soldier;* and *miles* from *mille,* which was anciently wrote *mile.* For in levying soldiers at Rome, as each tribe furnished a thousand, *mille,* or *mile, men;* whoever was of that number, was called *miles.*

MILITIA, in its proper and more restrained sense with us, is used to signify the inhabitants, or, as they have been sometimes called, the *trained-bands,* of a town or county; who are armed on a short warning for their own defence. In which sense militia is opposed to regular stated forces. Soon after the restoration of king Charles II., when the feudal tenures were abolished, it was thought proper to ascertain the power of the militia, to recognize the sole right of the crown to govern and command them, and to put the whole into a more regular method of military subordination; and the order in which the militia now stands by law, is principally built upon the statutes which were then enacted, *viz.* 13 Car. II. cap. 6. 14 Car. II. cap. 3. 15 Car. II. cap. 4.

It is true the two last of them are apparently repealed; but many of their provisions are re-enacted, with the addition of some new regulations, by the present militia laws; the general scheme of which is to discipline a certain number of the inhabitants of every county, chosen by lot, for three years, and officered by the lord-lieutenant, the deputy lieutenants, and other principal land-holders, under a commission from the crown. They are not compellable to march out of their counties, unless in case of invasion or actual rebellion, nor in any case compellable to march out of the kingdom. They are to be exercised at stated times; and their discipline in general is liberal and easy; but when drawn out in actual service, they are subject to the rigour of martial law, as necessary, to keep them in order. This is the constitutional security, which our laws have provided for the public peace, and for protecting the realm against foreign and domestic violence, and which the statutes 2 Geo. III. cap. 20. &c. 9 Geo. III. cap. 42. declare is essentially necessary to the safety and prosperity of the kingdom. Blackst. Com. book i.

By the 2 Geo. III. cap. 20. all former acts relating to the raising of the militia are repealed, except in such cases as are therein specially directed to be subject to the provisions of the former acts, or any of them; particularly with regard to the city of London, the Tower Hamlets, and the Cinque Ports. Several statutes were subsequently enacted, which it is needless to recite; because by the 42 Geo. III. c. 90. the chief former acts relative to the militia are from June 26, 1802, repealed; excepting such as relate to the city of London, Tower Hamlets, the Stannaries, and the Cinque Ports. The militia raised under such acts shall be subject to this act; and all deficiencies under the former militia laws are to be supplied, and the men so raised are to serve according to this act. It is first provided by this act that the king shall appoint lieutenants for the several counties, &c. with full power to call together, arm, array, and cause to be trained and exercised such persons, once in every year; and such lieutenants shall appoint 20 or more persons, duly qualified, to be deputy-lieutenants, and shall also appoint a proper number of colonels, lieutenant-colonels, majors, and other officers, qualified to train, discipline, and command the persons to be armed and arrayed. The names and ranks of all such officers to be certified to his majesty, and subject to his approbation. Every person, appointed to be a deputy-lieutenant, shall be either in law or equity, for his own use and benefit, in possession of a freehold, copyhold, or customary estate for life, or for the life of his wife, she having a freehold, copyhold, or customary estate for her life, or for some greater estate, or of an estate for some long term of years determinable on one or more life or lives, in manors, messuages, lands, tenements, or hereditaments, in England, Wales, or the town of Berwick-upon-Tweed, of the yearly value of 200*l.* or shall be heir apparent of some person in like manner possessed to the yearly value of 400*l.*; a colonel, to the yearly value of 1000*l.* or heir apparent to the yearly value of 2000*l.*; a lieutenant-colonel, to the yearly value of 600*l.* or heir apparent to the yearly value of 1200*l.*; a major, to the yearly value of 400*l.* or heir apparent to the yearly value of 800*l.*; a captain, to the yearly value of 200*l.* or heir apparent to the yearly value of 400*l.* or he shall be a younger son of some person who shall be, or at the time of his death was, possessed of a like estate of the yearly value of 600*l.*; a lieutenant, to the yearly value of 50*l.* or personal estate alone to the amount of 1000*l.* or real and personal estate together of the value of 2000*l.* or he shall be son of some person who shall be, or at the time of his death was, possessed of a like estate of the yearly value of 100*l.* or of a personal estate alone to the amount of 200*l.* or real and personal estate together to the value of 3000*l.*; an ensign, to the yearly value of 20*l.* or a personal estate alone to the amount of 500*l.* or real and personal estate together of the value of 1000*l.* or he shall be son of some person who shall be, or at the time of his death was, possessed of a like estate of the yearly value of 50*l.* or who shall be, or at the time of his death was, possessed of a personal estate alone to the amount of 1000*l.* or of real and personal estate together of the value of 1500*l.*; one moiety of which said estates, excepting of lieutenants and ensigns, shall be situate within the respective counties, ridings, or places, in which they shall be appointed to serve.

Provided, that the immediate reversion or remainder of and in manors, messuages, lands, tenements, or hereditaments, which are leased for one, two, or three lives, or for any term of years determinable on the death of one, two, or three lives, on reserved rents, and which are to the lessees of the clear yearly value of 300*l.* shall be deemed equal to an estate herein before described, of the yearly value of 100*l.* and so in proportion. f. 10.

Also, a person, either at law or equity, for his own use and benefit, in possession of an estate for a term originally granted for 20 years or more, of an annual value (over and above all rents and charges payable in respect of the same) equal to the annual value of such an estate as is required for the qualification of a deputy-lieutenant and commissioned officer respectively, and situate as aforesaid, shall be deemed sufficiently qualified.

In the counties of Cumberland, Huntingdon, Monmouth, Westmorland, and Rutland, and in every county and place in Wales, the qualifications shall be as follow, and of the like estates as before mentioned:

A deputy-lieutenant's shall be of the yearly value of 150*l.* or he shall be heir apparent to an estate of the yearly value of 300*l.*; a colonel's of the yearly value of 600*l.* or he shall be heir apparent to the yearly value of 1200*l.*; a lieutenant-colonel's or major commandant's shall be of the yearly value of 400*l.* or he shall be heir apparent to the yearly value of 800*l.*; a major's shall be of the yearly value of 200*l.* or he shall be heir apparent to the yearly value of 400*l.*; a captain's shall be of the yearly value of 150*l.* or he shall be son of a person who shall be, or at the time of his death was, possessed of a like estate of the yearly value of 300*l.*; a lieutenant's shall be of the yearly value of 30*l.* or a personal estate alone to the amount of 600*l.* or real and personal together

gether of the value of 1200*l.* or he ſhall be the ſon of a perſon who ſhall be, or at the time of his death was, poſſeſſed of a like eſtate of the yearly value of 60*l.* or a perſonal eſtate alone to the amount of 1200*l.* or a real and perſonal eſtate together of the value of 2400*l.*; an enſign's, of the yearly value of 20*l.* or a perſonal eſtate alone to the amount of 300*l.* or real and perſonal together of the value of 600*l.* or he ſhall be the ſon of a perſon who ſhall be, or at the time of his death was, poſſeſſed of a like eſtate of the yearly value of 30*l* or of perſonal eſtate alone to the amount of 600*l.* or real and perſonal together of the value of 1200*l.*; of all which reſpective eſtates (except thoſe for the qualifications of lieutenants and enſigns), one moiety ſhall be within the reſpective counties or places in which ſuch officers ſhall be reſpectively appointed to ſerve.

In the iſle of Ely, a deputy-lieutenant's ſhall be of the yearly value of 150*l.* or he ſhall be heir apparent to the yearly value of 300*l.*; a captain's ſhall be of the yearly value of 100*l.* or he ſhall be heir apparent to the yearly value of 200*l.* or he ſhall be a younger ſon of ſome perſon who ſhall be, or at the time of his death was, poſſeſſed of a like eſtate of the yearly value of 300*l.*; a lieutenant's ſhall be of the yearly value of 30*l.* or perſonal eſtate to the amount of 600*l.* or he ſhall be ſon of ſome perſon who ſhall be, or at the time of his death was, poſſeſſed of a like eſtate of the yearly value of 60*l.* or perſonal eſtate to the amount of 1200*l.*; an enſign's ſhall be of the yearly value of 20*l.* or perſonal eſtate to the amount of 300*l.* or he ſhall be the ſon of ſome perſon who ſhall be, or at the time of his death was, poſſeſſed of a like eſtate of the yearly value of 30*l.* or perſonal eſtate to the amount of 600*l.*; one-half of all which eſtates (except thoſe for the qualifications of lieutenants and enſigns), ſhall be ſituate or ariſing within the ſaid iſle of Ely, or ſome other part of the county of Cambridge.

In all cities or towns which are counties within themſelves, and have heretofore uſed to raiſe and train a ſeparate militia within their reſpective liberties, and which are united with and made part of any county for the purpoſes of raiſing the militia only, the lieutenant thereof, or, where no lieutenant, the chief magiſtrate, ſhall appoint the deputy-lieutenants, and alſo the officers of the militia, whoſe number and rank ſhall be proportionable to the number of men which ſuch city or town ſhall raiſe as their quota towards the militia of the county to which they are united for ſuch purpoſes; and all powers and proviſions made with reſpect to counties at large ſhall take place in the ſaid cities or towns. And the qualification for a deputy-lieutenant ſhall be 150*l.* a-year as aforeſaid, or a perſonal eſtate alone, or real and perſonal eſtate together, to the amount or value of 3000*l.* Field officer 300*l.* or perſonal eſtate alone, or real and perſonal together, to the value of 5000*l.* Captain 150*l.* a-year, or perſonal eſtate alone, or real and perſonal together, to the value of 2500*l.* Lieutenant 30*l.* a-year, or perſonal eſtate of 750*l.* Enſign 20*l.* a-year, or perſonal eſtate of 400*l.* One-half of all which real eſtates (except thoſe for the qualification of lieutenants and enſigns) ſhall be within ſuch city or town, or within the county to which ſuch city or town is united for the purpoſes aforeſaid. ſ. 9.

The whole number of private men to be raiſed, excluſive of certain places that are excepted, is 39,572; in various proportions for the ſeveral counties. Such numbers ſhall continue to be the reſpective quotas, until the 25th day of June, 1805, and from thence until other quotas ſhall be appointed by his majeſty's privy council; and the reſpective quotas that ſhall at or after the expiration of the ſaid firſt mentioned period, and alſo from time to time at or after the expiration of every ſucceſſive ten years after ſuch period, be ſo appointed by the privy council, ſhall from the appointment thereof continue until other quotas ſhall be appointed under this act.

By this act proviſion is made for a "Supplementary Militia;" for in caſe of invaſion, or imminent danger of it, and alſo in caſe of rebellion, the king may (the occaſion being firſt communicated to parliament if ſitting, or declared in council, and notified by proclamation, if there be no parliament ſitting) by his proclamation order and direct, in addition to the number of militia-men aforeſaid required to be raiſed under this act, any number of men not exceeding one-half of the aggregate number of the militia to be raiſed and enrolled. Theſe men ſhall, in purſuance of ſuch proclamation, be raiſed by the lieutenants and deputy-lieutenants. His majeſty may alſo, by proclamation, diſembody the ſupplementary militia; and the privates ſo diſembodied, or thoſe enrolled and not embodied, ſhall remain liable to ſerve and to ſupply all vacancies. The lieutenants and deputy-lieutenants ſhall hold meetings, and iſſue precepts for returning liſts, and ſettling of liſts, for proportioning the numbers in the ſeveral hundreds, &c., and the deputy-lieutenants ſhall cauſe the number appointed to ſerve to be choſen by ballot out of the liſt returned for every pariſh, &c. Pariſhes are allowed to offer volunteers without ballotting.

The perſons exempted from ſerving in the militia, or providing ſubſtitutes, are peers of this realm; commiſſioned officers in his majeſty's other forces, or in any of his caſtles or forts; non-commiſſioned officers and private men ſerving in any of his majeſty's other forces; commiſſioned officers ſerving, or who have ſerved four years in the militia; members of either of the univerſities; clergymen; licenſed teachers of any ſeparate congregations; conſtables, or other ſuch peace officers; articled clerks, apprentices, ſeamen or ſeafaring men; perſons muſtering and doing duty in any of his majeſty's dock-yards; perſons free of the company of watermen of the river Thames; perſons employed and muſtered at the Tower of London, Woolwich Warren, the ſeveral gun-wharfs at Portſmouth, Chatham, Sheerneſs, and Plymouth, or at the powder mills, magazines, or the houſes under the direction of the board of ordnance; and poor men who have more than one child born in wedlock. And by 43 Geo. III. c. 123. a perſon ſerving or having found a ſubſtitute in the army of reſerve; and by 44 Geo. III. c. 54. any effective volunteer. Perſons ballotted, that refuſe to ſerve or provide a ſubſtitute, ſhall forfeit 10*l.* which, by 43 Geo. III. c. 50. is increaſed to 15*l.* and at the expiration of five years, be liable to ſerve again, in perſon or by ſubſtitute. Thoſe who have ſerved are to be returned home in due time, ſo that they may reach the county to which they belong, if abſent from it, by the expiration of their term; unleſs they ſhall conſent to ſerve again. The enliſting of perſons enrolled to ſerve in the militia, for ſervice in his majeſty's other forces, ſhall be deemed null and void. The militia are required to be trained and exerciſed by regiment or battalion, once in a year for twenty-eight days together (43 Geo. III. c. 19.): and the penalty of not appearing, or deſerting, is the immediate payment of 20*l.* or impriſonment for ſix months, or till the money is paid. In caſe of actual invaſion, or immediate danger of it, or rebellion in this kingdom, his majeſty, communicating the occaſion to parliament, if ſitting, or declared in council, and notified by proclamation, if parliament be not ſitting, may order the militia to be embodied, put under the command of general officers, and led to any part of the kingdom, but not to go out of it; and they ſhall be ſubject to the acts againſt mutiny

and

and desertion. And any person not appearing, shall be liable to be apprehended and punished as a deserter; and if any person shall harbour or conceal any such militia man, he shall for every such offence forfeit 100*l.* From the date of his majesty's command for drawing out the militia into actual service, the officers and privates shall be entitled to the same pay as those of other infantry. Officers of the militia, during the time of service, are exempted from the office of sheriff, nor does the acceptance of a commission in the militia vacate the seat of any member returned to serve in parliament (42 Geo. III. c. 90.): and private men from highway duty, from parish offices, and serving in his majesty's other forces by sea or land. Militia men, when sick, are entitled to relief; and their destitute families to a weekly allowance out of the poor rates of the parish, &c. to which they belong. If they are maimed or wounded in actual service, they are entitled to the benefit of Chelsea-hospital: they may set up trades in any part of the kingdom.

As the militia of the city of London are now raised and regulated under and by virtue of the 36 G. 3. c. 92. and 39 G. 3. c. 82: And as the militia of the Tower Hamlets are now raised and regulated by the 37 G. 3. c. 75. and c. 25. and the same are thereby respectively made subject to certain provisions in the 26 G. 3. c. 107. by this act repealed; it is enacted, that, from and after the passing of this act, all and every the clauses, provisions, powers, authorities, punishments, bounties, penalties, forfeitures, matters, and things in this act contained, in relation to any persons, acts, matters, and things as to which the 26 G. 3. c. 107. or any of the clauses or provisions thereof, were in force or applicable as to the said respective militias, shall, from and after the passing of this act, be applied, practised, and put in full force as to all such persons, matters, and things, as far as the same can be applied, and are not contrary to any of the provisions of the said respective acts, or any or either of them: But nothing in this act contained shall be construed to extend to repeal any of the provisions of the said acts, or either of them, other than such as are in and by the said acts made subject to the rules and regulations of the 26 G. 3. c. 107.

Nothing in this act shall extend to the tinners in Devon and Cornwall; but the lord warden of the stannaries for the time being in pursuance of his majesty's commission in that behalf, and such as he shall commissionate and authorize under him, shall use the like powers, and array, assess, arm, muster, and exercise the said tinners as has been heretofore used, and according to the ancient privileges and customs of the stannaries.

The lord warden of the cinque ports, two ancient towns and their members, and in his absence his lieutenant or lieutenants, shall put in execution within the same all the powers and authorities granted by this act, in like manner as his majesty's lieutenants of counties and their deputy-lieutenants may do; and may keep up and continue the usual number of soldiers in the said ports, towns, and members, unless he or they find cause to lessen the same; and the militia of the said ports, towns, and members, shall remain separate from the militia of the several counties within which the said ports, towns, and members are situate; and the said warden, or his lieutenant or lieutenants, shall, in pursuance of orders from his majesty, in the manner prescribed by the 13 and 14 Car. 2. notwithstanding one or more months pay advanced be not reimbursed, raise and draw out the soldiers into actual service, and cause the persons charged as by the said act to provide their soldiers with pay in hand, not exceeding one month's pay, in such manner as if all the pay advanced and provided had been reimbursed; and shall use the like powers, and array, assess, and arm, muster and exercise the said soldiers, and make assessments, and issue warrants for the assessments made or to be made for raising any trophy money, and for defraying the necessary charges of trophies, and other incident expences of the militia of the said ports, towns, and members, as hath been heretofore used, and according to their ancient privileges and customs; any thing in the said act or this act to the contrary notwithstanding.

By 48 Geo. III. c. 111. and subsequent acts, a particular species of force is ordered to be raised under the name of the "Local Militia;" the provisions of which act regulate the mode of raising the same kind of force in the Cinque Ports, Stannaries, and some other privileged places. The number of men ballotted and enrolled under this denomination in any county, division, or part of any county, shall not exceed such number as will, including the effective yeomanry and volunteers then serving in such county, &c. exclusive of supernumeraries above the establishment of such corps, serving without pay, who shall have been enrolled therein after the 1st of April 1808, amount to six times the respective original quota or proportion of militia of such county, &c. under the 42 Geo. III. c. 90. The deficiencies in effective yeomanry and volunteers in any county, &c. shall be supplied from time to time by local militia men; so that the number in the whole of the local militia under this act, and effective yeomanry and volunteers, shall be equal to six times the amount of such quota or proportion. Volunteers are allowed to enter, whether any order be given for supplying deficiencies or not, until the local militia be completed; and such volunteers shall receive two guineas each, payable on their respective enrolment. By 49 Geo. III. c. 40, this is repealed, except as to members of volunteer corps. Volunteers transferring themselves into the local militia, are not liable to serve in the regular militia, in consequence of any former ballot. The men to be raised under the act 48 Geo. III. c. 111. shall be ballotted out of the persons between the ages of 18 and 30 returned in the lists now existing, or hereafter returned, amended or corrected for the raising of the militia; and his majesty may direct the making out of new lists; and no person ballotted to serve in the local militia shall be allowed to find any substitute, or be entitled to any bounty or half bounty. Persons ballotted are to take a prescribed oath, and then to be enrolled to serve in the local militia of such county as a private local militia man for the space of four years. Persons unable to serve from illness or bodily infirmity shall be excused; and persons exempted are licensed teachers of any congregation in holy orders, or pretended holy orders, and not carrying on any other trade, or exercising any other occupation for his livelihood, except that of a school-master; such medical men actually practising as physicians, surgeons, or apothecaries; no person mustered, trained, or doing duty, or employed in his majesty's service in the Tower of London, the royal arsenal at Woolwich, or at any gun wharfs, or at any powder mills, powder magazines, or other storehouses belonging to his majesty, under the direction of the board of ordnance, shall be liable to be ballotted for the local militia, so long as they respectively continue within any of the aforesaid descriptions; and every person who shall have served, or is now serving in person in the additional military force, raised under an act passed in the forty-third year of the reign of his present majesty, or who shall have been ballotted, and have provided any substitute, or shall have paid any fine for not serving or finding a substitute in such additional force, shall be exempt from ballot and service in the local militia, in like manner, and for the same period, as such person was or is exempt from ballot and service in the regular militia

during

during the continuance of the said act of the forty-third year aforesaid; any thing in any act or acts of parliament to the contrary notwithstanding.

No person having served in the regular militia or such additional force, or provided any substitute, or paid any fine for not serving, or finding any substitute in the regular militia or such additional force as aforesaid, shall be entitled to exemption from being ballotted under this act, for any longer period than four years after the expiration of his period of service, if he shall have served in person, or six years from the period of any such substitute being enrolled, or four years after having paid any such fine.

And no articled clerk or apprentice, nor any poor man who has less than three children born in wedlock, nor any person under the height of five feet four inches, who shall be of the height of five feet two inches, or upwards, shall by reason thereof, respectively be exempt under this act, notwithstanding they may, by reason thereof, respectively be exempt from the militia.

Provided that nothing in this act contained shall extend to authorize any apprentice ballotted under this act, to enlist in the army, navy, marines, or regular militia, or to enter as a volunteer in the local militia, without the consent of his master; provided also, that no ballot, enrolment, and service under this act, shall make void or in any manner affect any indenture of apprenticeship or contract of service between any master or servant, notwithstanding any covenant or agreement in any such indenture or contract, and no service under this act of any apprentice or servant shall be deemed to be an absence from service, or a breach of any covenant or agreement as to any service or absence from service in any indenture of apprenticeship or contract of service.

And every person claiming to be exempted from service under this act, upon payment of the fine of twenty pounds, or ten pounds, instead of thirty pounds, shall sign a declaration that the amount of his income does not exceed two hundred pounds or one hundred pounds as aforesaid, as the case may be, and shall deliver the same to the deputy-lieutenants before whom he shall appear to claim such exemption, or produce a certificate to the like effect, allowed by any commissioners under any act relating to the rates and duties arising on property, &c. or to any allowances made on any such rates and duties, within twelve months previous to the production of such certificate. Quakers, or united brethren, on production of certain certificates, shall not be enrolled, and may be adjudged to pay a proportion of the fines on persons ballotted, and not appearing. Persons serving in the local militia are entitled to the same exemptions as volunteers, and having served four years, are not liable to be ballotted for the regular militia for two years. Local militia officers shall not be exempt from serving the office of sheriff.

His majesty may order the local militia to be called out yearly to be trained; but they are not to be trained for more than 28 days in a year, nor to be ordered to march for that purpose further than some adjoining county. In case of invasion, or appearance of an enemy in force upon the coast of any part of the united kingdom, his majesty may order the local militia to be embodied and marched to any part of Great Britain, and continue there, so embodied, for any period not exceeding six weeks after the enemy shall have been prevented or repelled, or driven from the coast, or after any rebellion or insurrection shall have been suppressed. Lord lieutenants, &c. may call out the local militia for the suppression of riots, and those who do not appear are subject to certain penalties; but when so called out, they are not to be kept assembled for more than 14 days in one year. Local militia assembled in time of war are subjected to the mutiny act. Every person enrolled to serve in the local militia shall, upon being assembled for training and exercise, be entitled to receive one guinea for the first year of his service, and 10*s.* 6*d.* for each succeeding year; and a further sum of one guinea in case such person shall be embodied under any order of council or proclamation. The local militia, when not drawn out and embodied, shall be entitled to the same pay, clothing and allowances, as the regular militia are when not embodied; and when drawn out and embodied, shall be entitled to the same pay, clothing, and allowances, for themselves and families, as his majesty's other militia forces when drawn out and embodied. Local militia men may enlist in the army, navy, or marines, or regular militia of the same county; and their vacancies shall be supplied as other vacancies. No person shall enlist a local militia man during the period of training, on penalty of 20*l.* Every county, hundred, or parish, is subject to a fine of 15*l.* for each man deficient at a certain period, but it shall be entitled to a return of part, for every man enrolled within a certain time.

MILITUM CURIA. See CURIA.

MILITUM *Expensis levandis.* See EXPENSIS.

MILIUM, in *Botany*, an ancient name for a sort of corn or grass, remarkable for the abundance of its seeds; hence Festus, against whom we certainly can have no appeal, derives it from *mille*, a thousand. The plant of the Romans however was either a *Holcus*, or the *Panicum miliaceum*, or both; and our Linnæan genus has obtained this appellation from its resemblance in seed to those.—Linn. Gen. 33. Schreb. 47. Willd. Sp. Pl. v. 1. 358. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 75. Prodr. Fl. Græc. Sibth. v. 1. 44. Ait. Hort. Kew. ed 2. v. 1. 147. Juss. 29. Leers. 18. t. 8. f. 7.—Class and order, *Triandria Digynia.* Nat. Ord. *Gramina.*

Gen. Ch. *Cal.* Glume of two, nearly equal, ovate, tumid, pointed valves, inclosing a single flower. *Cor.* of two ovate valves, less than the calyx, permanent, finally cartilaginous, enfolding the seed; one of them smaller than the other. Nectary of two ovate, obtuse leaflets, tumid at the base. *Stam.* Filaments three, capillary, short; anthers oblong, versatile. *Pist.* Germen roundish; styles two, capillary; stigmas tufted. *Peric.* none, except the hardened and polished corolla, which closely invests the solitary roundish *seed.*

Eff. Ch. Calyx of two valves, single-flowered, tumid. Seed invested with the permanent hardened two-valved corolla.

1. M. *capense.* Cape Millet-grass. Linn. Mant. 185. Willd. n. 1.—"Panicle capillary. Calyx pointed. Corolla with a terminal curved awn."—Native of the Cape of Good Hope. *Stems* four inches high, smooth and slender. *Leaves* narrow, clothed underneath with scattered hairs, and bearded at the top of their sheath. *Panicle* spreading every way; the flower-stalks finer than a hair. *Calyx* of two ovate, slightly swelling, pointed valves, of nearly equal length. *Seed* the length of the calyx. *Awn* terminal, curved, longer than the flower." Such is the description Linnæus gives of this grass, which no botanist has ever been able to ascertain. Nothing in his herbarium bears this name, and yet there can be no doubt of his having described a specimen of his own. In writing the second *Mantissa*, he was often negligent about marking the plants he described. There is found in his genus *Avena*, confounded with the Spanish *A Loeflingiana*, from which it is very distinct, a Cape specimen, which answers precisely to his description of the *Milium* in question, except that the calyx generally contains

tains two florets, each with the twisted awn of an *Avena*. This however is as good a *Milium* as *M. paradoxum*, and we have no scruple in considering it as what Linnæus intended. The hairy sheaths and backs of the *leaves*, as well as the bearded *stipula*, are remarkable. The *corolla* is externally hairy. We cannot refer this grass to any in Thunberg's *Prodromus*.

2. M. *punctatum*. Dotted Millet-grass. Linn. Sp. Pl. 91. Amoen. Acad. v. 5. 392. Swartz. Obs. 37. Brown. Prod. Nov. Holl. v. 1. 188.—Panicle of alternate, linear, simple clusters. Lower flowers in pairs; upper solitary. Flower-stalks jointed. Outer valve of the corolla with a short awn. Native of Jamaica, in moist meadows. *Swartz*. Gathered by Mr. R. Brown near Port Jackson, as well as in the tropical part of New Holland; by Dr. Rottler at Madras. A pale upright grass, with the habit of a *Leersia*, or a *Paspalum*. *Stem* from one to two feet high, simple, round, jointed, smooth, leafy. *Leaves* broadish, striated, slightly roughish, with long smooth sheaths. *Panicle* a span long, erect, close, with hairy stalks. *Flowers* crowded, turned one way, ovate, acute, hairy. *Corolla* included, elliptical; its outer valve tipped, as Dr. Swartz and Mr. Brown observe, with a short rough awn. A purple stain, like a dark dot, under each flower, seems to have given rise to the specific name.

3. M. *lendigerum*. Panick Millet-grass. Linn. Sp. Pl. 91. Schreb. Gram. v. 2. 14. t. 23. f. 3. Engl. Bot. t. 1107. Fl. Græc. Sibth. v. 1. 49. t. 65. (Agrostis australis; Linn. Mant. 30. A. ventricosa; Gouan. Hort. 39. t. 1. f. 2. Knapp. t. 25. Gramen paniceum serotinum, spicâ laxâ pyramidali; Moris. v. 3. 189. n. 12. *Herb. Bobart.*)—Panicle close, somewhat spiked. Corolla awned, fringed.—Native of fields in the south of Europe, where water has stagnated; rather rare in England. Dr. Sibthorp found it on the sandy sea-shore of Asia Minor. It is annual, and flowers in the latter part of summer. The tufted fibrous *roots* produce many *stems*, from ten to twenty inches high. *Leaves* rough, with slightly swelling sheaths, and long, white, torn stipulas. *Panicle* pale, erect, acute, from one to four inches long, of innumerable crowded *flowers*; the base of their *calyx* tumid, smooth and polished. The permanent hardened *corolla*, which invests the seed, makes this species more certainly a *Milium*, than an *Agrostis*.

4. M. *compressum*. Compressed Millet-grass. Swartz. Ind. Occ. 183. Willd. n. 4.—Spikes two or three together, linear, on a very long stalk. Flowers alternate, close-pressed, awnless. Stem compressed, jointed in the middle.—Common in barren, rather alpine pastures in Jamaica; communicated by Dr. Swartz. *Roots* white, thread-shaped, perennial. *Stems* a foot high, or more, smooth, compressed quite flat, with a downy joint about the middle. *Leaves* long, linear, smooth, finely striated, radical; except one from the joint in the middle of the stem, which is broader, with a very long compressed sheath, bearded at its orifice. *Flower-stalks* from four to eight, from the sheath of the stem-leaf, about a foot long, thread-shaped, smooth, each bearing a pair of terminal, erect, linear, slender *spikes*, about two inches long, sometimes accompanied by a third at some distance, all together resembling some of the genus *Panicum*. The *common stalk* of each is zigzag and acutely angular. *Flowers* small, elliptic-oblong. *Calyx* ribbed, brownish, minutely fringed.

5. M. *digitatum*. Fingered Millet-grass. Swartz. Ind. Occ. 181. Willd. n. 5—Spikes finger-like, about four together, nearly sessile. Florets acute, awnless, close-pressed, in pairs, directed one way. Leaves with cartilaginous serratures.—Gathered by Dr. Swartz in barren pastures, in the south of Jamaica. This appears to be still more akin to *Panicum* than the last, having sometimes a minute third valve to its *calyx*. The *stem* is a foot high, simple, slender, upright, smooth. *Leaves* lanceolate, short, striated, with compressed bearded sheaths. *Spikes* terminal, slender, somewhat spreading, two inches long, purplish. *Flowers* in pairs, rather unequal, on serrated stalks.

6. M. *paniceum*. Panick-like Millet-grass. Swartz. Ind. Occ. 179. Willd. n. 6.—Spikes rather finger-like, alternate, spreading, thread shaped. Flowers triangular, awnless, stalked, in pairs, turned one way.—In dry sandy ground, in the southern part of Jamaica. *Swartz*. *Stem* a foot high, simple, slender, erect, roundish, smooth. *Leaves* linear, smooth; their sheaths hairy at the orifice. *Spikes* three or four, slender, alternate, but near together, at the top of a long slender stalk, spreading. *Flowers* minute. *Glumes* of the *calyx* somewhat fringed; the outer one convex; the inner flat. *Corolla* the shape and size of the calyx, smooth, brown and shining, finally blackish, containing the very small seed.

7. M. *effusum*. Spreading Millet-grass. Linn. Sp. Pl. 90. Curt. Lond. fasc. 4. t. 12. Engl. Bot. t. 1106. Knapp. t. 19. Willd. n. 7. (Gramen miliaceum; Ger. em. 6.)—Flowers loosely panicled, awnless. Glumes elliptical, pointless, sheaths of the leaves smooth.—Native of shady groves, where the ground is rather moist, throughout Europe, flowering in June or July. *Root* creeping, perennial. *Stems* erect, two or three feet high, leafy, smooth. *Leaves* light green, broad, flat, roughish at the edges; their sheaths smooth and naked, crowned by an oblong membranous *stipula*. *Panicle* erect, lax and widely spreading, composed of several alternate fascicles of variously branched capillary flower-stalks. *Flowers* solitary, pale whitish-green, elliptical, rather acute, but not pointed; their *calyx-glumes* even, finely ribbed, generally quite smooth, sometimes minutely roughish, never hairy nor fringed. *Corolla* at length horny, quite smooth and finely polished.

8. M. *confertum*. Close Millet-grass. Linn. Sp. Pl. ed. 1. 61. ed. 2. 90. Willd. n. 8. (Gramen paniculatum alpinum latifolium, paniculâ miliaceâ sparsâ; Scheuchz. Agrost. 134.)—Flowers closely panicled, awnless. Glumes elliptical, pointless. Sheaths of the leaves smooth.—Native of Switzerland. Haller asserts under his n. 1525. Hist. v. 2. 243, that this proved, on an inspection of Scheuchzer's specimen, a mere variety of the last. We know it not.

9. M. *arundinaceum*. Reed-like Millet-grass. Sm. Prodr. Fl. Græc. Sibth. v. 1. 45. Fl. Græc. t. 66. (Agrostis miliacea; Linn. Sp. Pl. 91. Willd. Sp. Pl. v. 1. 363.)—Flowers loosely panicled. Corolla awned, smooth. Calyx taper-pointed. Sheaths of the leaves smooth. Stipula very short, abrupt.—Native of Siberia, Spain, Portugal, Zante, and the neighbourhood of Athens. The modern inhabitants of Zante call it γεγλαγη. The *root* is perennial, tufted, with tortuous, downy, strong fibres. *Stems* numerous, two feet high, round, smooth, most knotty in their lower part. *Leaves* spreading, acute, roughish, with close smooth sheaths. *Panicle* rather turned to one side, slender, constructed much like that of *M. effusum*, but the *flowers* are only half as large, with ovate, tumid, long-pointed *calyx-glumes*, often reddish. *Corolla* ovate, the outer valve tipped with a rough awn, twice its own length. *Seed* coated with the hardened *corolla*, which makes the plant a true *Milium*, its resemblance to *Agrostis Spica-venti*, hinted by Linnæus, chiefly regarding its first aspect, and disappearing on a close examination.

10. M. *angulosum*. Little Angular-husked Millet-grass.—Flowers closely panicled, awnless. Glumes ovate, acute, strongly

ftrongly ribbed and furrowed. Sheaths of the leaves hairy.—Gathered in the Sandwich iflands, by Archibald Menzies, efq. This has the habit of the three preceding, but is diftinguifhed by the hairinefs of the backs of the *leaves*, and of their fheaths. The joints of the *ftem* are denfely bearded. *Panicle* rather clofe, at leaft in the dried fpecimen, drooping. *Flowers* fmaller than even thofe of *M. arundinaceum*, their glumes ftrongly ribbed, bluntly pointed, deftitute of awns, and of all hairinefs.

11. M. *fetofum*. Briftly-hufked Millet-grafs.—Flowers clofely panicled, pointed, awnlefs. Calyx fringed with long hairs. Sheaths of the leaves hairy.—Gathered in the Sandwich iflands, likewife by Mr. Menzies. *Root* of ftrong fmooth fibres, probably annual. *Stem* branched, a foot or more in height, with numerous joints, under each of which it is rough and hairy. *Leaves* and their fheaths very hairy, light green. *Panicle* much like the laft, but fhorter. *Glumes* of the calyx ftrongly furrowed, with a fhort but ftout point, fcarcely amounting to an awn; they are remarkably fringed, with a few fine long fpreading hairs, at each fide. *Corolla* elliptical, awnlefs, very fmooth, fmaller than the calyx.

12. M. *tenellum*. Small Tumid Millet-grafs. Cavan. Ic. v. 3. 37. t. 274. f. 1.—Panicle ovate, denfe, awnlefs. Calyx-glumes inflated, almoft hemifpherical, very fmooth. Sheaths of the leaves fwelling, ribbed, fmooth.—Gathered in fandy ground in Spain by the late Abbé Cavanilles, to whom we are obliged for a fpecimen. This is a little annual vernal grafs, in habit, fize and colour like *Aira caryophyllea*, along with which it grows. The *ftems* branch from the bottom, and are clothed with a few fhort, narrow, involute *leaves*, with long, inflated, ribbed, purplifh, fmooth fheaths. The upper part of each *branch* is naked, round, fmooth, rigid, purple, bearing an ovate, denfe, glittering *panicle*, an inch long. *Glumes* of the calyx rugofe at the keel, ovate, almoft hemifpherical, concave, enclofing the much fmaller *corolla*, which latter we have not feen in an advanced ftate, fo as to judge of the generic character. The afpect of the glumes of the *calyx* is that of a *Briza*.

13. M. *globofum*. Globofe Millet-grafs. Thunb. Jap. 49. Willd. n. 9.—Panicle fpreading, awnlefs; its partial ftalks annulated. Calyx-glumes ovate, obtufe. Sheaths of the leaves fringed.—Gathered by Thunberg in Japan. *Stem* fimple, erect, a foot high or more. *Leaves* lanceolate, ftriated, rough, bordered, fpreading, hardly a finger's length; their fheaths fringed at the edges and orifice. *Panicle* fomewhat ovate, fpreading; its ftalks capillary, zigzag, marked with a yellow ring near the top. *Calyx* ovate, obtufe, awnlefs, fmooth, brownifh-green. *Thunb.*

14. M. *paradoxum*. Black-feeded Millet-grafs. Linn. Sp. Pl. 90. Scop. Carn. t. 1. Schreb. Gram. v. 2. 50. t. 28. f. 2. Hoft. Gram. Auftr. v. 3. 16. t. 23. Willd. n. 10.—Panicle fpreading. Calyx ovate, taper-pointed, ribbed. Corolla long-awned, fmooth. Sheaths of the leaves fmooth. Stipula elongated, acute.—Native of the fouth of France, and of Carniola. A tall, flender, reed-like grafs, with narrow, fmooth, rather glaucous, taper-pointed *leaves*, whofe fheaths are clofe and fmooth, and their *ftipula* long, white, thin, membranous, acute, torn at the point. *Panicle* with folitary, fpreading, flender, compound branches. *Flowers* very large in proportion to all the foregoing, one-third of an inch in length. *Calyx-glumes* purplifh, ovate, concave, keeled and ribbed, with a long membranous point. *Corolla* half the length of the calyx, finally becoming black, hard and polifhed, its outer valve tipped with a long rough awn.

15. M. *racemofum*. Racemofe Millet-grafs.—Flowers in a fimple upright clufter. Calyx elliptical, acute, ribbed. Corolla long-awned, hairy. Leaves lanceolate, with fmooth fheaths.—Sent by the Rev. Dr. Muhlenberg from Lancafter in Pennfylvania. The *ftem* is flender, leafy, fmooth. *Leaves* lanceolate, flat, taper-pointed, half an inch broad. *Flowers* the fize of the laft, four or five, in a flender, erect, perfectly fimple *clufter*, with finely downy ftalks. *Calyx* many-ribbed, green. *Corolla* at length brown, clothed with a few fine hairs, and not much polifhed, bearing a long rough awn.

16. M. *cærulefcens*. Bluifh Millet-grafs. Desfont. Atlant. v. 1. 66. t. 12. Sm. Prodr. Fl. Græc. Sibth. v. 1. 45.—Panicle fpreading. Calyx ovate, taper-pointed. Corolla fmooth, with a flight awn fhorter than the calyx. Sheaths of the leaves fmooth. Stipula elongated, jagged.—Gathered by Desfontaines in the fiffures of rocks on mount Atlas, and by Dr. Sibthorp abundantly in the Greek ifles.—This has nearly the appearance of *M. paradoxum*, efpecially the *panicle*, but the *leaves* are more narrow and glaucous, the *corolla* fmaller, with only a fhort deciduous awn.

17. M. *villofum*. Shaggy-flowered Millet-grafs. Swartz. Prodr. 24. Obf. 383. Willd. n. 11. (Andropogon infulare; Linn. Sp. Pl. 1480. (Gramen avenaceum, paniculâ minùs fparfâ, glumis albâ fericeâ lanugine obductis; Sloane Jam. v. 1. 43. t. 14. f. 2.)—Panicle flightly fpreading, awnlefs. Calyx clothed with long hairs. Sheaths of the leaves fmooth.—Native of Jamaica and the Brazils. The *leaves* are lanceolate, roughifh. *Panicle* of very numerous angular branches. *Flowers* about half the fize of the laft, remarkable for the long filky hairs that clothe the *calyx*. *Awns* none. This fpecies feems rather to belong to the genus *Saccharum*. We know nothing of its *corolla*.

18. M. *ramofum*. Branching Millet-grafs. Retz. Obf. fafc. 6. 22. Willd. n. 12.—Stem branched, compreffed, decumbent. Flowers clofely panicled, hairy, ufually in pairs. Sheaths of the leaves fmooth.—Native of the Eaft Indies. *Stems* leafy, downy at the joints. *Leaves* linear, narrow, quite fmooth as well as their fheaths. *Panicles* feveral, on long ftalks, from the fheaths of the upper leaves, each a fpan long, clofe, fimply branched. *Flower-ftalks* thickened and fringed at the top, with a black ring under each flower. *Calyx* lanceolate, hairy. *Corolla* fmooth, polifhed, hard, the outer valve with a rigid point fhorter than the calyx. *Stigmas* long, feathery, brown. The nature of the *corolla* being confidered, the doubts of the accurate Retzius, whether this grafs fhould be reckoned a *Milium* or *Agroftis*, vanifh.

Milium *Arundinaceum*, a name by which fome authors call the lachrymæ Jobi, or Job's tears.

Milium *Indicum*, a name by which fome authors call the maize, or Indian wheat.

MILK, in *Rural Economy*, and *Animal Chemiftry*, is a white opaque fluid, fecreted by a certain organ exifting in all lactiferous animals. This fecreting apparatus is differently fituated in different animals. In women it is placed in the anterior part of the breaft: in the cow, the mare, the ewe, and fome others, it is fituated in the lower part of the abdomen. While in the fow, the bitch, and feveral other quadrupeds, it is arranged through the whole courfe of the abdomen. The glandular fubftance which conftitutes this organ is called the mamma: that projecting portion of the mamma, from whence the milk iffues, being called the papilla, or nipple. The mammæ are more or lefs in number in different animals, according to their number of young, fome having as many as ten, others but one. In the human fubject the mammæ are two, each having one nipple. In the cow but one mamma, with four nipples. This organ in all animals appears deftined to furnifh their

young

young with nouriſhment, till their own digeſtive organs are capable of performing their functions. Hence we find the period of lactation in animals to commence when they bring forth their young. This ſhews a ſtrong connection between the ſecretion of milk, and the uterine action. All this may eaſily take place from the great connection between thoſe branches of nerves which are beſtowed upon the mammæ and the uterus.

At the age of puberty, the ſame nervous connection which may induce the uterine action, may, at the ſame time, be alſo beſtowed upon the mammæ, cauſing them to be enlarged. During pregnancy, the nervous influence which is expended in forming the ſecretions for the growth of the fœtus, is, after delivery, transferred to the mammæ to produce lactation. Since ſecretion is dependent upon nervous influence, all ſubſtances moderately ſtimulating muſt facilitate the formation of milk. Some have ſuppoſed that the mammary artery is too ſmall to furniſh the quantity of milk which is furniſhed during lactation, and have thought that the chyle has been the principal ſource of this fluid. Fourcroy is of opinion, that the more ſubſtantial part of milk only is ſecreted from the blood, and that the aqueous part is furniſhed from the lymphatic veſſels. What renders this idea plauſible is, the very different ſtates in which we find cows' milk from different kinds of food.

Milk, as an article of food, and its products, are of ſuch importance in domeſtic economy, as to render all the improvements in its production and management particularly valuable. Since the milk of the cow is the moſt abundant and in general uſe, we ſhall confine the analyſis of this ſubſtance to cows' milk.

Milk, when drawn from the cow, is of a yellowiſh-white colour, and is the moſt yellow in the beginning of the period of lactation. The viſcidity of milk is ſomething greater than that of water. In this ſtate it has a peculiar but pleaſant odour, which becomes leſs by expoſure to the air, but returns when expoſed to heat. Its taſte is peculiar, rather agreeable, and ſomewhat ſaccharine. This, however, varies in different animals, and in the ſame animal, from particular kinds of food. Cabbage and turnips, when eaten by cows, give each their peculiar flavour to milk; and if they eat the ſmalleſt quantity of wild garlic, the milk and butter become perceptibly flavoured with its peculiar odour.

The ſpecific gravity of milk, on the average, is about 1.035, water being 1. According to Briſſon, whoſe authority on this phyſical property of bodies ſtands high, the following are the ſpecific gravities of the milk of different animals.

Women's milk - - -	1.0203
Cows' - - - -	1.0324
Goats' - - - -	1.0341
Mares' - - - -	1.0346
Aſſes' - - -	1.0355
Ewes' - - - -	1.0409

The ſpecific gravity of cows' milk varies from ſeveral cauſes. It is greateſt at the beginning of lactation. It is the leaſt when the milk appears the thinneſt, or when it is the moſt aqueous. Cows feeding on grains, which is the caſe frequently in large towns, give poor milk, of little ſpecific gravity.

When milk is expoſed, in a cold ſituation more eſpecially, it ſoon becomes covered with a ſubſtance, of greater viſcidity than the milk, of a yellow colour, and having an unctuous feel. This is called cream. The quantity of this ſtratum bears different proportions to the milk under different circumſtances. The milk now loſes ſome of its viſcidity, and becomes of a bluer colour. In this ſtate it is known by the name of ſkimmed milk. See DAIRYING.

When milk is expoſed to heat, it firſt ſwells, and boils, it is ſaid, at the temperature 199° of Fahrenheit. The ſurface ſoon becomes covered with a pellicle, which, if removed, is ſoon ſucceeded by another. This effect would take place till the reſiduum would become of an aqueous appearance, and incapable of furniſhing any pellicle. This ſubſtance formed on the ſurface, is found no longer to poſſeſs the properties of milk, but is a peculiar ſubſtance called caſeous matter, and is the ſame which conſtitutes the ſolid matter called cheeſe.

When milk is very ſlowly evaporated it forms a kind of thick extract of milk, which is called *franchipane*. This being mixed with ſugar, almonds, and orange flowers, conſtitutes a ſort of ſweetmeat or cuſtard.

When milk is diſtilled, a liquor comes over which has the odour of milk, but does not poſſeſs any other of its properties. It ſoon becomes putrid, depoſiting white flakes. If the heat be raiſed and continued, the thick part of the milk undergoes the deſtructive diſtillation. Empyreumatic oil, zoonic acid, and ammonia, are formed, with the diſengagement of carburetted hydrogen gas. After the proceſs, a voluminous coal is found in the ſtill.

When milk has been expoſed for ſeveral days in a temperature from 60° to 70°, it becomes a thick coagulum, ſo ſolid as not to be capable of pouring. During this change it is found that an acid has been formed which has ſeparated the milk into two portions, the one the coagulable part, called curd, or caſeous matter; the other the ſerous part, called whey. This change is alſo effected by other acids and by alcohol. The mineral acids are not proper for this purpoſe, becauſe they re-diſſolve the curd. Hence the vegetable acids are ſaid to produce more curd than the mineral acids. The ſubſtance generally employed by cheeſe-makers to ſeparate the curd, is a ſmall portion of the inner coat of the ſtomach of the calf, which is ſalted, dried, and kept for that purpoſe.

By a particular management milk may be made to undergo the vinous fermentation, by which a quantity of alcohol is formed. It will be eaſy to infer, however, that this change is occaſioned by the ſaccharine matter which it contains.

The Tartars have long been in the practice of making a vinous liquor, from which they diſtilled a ſpecies of brandy. This they procure from mares' milk, which is known to contain more ſugar than that of the cow. By expoſing it in large open veſſels, the fermentation takes place. The maſs being large, no doubt contributes to this change. A quantity both of the lactic and acetic acids are formed at the ſame time, which are ſeparated from the vinous ſpirit by repeated diſtillations. The curdy or caſeous part of milk above alluded to, is preſſed into molds for cheeſe. (See DAIRYING and CHEESE.) Although acids ſeparate the curd when added in ſmall quantity, yet when in conſiderable quantity, the curd becomes re-diſſolved. It is remarkable, that dilute vegetable acids ſeparate the curd without re-diſſolving it, while theſe acids, concentrated, diſſolve the ſame. The curd is, on the contrary, eaſily diſſolved by the dilute mineral acids, but not by theſe acids in their concentrated ſtate.

Many other ſubſtances coagulate milk, ſuch as alcohol, molaſſes, gelatine, and all aſtringent vegetables. The effect is ſuppoſed to ariſe from the affinity of the coagulating ſubſtance to water, the curd, which is principally albumen, having very little affinity for the ſame. The alkalies diſſolve curd with great facility, owing to their great affinity

affinity for that substance. If ammonia be added to milk which has curdled, it will restore it to the appearance of milk, by dissolving the curd. Lime has also the power of dissolving curd. If quick-lime be boiled with curd into the form of pulp, it forms a most powerful cement. A similar property may perhaps belong to barytes and strontian.

When curd is freed from cream, kneaded, and pressed to expel the liquid matter, it becomes very hard with time, assumes a degree of transparency, and possesses many of the properties of dried coagulated albumen. Exposed to heat, it softens and becomes glutinous. The heat being continued, it becomes brown, exhales fumes, which contain ammonia; and lastly, inflames, leaving a dense coal behind.

The dried curd does not change by exposure to the air, but if it contains moisture, it soon putrifies, giving a disagreeable fetid odour. This change would take place in cheese, if it were not for muriat of soda, which also acts as a seasoning. It is likely that certain proportions of nitre, muriat of soda, and sugar, would make an agreeable seasoning for cheese, and would be a better preservative than salt alone.

If curd remains in cold water for a length of time, its properties become changed; it becomes fat, unctuous, and soft, having, at the same time, a fetid smell. It is, doubtless, to a certain degree of this change that we may attribute what is called the ripening of cheeses, by laying them in a damp place, and turning them from time to time. The cheeses absorb a quantity of water, and gain much weight. Their bulk is increased, and the interior is much altered, and is said to be ripe or mellow. Instead of allowing the cheese to absorb water, it is not uncommon for epicures to saturate it with port wine, or strong ale.

The white colour of milk, after the cream has been separated, is owing to the curd. This substance, in numerous minute particles in a state of coagulation, constitutes its white opaque appearance, since the whey, after the last portions of curd and cream have been separated, becomes transparent and limpid.

The clear liquor last mentioned is what we shall now examine under the name of whey, or the serum of milk. It differs from the whey of dairies, since the latter always contains a portion of oily matter, as well as some unseparated curd. To get the serum or whey sufficiently pure for chemical examination, a small quantity of fresh membrane of the calf's stomach must be employed to coagulate the milk. This will be more effectually done by boiling them together till the change takes place. Previous, however, to this, the milk must be perfectly freed from its cream, by placing it in a cool situation, and skimming it frequently. When the curd is separated, first strain it through a coarse cloth; afterwards filter it through unsized writing paper.

In this state the whey is limpid, and of a greenish-yellow colour. It has a peculiar sweetish smell when hot, which it loses on cooling. Its taste is rather sweet, and not disagreeable. When exposed to a boiling heat, a whitish scum rises to the surface, the liquid becoming rather turbid. If it be boiled a little while, and then set to cool, that which rendered it turbid falls, leaving the liquor clear, and almost as colourless as water. This residuum last named, is a small portion of curd which remained in the whey. The clear liquor thus obtained is of less specific gravity than milk, being 1.0193. By slow evaporation, it affords crystals of a substance much resembling sugar, but much less soluble. This has been called sugar of milk. Near the end of the evaporation, crystals of the muriats of potash and soda are deposited, and some phosphat of lime.

The circumstance of muriat of potash being afforded in this analysis, is strongly in favour of the idea that milk is not wholly secreted from the blood, since potash is never found in that fluid. The sugar of milk is in the form of crystals of a brown-yellow colour. These, when purified by several successive solutions and evaporations, become white, of a prismatic shape, or rather parallelopipedons.

This substance is soluble in about four parts of boiling water, and twelve of cold. It is manufactured and sold in Switzerland, under the name of salt or sugar of milk.

When treated with nitric acid, with a view to obtain oxalic acid, a smaller portion of this acid is obtained than from the same weight of sugar. Scheele, however, who first made this experiment, found that a quantity of white powder was separated, which he found to be a peculiar acid, and which he denominated the acid of sugar of milk. This has been altered into *Saclactic acid*, which see. Fourcroy found that the same acid was afforded by treating gum arabic with nitric acid. On this account he called it the mucous acid. It was from this latter fact that this sagacious chemist inferred that sugar of milk was a substance of a middle nature between gum and sugar. It is the opinion of Deyeux and Parmentier, that sugar of milk consists of sugar combined with the saclactic acid.

The mother water, from which the sugar of milk is obtained, is of a brown colour, and of a thick gluey consistence, which, on cooling, assumes the appearance of animal jelly. If this be diluted and slowly evaporated a second time, an additional quantity of the muriat of potash is separated in crystals, and also of phosphats of soda and lime. The presence of phosphat of lime in the serum of milk, may be detected both by precipitating its acid and its base. If oxalat of ammonia be poured into the clear whey, a precipitate of oxalat of lime is formed. On the other hand, when nitrat of lead or nitrat of mercury is employed as a test, the phosphats of lead and mercury are precipitated. The great quantity of phosphat of lime in milk, in order to supply ossifying matter, so essential to young animals, is a remarkable provision of nature.

The remaining part of the whey chiefly consists of gelatine. If when whey has been evaporated to the consistency of syrup, a quantity of alcohol be poured upon it, a flaky precipitate is formed, consisting of gelatine and sugar of milk. The gelatine may be separated by tannin. Thus we see that whey consists of sugar of milk, gelatine, muriats of potash and soda, and phosphats of lime and soda, with a certain quantity of water. It is also said that whey contains sulphat of potash, and the phosphats of iron and magnesia.

Whey is exceedingly liable to turn sour. The acid which is formed, was thought by Scheele to be what he termed the lactic acid; the same which is formed when milk coagulates spontaneously. It is, however, now found to be the acetic acid, arising from the acetous fermentation which has succeeded the vinous; the latter being induced by the saccharine matter which the milk contains.

Having given the analysis of milk deprived of cream, or the oily part, we shall now give some account of the latter, which is also denominated the butyraceous part of milk.

Cream, the mode of separating which we have already given, gradually thickens by exposure to the air, and ultimately becomes a soft unctuous solid, called cream cheese. When cream is exposed to its boiling heat, and oil soon appears upon its surface, the rest of the cream consists of caseous matter and whey. This oil, by the operation of churning, is converted into a solid fatty substance, so well known under the name of butter. See BUTTER and DAIRYING.

If milk, when newly taken from the cow, be agitated for ſome time, the oily matter becomes concrete, and is diſperſed through the fluid in ſmall grains. Theſe being collected, conſtitute butter. It was formerly thought, that the agitation of the milk merely collected and preſſed the ſmall particles of butter together. It is now believed that the butter does not exiſt ready formed in the milk, but in a ſtate of oil, which requires to combine with oxygen before it can become hard. This idea is rendered plauſible by ſeveral circumſtances. The more acid the cream has become before churning, the ſooner butter is formed. It has alſo been aſcertained, that the preſence of freſh atmoſpheric air facilitates the formation of butter. The frequent inſtances which occur in practice, of not getting butter at any rate, may doubtleſs be traced to the want of a ſupply of oxygen. This may be a hint of ſome importance in the management of large dairies.

When butter has been obtained from cream, the liquid remaining conſiſts of milk, containing minute particles of butter. If cream has been kept till it ſhall have become ſour, the curd becomes precipitated. In this caſe it becomes of a thicker conſiſtence. This is known by the name of butter-milk.

Butter, prepared as above, is of a yellow colour, and more yellow as the cream has been kept longer. Its taſte is very unlike any other fatty ſubſtance, and extremely agreeable. This, however, is not always the caſe, ſince its flavour is ſometimes altered by the food of the cow. When it has been expoſed to the air for a certain time, it acquires a rancid taſte. Its flavour ſometimes becomes changed, and rendered diſagreeable, by a portion of the butter-milk which has not been waſhed out of it.

Butter, when newly made, fuſes in about 99° of Fahrenheit. Its ſpecific gravity is about .96, water being 1. When it is expoſed to the heat of boiling water in a glaſs tube, a portion of curd and whey is ſeparated from it. By this proceſs the butter becomes almoſt tranſparent; but it will be found to have loſt much of its agreeable taſte. Hence it would ſeem, that its flavour either depends upon the ſmall portion of ſerum and curd, which is always a conſtituent of butter, or that its aroma is expelled by the heat. Butter is not changed by a heat which merely fuſes it.

When butter is diſtilled from a ſmall glaſs retort, ſome drops of water firſt appear, and the greater part of the butter comes over. This is accompanied by a diſagreeable ſmell, and an inflammable gas. A ſmall quantity of coaly matter is left at the bottom of the retort, which contains phoſphat of lime. By repeated diſtillation, the oily ſubſtance which comes over becomes lighter and more volatile. This is probably owing to the ſeparation of carbon. If the retort be large, the oxygen, being more abundant, cauſes the formation of more water with the hydrogen from the butter. Another portion of the hydrogen and a portion of carbon combine with the oxygen, forming ſebacic acid.

Butter combines with moſt of the ſubſtances which combine with fat, ſuch as ſulphur, phoſphorus, the alkalies, and ſeveral metallic oxyds.

By collecting the different parts which have been given, we ſhall find the conſtituents of cows' milk as follows: curd; ſerum or whey, which conſiſts of water; gelatine; ſugar of milk, or mucaceous ſaccharine matter; muriats of ſoda and potaſh; ſulphat of potaſh, and the phoſphats of lime; magneſia and iron; butter, conſiſting of an oxygenated oil, combined with a little ſerum and caſeous matter.

In caſes where the milk of animals is taken away periodically by milking, as in the cow, the ſupply is continued, and hence the great value of that animal, in particular, to man, who is indebted to her for three of the moſt uſeful articles of food, milk, butter, and cheeſe. But in reſpect to the quality of milk, it differs conſiderably in different circumſtances and ſituations, and from the manner in which the cows are fed and managed. In order to have an abundant ſupply, it is neceſſary to have recourſe to conſtant plentiful feeding of the animals with rich luxuriant green food of different ſorts, given in a proper varied manner, as well as other kinds of food. In comparing the qualities of the milk of different cows, the time in which they have been in milk ſhould be fully conſidered, as the milk, ſoon after calving, is always much thinner than it is afterwards. The properties of milk, ſo far as they regard the dairy, and the management of it in reſpect to the making of butter and cheeſe, will be taken notice of in another place. In caſes where the mother is loſt, or the young animal is too feeble to have recourſe to her teats, milk with ſugar, gruel, and a ſmall quantity of ſpice, is ſometimes given as a means of ſupport. See DAIRYING, LACTOMETER, BUTTER, and CHEESE.

The milk of different animals differs conſiderably.

Women's milk is much thinner than cows' milk; is of a bluer colour, and contains more ſaccharine matter. It does not afford butter till ſome time after delivery, although it contains ſome oily matter. It contains leſs curd than the milk of the cow. The milk of women is liable to greater changes from diſeaſe than any other. Spaſms, which are not uncommon to thoſe who ſuckle, ſo change the milk, as to be unpleaſant and unwholeſome to the infant. It is obſerved by Deyeux and Parmentier, that when the milk is drawn from the breaſt at ſhort intervals, it is conſtantly watery and poor, and is of but little ſervice to the infant. They therefore recommend, that the intervals of ſuckling ſhould be as great as poſſible, without inconvenience to the infant or the nurſe.

The milk of the aſs is alſo different from cows' milk: it contains more ſaccharine matter, and, like women's milk, is thinner than that of the cow. There is nothing in this milk more than in others, to warrant the medical qualities which ſome aſcribe to it.

Aſſes' milk is ſaid to be a great beautifier and preſerver of the ſkin. Poppæa, wife of the emperor Nero, uſed it for that purpoſe; having four or five hundred aſſes conſtantly in her retinue, to furniſh her every morning with a freſh bath. The receipt for making what is called artificial aſſes' milk is as follows:

℞ limac. terreſt. contus. xviii. Raſur. C. Cervi, Hordei perlati, Rad. eryngii, ſing. unc. i. aquæ puræ lib. vi. coque leni igne in vaſe ſigulino vitriato ad lib. iii; dein cola et adde ſyrupi balſamici ſeſcunciam. Capiat æger mane et veſperi quotidie unc. iv. hujus liquoris miſtas cum lactis vaccin. recentis p. æ. Med. Tranſ. vol. ii. p. 341.

Goats' milk is ſomething thicker, and appears richer than even the cows' milk. It has a peculiar aroma, which, from the black goat, is ſo ſtrong as to be diſagreeable. It affords butter and cheeſe: the former is of a whiter colour than that from the cow, and is ſaid to keep longer.

Ewes' milk has the appearance of cows' milk. It affords a much larger quantity of cream, forming a ſoft and very fuſible butter. Its caſeous matter is very ſoft and unctuous, and is ſometimes mixed with that from the cow, to give it a rich appearance.

Mares' milk is the next to women's milk in quantity of ſaccharine matter: it affords little cream; and does not eaſily coagulate.

coagulate. It is from the quantity of fugar contained in this milk, that it affords alcohol by fermentation.

Milk, in the *Wine Trade.* The coopers know very well the ufe of fkimmed milk, which makes an innocent and efficacious forcing for the fining down of all white wines, aracks, and fmall fpirits; but is by no means to be ufed for red wines, becaufe it difcharges their colour. Thus, if a few quarts of well-fkimmed milk be put to a hogfhead of red wine, it will foon precipitate the greater part of the colour, and leave the whole nearly white; and this is of known ufe in the turning red wines, when pricked, into white; in which a fmall degree of acidity is not fo much perceived.

Milk is, from this quality of difcharging colour from wines, of ufe alfo to the wine-coopers, for the whitening of wines that have acquired a brown colour from the cafk, or from having been haftily boiled before fermenting; for the addition of a little fkimmed milk in thefe cafes precipitates the brown colour, and leaves the wines almoft limpid, or of what they call a water whitenefs, which is much coveted abroad in wines as well as in brandies.

Milk-*Abfcefs.* See Abscess *of the Breaft.*

Milk-*Fever,* a fever frequently attacking women the fecond or third day after being delivered, occafioned probably by fome circumftance attending the fecretion of the milk into the breafts. It is of fhort duration, and not attended with danger. For the treatment and cure, fee Labour, *Natural.*

Milk *of the Moon, lac lunæ,* a name given by naturalifts to foffil agaric, a white light marle. See Lac *lunæ.*

Some fay, it is chiefly found in filver mines, and that it is a flower fublimed from the ore of that metal; whence its denomination, *flower of filver.*

Milk *of Sulphur, lac fulphuris,* a preparation of flowers of fulphur and falt of tartar; prefcribed by phyficians as a fudorific. See Sulphur *Præcipitatum.*

Milk-*Vetch,* in *Botany.* See Astragalus.

Milk-*Vetch, Baftard.* See Vetch.

Milk-*Vetch,* or *Goat's-thorn,* in the *Materia Medica.* See Tragacanth.

Milk, *Virgin's, lac virginale,* compofed of roch alum, fpring-water, litharge, and vinegar; ufed as a cofmetic, to drive in pimples, and check any cutaneous eruptions, by its cooling, reftringent quality. See Virgin's *Milk.*

Milk-*Water.* See Water.

Milk-*Wood,* in *Botany.* See Trumpet-*flower.*

Milk-*Wort.* See Polygala.

Milk-*Wort,* or *Wart-wort.* See Spurge.

Milk-*Wort, Sea.* See Glaux.

Milk, in *Geography,* a river of Jamaica, which runs into the fea, four miles N.W. of Maccaree bay.

Milk *Cove,* a creek of Ireland, on the S.E. fide of the entrance into Rofs bay, near Gully Head.

Milk *Haven,* a fmall harbour of Ireland, in the county of Sligo, S. of Donegal bay.

Milk *River,* a river of Canada, which runs into lake Erie, N. lat. 42° 28′. W. long. 82° 22′.

MILKING, the means or operation of drawing the milk from the cow or other animal. The proper milking of cows is a matter of much confequence to the cow and dairy farmer. And it has been obferved, that more care is neceffary in this bufinefs than is generally fuppofed, in order to obtain the largeft poffible quantity of milk. "On the phyfiological principle of the fecretions of animals being increafed in proportion as the fecreted fluid is more frequently withdrawn, it has been, it is faid, recommended to have recourfe to more frequent milkings in order to augment the quantity of that fluid in cows. And there can be little doubt but that by accuftoming the fecretory organs to a more frequent fecretion, fuch a habit may be eftablifhed in them as will afford a large proportion of milk in a given time. But in order to effect this in the moft perfect manner, it will be neceffary to have the cows highly fed, and to obferve the greateft regularity and exactnefs in the periods of milking, and to be careful that every drop of milk is drawn away each time, as without due regard in thefe refpects the defired effect will not be produced. This is fully fhewn to be the cafe by the few experiments that have been inftituted with the view of deciding the matter; as while the cows were confuming the more juicy fpring food, there appears to have been an increafe in the quantity of milk both by three and four milkings in the day; but in the autumnal feafon there feems to have been rather a decreafe under the fame circumftances." But "in order to afcertain the advantages to be obtained in this way with accuracy, the following experiments were made by Mr. Marco, and the refults ftated in the twelfth volume of the Annals of Agriculture to be thefe:

		Pints.
1789—May 21,	Firft meal - -	$9\frac{1}{2}$
	Second ditto - -	13
		$22\frac{1}{2}$
22,	Firft meal - -	13
	Second do. - -	8
	Third do. - - -	5
		26
23,	Firft meal - -	12
	Second do. - -	7
	Third do. - -	6
	Fourth do. - -	1
		26
October 22,	Firft meal - -	11
	Second do. - -	6
		17
23,	Firft meal - -	11
	Second do. - -	3
	Third do. - - -	3
		17
24,	Firft meal - -	10
	Second do. - -	$1\frac{1}{2}$
	Third do. - - -	$1\frac{1}{2}$
	Fourth do. - -	3
		16

But it is evident, that "fuch trials, to afford any fatisfactory conclufions, fhould have been continued for a much greater length of time, being varied confiderably in the times of milking, and nicely compared with the nature and quantity of the food employed; as it is only by afcertaining how much depends upon the fimple operation of taking away the milk, and how much upon the quality and proportion of food that is taken in, that the queftion can be fairly decided.

decided. The deterioration of the animal should also be considered. It is not to be supposed that merely increasing the number of milkings for a few days can have much influence in altering the state of the secretion in the animals. Some, with the intention of increasing the quantity of milk, have recommended milking, when the cows are fully fed in the summer season, three times in the course of the day at equal distances, as the convenience of the business will admit as the most proper. Early in the morning, about the middle of the day, and in the evening before it is too late. The exact proportion of increase in the milk that may be produced in this way over that of milking in the morning and evening only, which is the usual mode, has not, that we know of, been ascertained with any degree of accuracy; but some suppose that it may approach to nearly one-half of the whole, while others contend that it cannot be any thing near so much. If a third were gained, by such means, it would amply repay the cow-keeper for his additional trouble and expence."

With respect to "the method of milking adopted by cow-farmers in most cases, it is only to have their milking performed twice in the course of twenty-four hours. In such cases the most proper times would seem to be about seven o'clock in the morning, and five in the afternoon; but in the neighbourhood of London, according to the Report of Middlesex, and in other large towns, it is the practice to have this work performed from four to half-past six in the morning, and from half-past one to three in the afternoon. It is, therefore, probable, that more frequent milking in the business of cow-farming, especially when conducted upon an extensive scale, would not only be inconvenient but impracticable. In such cases it is supposed, that all that can be done is, perhaps, that of having the operation executed with as much care as possible, in respect to the whole of the milk being taken away each time, and by persons who are careful and perfectly accustomed to the work. Where this is neglected, much loss may be sustained not only in the immediate produce of the milk, but in the cows becoming much more quickly dry, as well as their being more subject to affections of the udder. The best advice is, to have the business performed in an expeditious manner, in regard to the whole of the animals, and with the utmost attention in respect to cleanness. A sufficient number of persons should of course be employed in proportion to that of the cows. An expert milker is capable of performing the operation on from six to seven or eight cows in the course of an hour." It is proper that the number of milkers employed should constantly be such as to have the business performed in about the course of an hour at the farthest. See Dairy, and Dairying.

Milking *Pail*, in *Rural Economy*, the vessel made use of for containing the milk as it is drawn from the cow. These pails are made of wood, and sometimes hooped with iron at the bottom. They are made of different sizes, and should be kept well seasoned by frequent scalding.

MILKNESS, a provincial term applied to a dairy. See Dairy.

MILKOVAIA Dervina, in *Geography*, a town of Kamtschatka, settled by a colony of Russians; 15 miles N. of Verchnei Kamtschatka.

MILKY Grotto. See Grotto.

Milky *Way*, *via lactea*, or *galaxy*. See Galaxy.

MILL, John, in *Biography*, a learned English divine and biblical critic, was born at Shapp, in Westmorland, about the year 1645. He was entered of Queen's college, Oxford, where he took his degrees in arts, and of which college he afterwards became a fellow and eminent tutor. As soon as he entered into holy orders he distinguished himself by his pulpit talents, and was much followed as an eloquent preacher. He published one of his sermons preached at St. Martin's-in-the-Fields about the year 1676, intended to shew that there was no sort of foundation for the worship of the Virgin Mary, and at this period the bishop of Exeter appointed Mr. Mill one of his chaplains, and gave him a prebend in his cathedral church. In 1680 he took his degree of B.D., and in the following year was presented by his college to the rectory of Blechingdon, in Oxfordshire, at the same time proceeded doctor in divinity, and was nominated chaplain in ordinary to king Charles II. Dr. Mill had been some years employed in preparing for the press his valuable edition of the "New Testament," which is now as rare as it is excellent. This great work he undertook by the advice and with the encouragement of Dr. Fell, bishop of Oxford, at whose expence it was to be printed. At an early stage of the business the liberal-minded prelate died, and his executors being unwilling to proceed with the work, Dr. Mill, with a noble spirit, refunded to them the sums of money which his departed friend had advanced, and determined to complete it at his own risk. To this work, which cannot fail to transmit his name with distinguished honour to posterity, he devoted the thirty last years of his life, with the most patient assiduity, as well as scrupulous care, and he had the satisfaction of seeing his useful labours brought to a close, and the fruits of them presented to the world. In 1685, Dr. Mill was elected principal of St. Edmund's hall, Oxford, which preferment was the more acceptable, as it gave him an honourable settlement in the university, and enabled him to prosecute his design to the utmost advantage. In 1704 he was, by the interest of Dr. Sharp, archbishop of York, presented with a prebendary of Canterbury. His work was published in 1707, an event which he did not survive more than a fortnight, being carried off by an apoplectic stroke in the sixty-third year of his age. Of his great learning his work gives ample proofs: it is founded upon, and is an improvement of, Robert Stephens' elegant folio edition, published at Paris in the year 1550, which has in the inner margin the collation of sixteen manuscripts, and of bishop Fell's neat and accurate edition, published at Oxford in 1675. To the various readings of the former, Dr. Mill added those of sixteen MSS. out of the English Polyglot bible. He also collated himself all the valuable MSS. in England, and procured collations of the most esteemed ones at Rome, Paris, Vienna, and other places, as well as of the ancient translations of the New Testament. This edition of the New Testament was reprinted at Rotterdam in 1710, in folio, by the learned Kuster, who augmented it with the collation of twelve new MSS. It was also reprinted at Leipsic in 1723. Dr. Mill's labours gave very general satisfaction to the learned of this country, and to biblical scholars every where; but there were some few who doubted if it might not tend to unhinge the minds of people, by countenancing the notion that the text was precarious, as the author had collected thirty thousand various readings. On this account Dr. Whitby made it the subject of an attack, which was ably answered by Mr. Whiston, and still more fully by Dr. Bentley, in the thirty-second section of his "Remarks" upon it, under the assumed title of "Phileleutherus Lipsiensis." Biog. Brit.

Mill *Bay*, in *Geography*, a bay on the E. coast of the island of Stronsa. N. lat. 58° 59'. W. long. 2° 20'.

Mill *Creek*, a river of Virginia, which runs into the Ohio, N. lat. 40° 36'. W. long. 80° 36'.

MILL *Gaut*, a town of Hindooftan, in the circar of Hindia, on the left bank of the Nerbudda; 10 miles E. of Hindia.

MILL *Iſlands*, four ſmall iſlands in Hudſon's bay. N. lat. 64° 30'. W. long. 78° 30' to 79° 40'.

MILL, in propriety, denotes a machine for grinding corn, &c. but, in a more general ſignification, is applied to all machines whoſe action depends on a circular motion.

Of theſe there are ſeveral kinds, according to the various methods of applying the moving power; as water-mills, wind-mills, mills worked by horſes, &c.

Few people are ignorant, that corn is ground by two mill-ſtones, placed one above the other, without touching.

The lower mill-ſtone is immoveable, but the upper one turns upon a ſpindle. The oppoſite ſurfaces of the two ſtones, which act to grind the corn, are not plane or flat; but the upper one is hollow, and the under one ſwells up; each of them being of a conic figure, whoſe axis indeed is very ſhort, in proportion to the diameter of its baſe; for the upper one being ſix feet in diameter, is hollowed but about one inch at its centre; and the lower one riſes but about three-fourths of an inch. Theſe two mill-ſtones come nearer and nearer towards their circumference, whereby the corn that falls from the hopper has room to inſinuate between them as far as two-thirds of the radius, which is the place where it begins to be ground, and where it makes the greateſt reſiſtance that it is capable of; the ſpace between the two ſtones being in that place about but two-thirds or three-fourths of the thickneſs of a grain of corn. But as the millers have the liberty of raiſing or ſinking the upper ſtone a little, they can proportion its diſtance from the lower one, according as they would have the flour finer or coarſer.

In order to cut and grind the corn, both the upper and under mill-ſtones have channels or furrows cut in them, proceeding obliquely from the centre towards the circumference. And theſe furrows are each cut perpendicularly on one ſide, and obliquely on the other, into the ſtone; which gives each furrow a ſharp edge, and in the two ſtones, they come, as it were, againſt one another, like the edges of a pair of ſciſſars; and ſo cut the corn to make it grind the eaſier, when it falls upon the places between the furrows. Theſe are cut the ſame way in both ſtones when they lie upon their backs, which makes them run croſs-ways to each other, when the upper ſtone is inverted by turning its furrowed ſurface towards that of the lower. For if the furrows of both ſtones lay the ſame way, a great deal of the corn would be drove onward in the lower furrows, and ſo come out from between the ſtones without ever being cut. When the furrows become blunt and ſhallow by wearing, the running ſtone muſt be taken up, and both ſtones new dreſt with a chiſſel and hammer. But, by this repeated operation, their thickneſſes, and conſequently their weight, diminiſh; and it is obſerved, that when they come to have but three-quarters, or half of the thickneſs which they had when new, they produce but three-quarters or half the flour which they yielded at the beginning.

The circular motion of the upper mill-ſtone brings the corn out of the hopper by jerks, and cauſes it to recede from the centre towards the circumference, where, being quite reduced to flour, it is thrown out of the mill, by the centrifugal force of the ſtone, through a hole provided on purpoſe.

The diameter of common mill-ſtones, according to Dr. Deſaguliers, is from five to ſeven feet, and their thickneſs, twelve, fifteen, or eighteen inches: they laſt thirty-five or forty years, and when they have been long uſed, ſo that their thickneſs is conſiderably diminiſhed, they are cut anew, to give their ſurface a contrary figure to what they had before: ſo that the upper mill-ſtone is made the lower.

In water-mills, the momentum of the water is the moving power, and the attrition of the two ſtones in grinding is the force to be overcome. Of theſe there are two kinds, *viz.* thoſe where the force of the water is applied above the wheel, and thoſe where it is applied below the wheel; the former being called over-ſhot, and the latter under-ſhot mills: and to theſe we may add a breaſt-mill, where the water ſtrikes againſt the middle of the wheel.

In a common breaſt-mill, where the fall of water may be about ten feet, A A, (*Plate* XXIII. *Mechanics*, *fig.* 1.) is the great wheel, which is generally about ſeventeen or eighteen feet diameter, from *a* the outermoſt edge of any float board, to *b*, that of its oppoſite float. To this wheel the water is conveyed through a channel, and falling upon the wheel, turns it round. On the axis B B, of this wheel, and within the mill-houſe, is a wheel D, about eight or nine feet diameter, having ſixty-one cogs, which turn a trundle E, containing ten upright ſtaves or rounds; and when this is the number of cogs and rounds, the trundle will make $6\frac{1}{10}$ revolutions for one revolution of the wheel. The reaſon of adding an odd cog, called the hunting cog, to the wheel, is this; that, as every cog comes to the trundle, it may take the next ſtaff or round behind the one which it took in the former revolution, and thus it will wear all the parts of the cogs and rounds which work upon one another equally, and to equal diſtances from one another in a little time; and make a true uniform motion throughout the whole work. The trundle is fixed upon an iron axis called the ſpindle, the lower end of which turns in a braſs foot, fixed at F, in the horizontal beam S T, called the bridge-tree; and the upper part of the ſpindle turns in a wooden buſh fixed into the lower mill-ſtone, which lies upon beams in the floor Y Y. The top part of the ſpindle above the buſh is ſquare, and goes into a ſquare hole in a ſtrong iron croſs, *a b c d*, (*fig.* 2.) called the rynd; under which, and cloſe to the buſh, is a round piece of thick leather upon the ſpindle, which it turns round at the ſame time as it does the rynd. The rynd is let into grooves in the under ſurface of the running mill-ſtone G, (*fig.* 1.) and ſo turns it round in the ſame time that the trundle E is turned round by the cog-wheel D. This mill-ſtone has a large hole quite through its middle, called the eye of the ſtone, through which the middle part of the rynd and upper end of the ſpindle may be ſeen; whilſt the four ends of the rynd lie hid below the ſtone in their grooves.

The end T of the bridge-tree T S (which ſupports the upper mill-ſtone G upon the ſpindle) is fixed into a hole in the wall; and the end S is let into a beam Q R called the brayer, whoſe end R remains fixed in a mortiſe: and its other end Q hangs by a ſtrong iron rod P, which goes through the floor Y Y, and has a ſcrew-nut on its top at O; by the turning of which nut, the end Q of the brayer is raiſed or depreſſed at pleaſure; and, conſequently, the bridge-tree T S and upper mill-ſtone. By this means the upper mill-ſtone may be ſet as cloſe to the under one, or raiſed as high from it, as the miller pleaſes. The nearer the mill-ſtones are to one another, the finer they grind the corn; and the more remote from one another, the coarſer.

The upper mill-ſtone G is incloſed in a round box H, which does not touch it any where; and is about an inch diſtant from its edge all around. On the top of this box ſtands a frame for holding the hopper *k k*, to which is hung the ſhoe I, by two lines faſtened to the hind-part of it, fixed upon hooks in the hopper, and by one end of the

crook-

crook-ſtring K faſtened to the fore-part of it at *i*; the other end being twiſted round the pin L. As the pin is turned one way, the ſtring draws up the ſhoe cloſer to the hopper, and ſo leſſens the aperture between them; and as the pin is turned the other way, it lets down the ſhoe, and enlarges the aperture.

If the ſhoe be drawn up quite to the hopper, no corn can fall from the hopper into the mill; if it be let a little down, ſome will fall: and the quantity will be more or leſs, according as the ſhoe is more or leſs let down. For the hopper is open at bottom, and there is a hole in the bottom of the ſhoe, not directly under the bottom of the hopper, but forwarder towards the end *i*, over the middle of the eye of the mill-ſtone.

There is a ſquare hole in the top of the ſpindle, in which is put the feeder *e* (*fig.* 2.); this feeder (as the ſpindle turns round) jogs the ſhoe three times in each revolution, and ſo cauſes the corn to run conſtantly down from the hopper, through the ſhoe, into the eye of the mill-ſtone, where it falls upon the top of the rynd, and is, by the motion of the rynd and the leather under it, thrown below the upper ſtone, and ground between it and the lower one. The violent motion of the ſtone creates a centrifugal force in the corn going round with it, by which means it gets farther and farther from the centre, as in a ſpiral, in every revolution, until it be thrown quite out; and, being then ground, it falls through a ſpout M, called the mill-eye, into the trough N. When the mill is fed too faſt, the corn bears up the ſtone, and is ground too coarſe; and beſides, it clogs the mill ſo as to make it go too ſlow. When the mill is too ſlowly fed, it goes too faſt, and the ſtones, by their attrition, are apt to ſtrike fire againſt one another. Both which inconveniencies are avoided by turning the pin L backwards or forwards, which draws up or lets down the ſhoe; and ſo regulates the feeding as the miller ſees convenient.

Sometimes, where there is a ſufficient quantity of water, the cog-wheel in *fig.* 1. turns a large trundle, on whoſe axis is fixed a horizontal wheel, with cogs all around its edge, turning two trundles at the ſame time; whoſe axis or ſpindles turn two mill-ſtones. When there is not work for them both, either may be made to lie quiet, by taking out one of the ſtaves of its trundle, and turning the vacant place towards the horizontal cog-wheel. And there may be a wheel fixed on the upper end of the great upright axle of this wheel for turning a couple of boulting-mills; and other work for drawing up the ſacks, fanning and cleaning the corn, ſharpening of tools, &c. As the water acts upon an over-ſhot mill both by impulſe and weight, ſo does it likewiſe upon a breaſt-mill, or that where the water comes upon the breaſt or middle part of the wheel: and here, though the weight of the water is not ſo great as in the over-ſhot mill, being contained in the buckets of the lower quarter only; yet the impulſe of the water is much greater, the height of the water being increaſed nearly the ſemi-diameter of the great wheel, all other things being equal. If the height of the water remain the ſame, the aperture of the penſtock muſt be enlarged to nearly twice the area, that the force may be the ſame; ſo that to produce the ſame effect, twice as much water is neceſſary for the breaſt-mill as for an over-ſhot one, every thing elſe being the ſame.

Mr. Ferguſon obſerves, that where there is but a ſmall quantity of water, and a fall great enough for the wheel to lie under it, the bucket or over-ſhot wheel is always uſed. But where there is a large body of water, with a little fall, the breaſt or float-board wheel muſt take place. As to the under-ſhot mill, it is evident there can be only the impulſe from the water; and therefore, the height of the water remaining the ſame, there muſt be a larger aperture of the penſtock for the diſcharge of a greater quantity of water in the ſame time, in order to produce the ſame effect as the over-ſhot or breaſt-mill; whence a greater expence of water will be made here than in any other mill, and can only be ſupplied for a conſtancy by a river; and where this can be had, the under-ſhot is the eaſieſt, cheapeſt, and moſt ſimple ſtructure, of which a mill is capable. Dr. Deſaguliers, having had occaſion to examine many under-ſhot and over-ſhot mills, generally found that a well made over-ſhot mill ground as much corn, in the ſame time as an under-ſhot mill with ten times leſs water; ſuppoſing the fall of water at the over-ſhot to be twenty feet, and at the under-ſhot to be about ſix or ſeven feet: and he generally obſerved, that the wheel of the over-ſhot mill was of fifteen or ſixteen feet diameter, with a head of water of four or five feet, to drive the water into the buckets with ſome momentum.

Mr. Ferguſon has given the following directions how to conſtruct water-mills, ſo as to be in the greateſt degree of perfection; and alſo a table calculated from his rules, for the ſake of thoſe mill-wrights who either cannot calculate, or do not like to take the trouble.

When the float-boards of the water-wheel move with a third part of the velocity of the water that acts upon them, the water has the greateſt power to turn the mill: and when the mill-ſtone makes about ſixty revolutions in a minute, it is found to do its work the beſt. For, when it makes but about forty or fifty, it grinds too ſlowly, and when it makes more than ſeventy, it heats the meal too much, and cuts the bran ſo ſmall, that a great part thereof mixes with the meal, and cannot be ſeparated from it by ſifting or boulting. Conſequently, the utmoſt perfection of mill-work lies in making the train ſo, as that the mill-ſtone ſhall make about ſixty turns in a minute when the water-wheel moves with a third part of the velocity of the water. To have it ſo, obſerve the following rules:

1. Meaſure the perpendicular height of the fall of water, in feet, above the middle of the aperture, where it is let out to act by impulſe againſt the float-boards on the loweſt ſide of the under-ſhot wheel.

2. Multiply this conſtant number 64.2882, by the height of the fall in feet, and extract the ſquare root of the product, which ſhall be the velocity of the water at the bottom of the fall; or the number of feet the water moves *per* ſecond.

3. Divide the velocity of the water by 3; and the quotient ſhall be the velocity of the floats of the wheel in feet *per* ſecond.

4. Divide the circumference of the wheel, in feet, by the velocity of its floats; and the quotient ſhall be the number of ſeconds in one turn or revolution of the great water-wheel on whoſe axis the cog-wheel that turns the trundle is fixed

5. Divide 60 by the number of ſeconds in a turn of the water-wheel or cog-wheel; and the quotient ſhall be the number of turns of either of theſe wheels in a minute.

6. By this number of turns divide 60 (the number of turns the mill-ſtone ought to have in a minute) and the quotient ſhall be the number of turns the mill-ſtone ought to have for one turn of the water or cog-wheel. Then,

7. As the required number of turns of the mill-ſtone in a minute is to the number of turns of the cog-wheel in a minute, ſo muſt the number of cogs in the wheel be to the number of ſtaves in the trundle on the axis of the mill-ſtone, in the neareſt whole number that can be found. By theſe rules the following table is calculated; in which the diameter of the water-wheel is ſuppoſed to be 18 feet, (and conſequently

quently its circumference 56½ feet,) and the diameter of the mill-stone to be five feet.

Perpendicular height of the fall of water in feet.	Velocity of the water in feet *per* second.	Velocity of the wheel in feet *per* second.	Number of turns of the wheel in a minute.	Required number of turns of the mill-stone for each turn of the wheel.	Nearest number of cogs and staves for that purpose. Cogs.	Stav.	Number of turns of the mill-stone for one turn of the wheel by those cogs and staves.	Number of turns of the mill-stone in a minute by these cogs and staves.
1	8.02	2.67	2.83	21.20	127	6	21.17	59.91
2	11.40	3.72	4.00	15.00	105	7	15.00	60.00
3	13.89	4.63	4.91	12.22	98	8	12.25	60.14
4	16.04	5.35	5.67	10.58	95	9	10.56	59.87
5	17.93	5.98	6.34	9.46	85	9	9.44	59.84
6	19.64	6.55	6.94	8.64	78	9	8.66	60.10
7	21.21	7.07	7.50	8.00	72	9	8.00	60.00
8	22.68	7.56	8.02	7.48	67	9	7.44	59.67
9	24.05	8.02	8.51	7.05	70	10	7.00	59.57
10	25.35	8.45	8.97	6.69	67	10	6.70	60.09
11	26.59	8.86	9.40	6.38	64	10	6.40	60.16
12	27.77	9.26	9.82	6.11	61	10	6.10	59.90
13	28 91	9.64	10.22	5.87	59	10	5.90	60.18
14	30.00	10.00	10.60	5.66	56	10	5.60	59.36
15	31.05	10.35	10.99	5.46	55	10	5.40	60.48
16	32 07	10.69	11.34	5.29	53	10	5.30	60.10
17	33.06	11.02	11.70	5.13	51	10	5.10	59.67
18	34.02	11.34	12.02	4.90	50	10	5.00	60.10
19	34.95	11.65	12.37	4.85	49	10	4.80	60.61
20	35.86	11.92	12.68	4.73	47	10	4.70	59.59
1	2	3	4	5	6		7	8

Example.—Suppose an under-shot mill is to be built where the perpendicular height of the fall of water is nine feet: it is required to find how many cogs must be in the wheel, and how many staves in the trundle, to make the mill-stone go about 60 times round in a minute, while the water-wheel-floats move with a third part of the velocity with which the water spouts against them from the aperture at the bottom of the fall.

Find 9 (the height of the fall) in the first column of the table; then against that number, in the sixth column, is 70, for the number of cogs in the wheel, and 10 for the number of staves in the trundle: and by these numbers, we find in the eighth column that the mill-stone will make $59\frac{57}{100}$ turns in a minute, which is within half a turn of 60, and near enough for the purpose; as it is not absolutely requisite that there should be just 60 without any fraction: and throughout the whole table the number of turns is not quite one more or less than 60.

The diameter of the wheel being eighteen feet, and the fall of water nine feet, the second column shews the velocity of the water at the bottom of the fall, to be $24\frac{5}{100}$ feet *per* second; the third column the velocity of the float-boards of the wheel to be $8\frac{2}{100}$ feet *per* second; the fourth column shews that the wheel will make $8\frac{51}{100}$ turns in a minute; and the sixth column shews that for the mill-stone to make exactly 60 turns in a minute, it ought to make $7\frac{5}{100}$ (or seven turns and five hundred parts of a turn) for one turn of the wheel.

Dr. Barker has invented a water-mill, that has neither wheel nor trundle: this is represented in *fig.* 3, in which A is a pipe or channel that brings water to the upright tube B. The water runs down the tube, and thence into the horizontal trunk C, and runs out through holes at *d* and *e* near the ends of the trunk on the contrary sides thereof.

The upright spindle D is fixed in the bottom of the trunk, and screwed to it below by the nut *g*; and is fixed into the trunk by two cross-bars at *f*: so that if the tube B and trunk C be turned round, the spindle D will be turned also.

The top of the spindle goes square into the rynd of the upper mill-stone H, as in common mills; and as the trunk, tube, and spindle turn round, the mill-stone is turned round thereby. The lower, or quiescent mill-stone, is represented by I; and K is the floor on which it rests, and wherein is the hole L for letting the meal run through, and fall down into a trough which may be about M. The hoop or case that goes round the mill-stone rests on the floor K, and supports the hopper, in the common way. The lower end of the spindle turns in a hole in the bridge-tree G F, which supports the mill-stone, tube, spindle, and trunk. This tree is moveable on a pin at *h*, and its other end is supported by an iron rod N fixed into it, the top of the rod going through the fixed bracket O, and having a screw-nut *o* upon it, above the bracket. By turning this nut forward or backward, the mill-stone is raised or lowered at pleasure.

Whilst the tube B is kept full of water from the pipe A, and the water continues to run out from the ends of the trunk; the upper mill-stone H, together with the trunk, tube, and spindle, turns round. But if the holes in the trunk were stopt, no motion would ensue; even though the tube and trunk were full of water. For,

If there were no hole in the trunk, the pressure of the water would be equal against all parts of its sides within. But, when the water has free egress through the holes, its pressure there is entirely removed; and the pressure against the parts of the sides which are opposite to the holes, turns the machine. See Desaguliers's Exp. Phil. vol. ii. p. 417, &c. p. 431, &c. p. 459, &c. Ferguson's Mechanics, p. 45, &c. 4to. ed. and Supp. p. 10. See also on this subject, an elaborate paper of Mr. Smeaton, containing an account of a number of experiments, in order to estimate the natural powers of water and wind to turn mills, in the Phil. Tranf. vol. li. art. 18 p. 100, &c.

The description of a mill, which we have given above in the words of the late ingenious Mr. Ferguson, is very correct. The improvements of late years, which have been made in mills for grinding corn, relate to the manner of their construction, and the proportions of the wheel-work, for giving motion to the mill-stones, by which the grinding is performed in the manner described. The late Mr. John Smeaton, F.R.S., was celebrated for his accuracy and judgment in the proportions of his mills, particularly those turned by water. We shall, under the article WATER-*Wheels*, give some account of his principles; and under this head we shall describe a steam flour-mill, which was erected from his designs, at the victualling house for the navy at Deptford, in 1781. This was before the steam-engine of Mr. Watt was brought to the perfection it has since attained; and as the old atmospheric engine was thought to be unfit for producing a rotatory motion, Mr. Smeaton erected a common steam-engine to pump up water for the supply of a large overshot water-wheel, which actuated the mill. *Fig.* 1. of *Plate* XXXIV. *Mechanics*, represents the whole mill, by a longitudinal section of the house; and *fig.* 2, another

another section, taken perpendicular to the former. The mill is double, that is, the water-wheel, A A, is situated between two buildings, only one of which is represented in *fig.* 2; and the wall, B B, of the other is one side of a house, containing exactly the same machinery as that which is delineated. Over the water-wheel two large cisterns, or troughs, C, D, are placed, communicating with each other by a large iron pipe E, *fig.* 1; and one of these troughs, C, has a pipe or trough, leading water into it, from the pump of the steam-engine supplying the water for the mill: in the other trough, D, is a shuttle *a*, which being raised up, permits the water to issue from a hole in the end of the trough, and fly forwards horizontally through a proper shute, or pentrough, into the buckets of the wheel A. The form of these buckets is shewn by *fig.* 1, a portion of the wheel being represented in section for that purpose. The buckets, which are thus filled at the top of the wheel, descend by their weight, turning the wheel round, till they come to the lowest part of the wheel; and here, by the buckets becoming inverted, the water is discharged from them, and they go up empty to the top of the wheel, where they are filled again from the trough. In this manner, one side of the wheel being always loaded by the buckets full of water, and the other side being empty, it has a constant tendency to turn round. The axis of the wheel has a large spur-wheel, E, fixed upon its extreme end, which being furnished with a double row of cogs, as shewn in *fig.* 2, communicates motion to the lanterns or trundles, F, G, one above, and the other below it: the latter, G, is fixed upon the end of an horizontal shaft H H, extending beneath the mill-stones, situated at I I and L: it actuates the upper stone of each pair, by means of crown or face-wheels K, which turn the pinions fixed at the lower ends of the respective spindle *d d*. The upper trundle, F, is fixed upon a shaft, which carries two face-wheels, *e*, *f*: the teeth of these wheels are opposite to each other, and either of them can be made to work a pinion, *g*, *fig.* 1, fixed upon the end of an axis *h*, which at the other end has a cog-wheel turning a pinion at *k*, on the end of the spindle of a machine, M, for dressing flour. This machine consists of a hollow cylinder or frame, covered with wire-cloth of different degrees of fineness; the finest being at the end A, which is the most elevated, for the axis of the cylinder is inclined in the direction of the dotted line: every one of the lengths, as it goes towards the other end, is covered with a coarser kind of wire-cloth, for sifting the flour. Within this cylinder, which is stationary, a reel is situated; its axis being exactly in the centre of the cylinder, and turned round by the pinion *k*: the rails of this reel are provided with hair brushes, which, as they revolve, brush against the interior wire surface of the cylinder. The machine is provided with a shoe or jigger, very similar to that of the mill-stones, to bring down the flour or meal through a trough, from the floor above, where it is kept after being ground: the meal, being by this means gradually fed into the cylinder, is, by the motion of the brushes on the reel, sifted or rubbed through the wire: the finest of the flour will of course go through at the upper end, but no other kind; the second through the next division, and so on till the bran falls out at the end of the cylinder, being too coarse to go through any of the wires. The cylinder is enclosed in a tight and close box M, to prevent waste by the flour flying about; and the box has partitions, which divide it into as many lengths as the cylinder has different kinds of wire. Thus each division of the box receives a different quality of flour; and spouts being fixed, which go down into the floor beneath, sacks can be filled at them without waste or inconvenience.

The pinion *g*, for turning the dressing machine, can be made to turn either way about, by engaging it with the teeth of either of the cog-wheels *e*, *f*, which acting on the opposite sides of the pinion *g*, give the means of turning it in either direction at pleasure. The pinion is of such a diameter, that it cannot be engaged with both wheels at once; and the upright lever *r*, which supports the pivot of its axis *h*, can be thrown to either side, as is shewn in *fig.* 2: for its lower end moves on a centre at the floor, and at top it is guided by a groove in a piece of wood, fixed to the ceiling, and can be fastened at either side by a pin, so as to throw the pinion in gear with either *e* or *f*. The object of this contrivance is, that when the machine, M, has for a long time been running in one direction, and its brushes become worse, or bent on one side, its motion may be reversed, to give them an equal wear on the opposite side. The wheel, *e*, has another fixed to it at the back (see *fig.* 2.), which actuates a cog-wheel N, upon the end of a roller R, having a rope wound round it, for drawing up sacks of corn or flour from one floor of the mill to another. This rope passes upwards from the roller to the roof of the building, where it passes over a pulley, and thence descends through square holes in the several floors to the ground. These holes are covered by double doors, opening upwards, so that a sack, being drawn up, opens the door, which falls down as soon as it has passed. The wheel, N, of the sack-roller can be disengaged at pleasure from the cog-wheel, *e*, which turns it; and then the rope can be unwound and run down again, to fetch up another sack. This disengagement of the wheel is effected by the same means as described of the upright lever *r*; and a line being conducted from the top of the lever, over proper pullies, into various parts of the mill, the miller can, by pulling this line, disengage the roller at pleasure, to draw up or let down a sack. A pinion and shaft, similar to *g* and *h*, *fig.* 1, may be placed on the opposite side of the wheels, *e* and *f*, to work another dressing machine at the opposite side of the mill, or what is called a bolting machine. This is rather of a different construction, being the original flour-dressing machine: it consists of a reel like the former, but without any brushes; and upon this, instead of a wire-cylinder, a cloth like a sack, cut open at the bottom, is fastened, and revolves with it; the flour, being introduced by a feeding-shoe into this, is sifted round in the revolving cloth, and the fine flour passes through. To prevent the flour accumulating at any one side of the cloth into a bag, and swinging round with it, without sifting, four rails are fixed in the machine, parallel to the axis; and if the cloth swings out by the weight of the flour within it, the cloth strikes against these rails, and the flour is thus shaken through it into the chest or case of the machine.

The lower figures of the plate contain the developement of the parts of the mill, tending to explain their construction. *Figs.* 3, 4, and 5, shew the cast-iron axis for the water-wheel; N is the cylindric shaft, and *h*, *h*, its two necks, which lay on bearings in the wall of the mill, and bear the weight: beyond these necks the axis has a square box, O O, at each end, for framing the great cog-wheels upon. The manner of attaching the arms of the great water-wheel to the shaft is this: two circular plates or flaunches, P, P, *fig.* 3, are cast upon the axis; and against each of these 12 arms, Q, Q, are bolted: they are placed against the flaunch, tending to the centre, and the spaces between them are filled up by wooden pieces, as shewn by *r*, *r*, *r*, *fig.* 4: two iron rings, R and S, are placed over the arms, and a bolt put through each arm, to attach it to the flaunch, and to the axis; the wooden pieces, *r*, *r*, are kept in their places by a wedge driven through each, within the great hoop R, and by means of these wedges the pieces, *r*, *r*, can

at

at any time be drawn up towards the centre, to hold all the arms faſt in their places.

This method of framing water-wheels was uſed with great ſucceſs by Mr. Smeaton in many inſtances, and was found to anſwer the purpoſe extremely well, being a great improvement upon the old method of mortiſing the arms into a wooden ſhaft.

Figs. 6, 7, and 8, ſhew one of the ſpindles for the mill-ſtones H and L, *fig.* 2: it is a ſtraight iron axis, *d*, formed to a pivot, *s*, at the lower end, which reſts and turns in a piece of braſs: near the upper end of the ſpindle another neck or pivot, *t*, is formed, and runs in a collar, in the centre of the nether or lower mill-ſtone, whilſt the upper one is hung upon the arms of an iron croſs T: ſee alſo *fig.* 7, fitted with a ſquare upon the top of the ſpindle. On the lower part of the ſpindle the pinion Z, which gives it motion, is fixed: it has a ſquare hole through it, fitting on the ſquare ſpindle, and iron croſſes are fixed both at top and bottom of the block of wood forming the body of the pinion: in this iron are two ſcrews (ſee *fig.* 8.), which, being ſcrewed faſt, fix the pinion firmly to the ſpindle, its weight being ſupported by a wedge, *v*, put through a hole in it; but when this wedge is withdrawn, and the ſcrews ſlackened, the pinion falls down ſo low upon the ſpindle, that its teeth are clear of the teeth of the cog-wheels *k*, *fig.* 2, and in this ſtate the ſpindle and mill-ſtone upon it will ſtand ſtill, though the mill is going. The ſpindle foot, *s*, reſts in a braſs ſocket, fixed in a lever *w*, *figs.* 1 and 2, called the bridge-tree: its fulcrum is in the ſolid wall, W, *fig.* 1, at one end, and the other reſts on the middle of a ſecond lever X, perpendicular to the former, called the brayer, one end of which has a fulcrum in the framing, *fig.* 2, and the other is ſupported by a ſcrew, which the miller turns round, to elevate or depreſs the upper ſtone, and adjuſt the diſtance between them at pleaſure, according as he wiſhes to grind finer or coarſer flour. The upper part of the mill before us is uſed as a ſtore-houſe for corn, which is drawn up in ſacks by the tackle into the roof, and there emptied into binns, or different compartments, of the upper floor: from theſe it is let down to the mill-ſtones, and ground into meal. The ſpouts from the ſtones lead the meal into ſacks, which, when full, are drawn up to the top of the houſe again, and emptied out into a flour binn, ſituated over the dreſſing machine M, which ſeparates it into various qualities for uſe.

The mills which grind for the London market uſe three dreſſing machines: the fineſt flour is that which has been paſſed through a wire-cloth of 64 *per* inch, when the meal is dreſſed the firſt time; the other part of the cylinder is coarſe wire, which ſuffers a coarſe meal, called middlings, to paſs through it; but the bran and coarſe pollard fall out at the end of the cylinder. The middlings are ground over again in a pair of mill-ſtones, which are rather dull, and become unfit for grinding corn, without dreſſing them again: then, after this ſecond grinding, the meal is dreſſed in the cloth machine, called the bolting cloth, which takes out the ſecond flour, and the pollard comes out at the end of the cloth: the bran and the pollard together are now put into the clearing-off machine, which is a coarſe wire-cylinder of the kind we have deſcribed, and by it is ſeparated into hog pollard, which is the fineſt ſort; 2d, horſe pollard; and, 3d, bran. A pair of mill-ſtones will grind five buſhels of wheat *per* hour, when in good condition; but require to be taken up and dreſſed once a week, if uſed conſtantly. This dreſſing is done by picking the ſurface of the ſtone over with the mill-pick, to cut the grooves and furrows ſharp, that they may grind and cut the corn between them.

Perſons riotouſly aſſembling and deſtroying, or maliciouſly burning, any wind-ſaw mill, wind-mill, or water-mill, &c. ſhall be guilty of felony, without benefit of clergy, by 9 Geo. III. c. 29. Proſecution to be commenced within eighteen months after the offence committed. By 41 Geo. III. c. 24. the damages occaſioned by demoliſhing any ſuch mill by perſons riotouſly aſſembled, may be ſued for and recovered in the manner provided for by 1 Geo. ſtat. 2. c. 5. reſpecting the demoliſhing of churches and other buildings. (See Riot.) By 43 Geo. III. c. 58. any perſon who ſhall maliciouſly ſet fire to any mill in the poſſeſſion of any other perſon, or of any body corporate, ſhall be guilty of felony, without benefit of clergy.

Water-mills have long been great nuiſances to agriculture, by preventing the uſe of the ſtreams on which they ſtand, in many caſes, in irrigating and flooding the adjoining lands, by which much improvement is kept back, that would otherwiſe take place. They are alſo injurious by obſtructing and damming up the water in numerous inſtances, ſo as to render it ſtagnant on the ground above. Wind and ſteam may, however, be applied as the moving powers of mills without producing any ſuch effects, and are, of courſe, the moſt proper powers to be employed.

The ancient feudal cuſtom of obliging tenants to grind at the lord's mills, is now almoſt wholly done away. Draining or lifting-mills are often extremely uſeful in diſcharging water from low flat lands in many ſituations. The moving power in theſe is commonly wind. See Mill, in *Mechanics*.

By an ancient ordinance the toll for grinding ſhall be taken either to the 20th or 24th corn; and yet, in ſome places, millers claim and take the 16th part: but Mr. Dalton ſays, that the miller ſhould take but one quart for grinding one buſhel of hard corn, and if he carry back the griſt to the owner he may take two quarts of ſuch corn, *i. e.* wheat rye, and meſlin, (wheat and rye mixed.) For malt he ſhall take half as much as for hard corn. By Holt ch. juſt. the toll of a mill muſt be regulated by cuſtom, and if the miller takes more than the cuſtom warrants, it is extortion: but if it be a new mill, the miller is not reſtrained to any certain toll. (1 L. Raym. 149.) In ſome places the tenants are bound to have their corn ground at the lord's mill. When a miller, upon information given on oath to any magiſtrate, is ſuſpected of adulterating meal or flour, the houſe, mill, &c. of ſuch miller may be entered under the authority of a warrant of a magiſtrate, at all ſeaſonable times of the day, to ſearch for diſcovery, and if ſuch adulterated meal or flour be found, it may be ſeized by the officer executing the warrant, ſeized by the magiſtrate to whom it is carried, and diſpoſed of at his diſcretion. (31 Geo. III. c. 29.) A miller who hath corn given him to grind, and who charges for that which is bad, is indictable; and he may be guilty of felony by taking away any part with an intent to ſteal it. (Hawk. c. 33.) Millers are not to be common buyers of any corn, with a view to ſell the ſame again, either in corn or meal. (Dalt. c. 122.) By 36 Geo. III. c. 85, every miller ſhall keep balances and weights according to the ſtandard of the exchequer, which may be examined by a perſon appointed for this purpoſe by 35 Geo. III. c. 102; and in default thereof the miller ſhall forfeit not exceeding 20*s.* &c &c. Millers may be required to weigh corn, and, on refuſal, ſhall forfeit not exceeding 40*s.* Millers are to deliver the whole produce of corn when ground, if required, allowing for waſte in grinding and dreſſing, and for toll when taken; and if ſuch

 corn

corn ſhall weigh leſs than the full weight, ſuch miller ſhall, for every buſhel of corn deficient in weight, forfeit not exceeding 1*s.* and alſo treble the value of ſuch deficiency. When toll is taken, it ſhall be deducted before the corn ſhall be put into the mill. No miller ſhall demand corn for toll, but in lieu thereof ſhall be entitled to payment in money, under penalty of forfeiting not exceeding 5*l.*: excepting when perſons ſhall not have money to pay for grinding, and alſo, that this ſhall not extend to mills called "Soke-mills," or ſuch ancient mills as are eſtabliſhed by cuſtom and the law of the land, which mills ſhall continue to take toll as they have been accuſtomed to do. Every miller is required to put up in his mill a table of the prices in money, or of the amount of toll or multure, on pain of forfeiting 20*s.* for every ſuch offence.

Mills, *Wind*, are, with reſpect to their working parts, little different from thoſe of water-mills; but they are turned by the force of wind gathered in their ſails.

Of theſe, ſome are called *vertical*, others *horizontal*, according to the poſition of the ſails; or, rather, according to the direction of their motion, with regard to the horizon.

For the beſt form of horizontal ſails, and alſo for determining the poſition of the axis of wind-mills, ſee Wind-*mill* and Mechanics.

Mills, *Portative* or *Hand*, are thoſe kept in motion by the hand; or elſe whoſe mill-ſtones are turned, or piſtons driven by the force of horſes or other beaſts. Thus, if the cog-wheel D, (*Plate* XXXIII. *Mechanics*, *fig.* 1.) be made about eighteen inches diameter, with thirty cogs, the trundle as ſmall in proportion, with ten ſtaves, and the mill-ſtones be each about two feet in diameter, and the whole work be put into a ſtrong frame of wood, as repreſented in the figure, the engine will be a hand-mill for grinding corn or malt in private families. And then it may be turned by a winch inſtead of the wheel A A; the mill-ſtone making three revolutions for every one of the winch. If a heavy fly be put upon the axle B, near the winch, it will aſſiſt greatly in regulating the motion.

If the cog-wheel that turns the trundle or trundles of a mill be placed horizontally, horizontal levers may be fixed into its vertical axis, and horſes applied to theſe for turning the mill; which is often done where water cannot be had for that purpoſe.

The uſe of mills and mill-ſtones, according to Pauſanias, was firſt invented by Myla, ſon of Meleges, firſt king of Sparta; though Pliny attributes the invention of every thing belonging to bread and baking, to Ceres: Polydore Virgil was not able to diſcover the author of ſo uſeful a machine. It is doubted whether or not water-mills were known to the Romans, there being no mention made, in the Digeſt, but of mills turned by ſlaves and aſſes. Salmaſius, however, and Gothofred, will not allow water-mills to have been unknown to the ancient Romans, though they were not in ordinary uſe. Wind-mills are of much more modern invention; the firſt model of theſe was brought from Aſia into Europe in the time of the holy wars.

Mill is alſo uſed for any machine, which being moved by ſome external force, ſerves to give a violent impreſſion on things applied to it.

Mills, in this ſenſe, are machines of vaſt uſe in the manufactures, arts, and trades; for the making and preparing divers kinds of merchandizes. The principal are thoſe which follow.

Mill, *Colour*. Colours for the uſe of painters, paper-ſtainers, &c. are prepared, in the large way, by grinding them, either with oil or water, in mills worked formerly by horſes, but now frequently ſteam-engines are uſed for ſuch purpoſe in London. Theſe colour-mills conſiſt of a large toothed-wheel, or cog-wheel, worked by the horſes, or ſteam-engine, &c. which gives motion to ſeveral trundles and upright ſpindles of ſmall mill-ſtones placed round its circumference. The conſtruction and uſe of theſe will be readily comprehended from the following deſcription of a ſingle pair of ſtones to be worked by hand, *Plate* XXXV. *fig.* 1. The winch-handle A gives motion, by the labour of a man, to the ſpindle B and fly-wheel C, fixed thereon; and which alſo carries a ſmall ſpur-wheel D, having eighteen bevelled teeth, which work into thoſe of the crown-wheel E E, of twenty-ſix teeth, fixed upon the upright ſpindle F, working in a braſs collar at top, fixed to the piece of wood G, which is adjuſtable by means of the wedge H, ſo as to keep the teeth of the wheels properly in geer: the bottom of the ſpindle works in the end of a braſs ſcrew R, working in the bottom framing of the machine, and paſſing up through the centre of the lower ſtone, the turning of which ſcrew, occaſionally, adjuſts the diſtance of the ſtones, which are of the common conſtruction, exactly like thoſe for grinding flour, but ſmaller, each being ſixteen inches diameter and three inches thick. The upper ſtone I is ſupported on the upright ſpindle F by a ſhoulder and crow, the ſame as mill-ſtones in general; it has a hopper K affixed to it, and which revolves with it, into which the ſemi-fluid colours intended to be ground are put, and when ground they are protruded through a ſpout from the tub M, nineteen inches diameter, which contains the ſtones.

After the above proceſs, colours for the uſe of painters, &c. were ground by hand with oil or water, on a poliſhed marble ſlab with a pebble muller; but this proceſs being tedious and expenſive, as well as highly prejudicial to the health of the workman, Mr. James Rawlinſon of Derby, ſome years ago contrived a mill for this purpoſe, which is repreſented in *fig.* 2, a model of which he preſented to the Society of Arts in the Adelphi, London, in 1804. A is a roller or cylinder of black marble, truly formed and well poliſhed, $16\frac{1}{2}$ inches diameter and $4\frac{1}{2}$ inches broad; B is a concave muller, covering one-third of the roller, of the ſame kind of marble, well poliſhed, and fixed in the wooden caſe or frame *b*, which is hung on hinges at *i*, for uſe when the muller requires to be lifted off the cylinder. C is a crooked bar of iron, about an inch broad, moveable on a pin at *f*, in order to turn down out of the way when the muller is to be lifted off: near the end of this bar is a thumb-ſcrew *c*, whoſe end acts in a hole in the wooden caſe *b*, and ſerves to keep that and the muller ſteady, and to increaſe the preſſure of the muller as occaſion may require. D is a ſcraper or taker-off, made of a piece of clock-ſpring fixed in an iron frame K, in the manner of a frame-ſaw, and turning on centres *d d*, ſo that when in uſe the taker-off lies in an inclined poſition againſt the cylinder, and at other times is turned back out of the way. H is a plate ſet under the taker-off to catch the colour when ſufficiently ground, which ſtands upon a ſliding board that can occaſionally be drawn out, to remove any colour which may accidentally drop from the cylinder. F is a drawer under the mill for holding curriers' ſhavings, for cleaning the cylinder and muller, when a freſh colour is wanted to be ground. The colour, roughly ground in a large colour-mill above deſcribed, is applied in proper quantities, by means of a knife, to the front of the cylinder above the taker-off, and by means of the winch-handle G the mill is worked, until the colour, by paſſing between the revolving stone and muller, is sufficiently ground; when the taker-off D, which during the operation lay back, is turned against the stone, the winch-handle is turned the reverse way for a few revolutions, in order to scrape off the colour which falls into the dish H.

In the Philosophical Transactions, No. 87, a mill is described as having been used by Dr. Langelot, for grinding leaf gold to powder, for the fanciful purpose of preparing *Aurum potabile*: the principles of this mill were, some years ago, found applicable to the grinding of dry indigo in Mr. Taylor's manufactory at Manchester, and were also found by Mr. Rawlinson, above mentioned, to be the best adapted for finely pulverizing the dry colours intended to be ground with oil or water in his colour-mill. This simple mill is represented in *fig.* 3, where L is a marble mortar, nicely formed and polished; M is a muller nearly in the form of a pear, having an iron axis fixed into its upper end, which is bent into the form of a crank at P to serve as a handle for turning the muller: the axis is fixed, when in use, into two collars O, O, in beams of wood N N, so as to revolve easily and truly in the axis of the mortar. This muller is shewn separately at *fig.* 4, which shews a slit that is made through it, almost dividing it into two parts; this slit is of use in collecting the colour which is grinding, and bringing it continually under the muller. A circular board in two halves, with a centre-hole to fit the axis, is used to lay over the mortar, to prevent the dust of the colours from flying out, to waste the same and injure the health of the workmen. By means of the flat perforated weights R, on the top of the axis, any required pressure can be applied upon the muller.

For preserving the health of such colour-men and painters as still prefer the common stone and muller for grinding their colours, M. Boulard, in the Journal de Physique, recommends an apparatus represented in *fig.* 5, wherein the stone, and its table A B, is surrounded by a close-sided casing of boards C, C, fitted to the floor of the room, and leaving a space of about $\frac{1}{16}$th of an inch wide all round the table supporting the stone; this is for emitting a current of fresh air, which is to be supplied by a pipe D D extending from a hole in the floor under the case, to the outward air in some most convenient place. Over the stone a glazed pyramid E E and metal tube F is supported by the irons G and braces H, H, H, or by other more convenient means, so that the pyramid E E projects, on all sides, about three inches beyond the stone; and at a height above the same no greater than is sufficient for the free admission of the workman's arms to work the muller, and with his pallet knife to scrape together the colour when requisite, and which he will be able perfectly to see to do, through the glass in the frame, without inhaling the vapour from the colours, but which are to be made to ascend through the tube F, and pass off into the open air through the tube M M, by means of a small stove I I closely jointed to the tubes F and G, which is to be kept burning during the hours of work, in order to produce a current between the pipes D and M, that may effectually carry off the contaminated air which has been in contact with the colours on the stone, along with their effluvia. K represents the door of the fire-place, and L that of the ash-hole of the stove, both contrived to shut very close. In the pipe F a register N should be made for regulating the burning of the stove, by the admission of more or less air thereto through the pipe F. If desirable, the close pipe F may be conducted into the fire-place of any stove or fire in the apartments above, or it may even descend by a proper curvature, so as to admit of the stove I I being placed on the ground, and applied to any useful purpose, as the boiling of oil, or heating an adjoining room, &c.

Mill, *Cotton*. See Manufacture *of Cotton*.

Mill, *Flood*, that sort of mill which is contrived for the purpose of raising water in order to discharge it from fens, marshes, and other similar kinds of land.

Mills, *Forge*, turned by water, serve to raise and let fall one or more huge hammers, to beat and form the iron into bars, anchors, and other massive works. They are also called tilt-mills. See Forge, Iron, and Steel.

Mill, *Fulling*, is a water-mill which raises and beats down large wooden pistons in proper vessels called *pools*, or *troughs*; in order to full, scour, and cleanse woollen stuffs. See Fulling-*Mill*.

Mill, *Gunpowder*, is that used to pound and beat together the ingredients whereof gunpowder is composed.

This is done in a kind of iron or brass mortar, by means of iron pestles wrought by a wheel, without-side the mill, turned by the water falling on it. See Gunpowder.

Mills, *Leather*, are used to scour and prepare with oil, the skins of stags, buffaloes, elks, bullocks, &c. to make what they call *buff-leather*, for the use of the soldiery.

This is effected by means of several large pistons, rising and falling on the skins, in large wooden troughs, by means of a wheel without-side, turned by the force of water.

Mills, *Linen*, do not differ much from fulling-mills. Their use is, to scour linens, after their having been first cleansed when taken out of the lixivium, or ley. Some of these go by water, and the generality by horses.

Mills, *Oil*, when turned by men, water, hand, or horse, serve to bruise or break the nuts, olives, and other fruits and grains, whose juice is to be drawn, by expression, to make oil. See Oil.

Mill, *Paper*, a water-mill, furnished with engines containing cylinders furnished with teeth which cut and grind the rags or cloth in a kind of wooden trough; and thus, by reducing them to little pieces, turn them into a kind of pulp, by means of water conveyed into the troughs by a pipe for that purpose. See Paper.

Mill, *Sawing*, is a water-mill, serving to saw several planks or boards at the same time.

These are frequent in France, especially in Dauphiné.

They were lately prohibited in England, where they were begun to be introduced, from a view to the ruin of the sawyers, which must have ensued. See Sawing, also Machinery, *Block*.

There are also *silk* mills, for spinning, throwing, and twisting silks; which are large round machines in form of turrets, five or six feet high, and six yards in diameter; which, being turned, either by the force of water or that of men, work at the same time an infinity of bobbins fastened thereto, whereon the silk had been wound to be here spun and twisted.

There are abundance of mills of this kind in France, especially about Lyons and Tours, some of which are so disposed, as that three of them will go at the same time, and by the same wheel wrought by water or by strength of hand. That in the Hôpital de la Charité at Lyons, is wonderful, a single man working no less than 48 of these mills. See Silk, and Winding *of Silk*.

Mill, *Stamping*. See Stamping.

Mill, *Sugar*, is a machine that serves to bruise the sugar-canes, and express the liquor or juice contained therein. The sugar-mills are very curious contrivances. Of these there are four kinds, being turned either by water, wind, men, or horses.

Those turned by the hand were first in use; but they are now laid aside, as being an intolerable hardship on the poor

negro

negroes who were doomed thereto, besides the slowness of their progress.

Wind-mills are the most modern: but they are yet somewhat rare, excepting in St. Christopher's and Barbadoes, and among the Portuguese. These make good dispatch, but have this inconvenience, that they are not easily stopped; which proves frequently fatal to the negroes who feed them. See SUGAR.

MILLS, *Tan* or *Bark*, wrought by water or horses, serve to cut certain barks into a coarser sort of powder, proper for the tanning of hides, &c.

MILLS *for Sword-blades* are likewise moved by water. They are frequent at Vienne, in Dauphiné. By working heavy hammers they forge those excellent sword-blades, called *blades of Vienne*.

The uses and operations of these several mills, more at large, see under PAPER, FULLING, SUGARS, &c.

MILL, *Threshing*, such a machine as is contrived for the purpose of threshing grain or other sorts of seed crops. See THRESHING *Machine*.

MILL, in *Coinage*, is a machine used to prepare the laminæ, or plates of metal, and to give them proper thickness, hardness, and consistence, before they be struck, or stamped.

This machine has not been long known among us; but is of some standing in Germany. It consists of several wheels dented like those of clocks, &c. which move two cylinders of steel, between which the metal is passed to be brought to its proper thickness. It was first turned with water, since with horses. See COINAGE.

MILL, in *Commerce*, a money of account in the United States of America; 1000 mills being = 100 cents = 10 deniers = a dollar.

MILL, among *Gold Wire Drawers*, is a little machine consisting of two cylinders of steel, serving to flatten the gold or silver wire, and reduce it into laminæ, or plates. See GOLD *Wire*.

They have also mills to wind the gold wire or thread on the silk: these are composed of several rows of bobbins all turned at the same time.

MILL-*Reek*, in *Medicine*, an appellation given by the miners, employed at the Leadhills in Scotland, to those affections of the bowels, and of the nervous system, which are occasioned by the poison of the lead. The melting-houses, in which the operations are carried on, are called *mills*, because the bellows there are worked by water-wheels; and the *reek*, or smoke, arising from the melted lead, is believed to be the chief cause of the disease: whence the term *mill-reek* has been appropriated to the malady. See Essays and Obs. Phys. and Liter. vol. i. art. xxii. Edinburgh.

MILL-*Dams*, in *Rural Economy*, the basons which contain the water for supplying mills. A very firm way of making these in a quick or running sand, which is usually found a very troublesome circumstance in the making of them, is by laying the foundation with unslaked lime; which, by slaking among the sand, runs together into a hard stone, which gives a very firm and sure foundation. Plott's Staffordshire, p. 336.

MILL-*Holms*, a term applied to the low meadows, and other fields in the vicinity of mills, or watery places about mill-dams. The soils in these cases are generally of a good quality.

MILL-*Pool*, a stock or pond of water, by the force of which the motion of a water-mill is effected.

The dam of a mill-pool is raised much in the same manner as directed for *fish-ponds*; which see.

MILL-*Stones*, in *Rural Economy*, the prepared stones made use of in grinding grain and other substances, which are of different kinds, according to the purposes for which they are employed, but those chiefly used in grinding wheat into flour, were formerly imported from France, and termed *burrs*. Lately, however, stones proper for this use have been discovered in different parts of this kingdom, as in Wales and Scotland. In the first of these places they were found by Mr. Bowes, in a quarry which is "situated within the corporation liberties of Conway: the stone appears within a quarter of a mile of that town, and extends from east to west for the distance of two miles, appearing in most places upon the surface within that distance. Such an immense body of the stone has been left bare and exposed to view, that the industry of ages would scarcely lessen it. A deep chasm intervenes at the end of two miles; and, on examining the same line across this valley, he found the stone mixed up with various other fossil substances, to which it seems to bear no relation. In the next rise of mountains it resumes its quality, and takes a southerly direction, passing through a range of hills to the distance of two miles more, where the vein disappears. It is every where the highest stratum; and when disengaged from the quarry where now worked, it tumbles down the side of the mountain to the plain within five hundred yards of the shipping-place, where small vessels may lie safely in all weathers at a natural quay, completely calculated for this business." The quarry lies on the decline of a hill: the vein now is about eight yards wide; but he has reason to suppose it wider below. At the depth he has sunk, which is at least twenty-five feet, the stone mends in quality. When first taken from the quarry it is much softer and easier wrought into shape, than when exposed to the air: even a day makes a difference. The vein appears to him quite inexhaustible, and contains every variety of the stone, cellular, close, hard, or soft. The right in this tract of country has been presented to him, by Mr. Sneyd of Staffordshire, under the hope that he might be able to make this discovery, and carry it vigorously into effect, in which he has not been disappointed.

It would appear from the evidence sent to the Society for the Encouragement of Arts, &c. that the stones raised from this quarry are capable of being employed in most cases where those imported from France have been in use, and that the stone, from its external appearance, seems to be constituted of quartz and cherts.

And in the latter of the above situations stones fit for this use were discovered by James Brownhill, miller, "who, when the late unfortunate war had rendered the getting of the French burr extremely difficult, as he was passing by the great basaltic rock of the Abbey Craig, near Stirling, examined the texture of several masses of the stones; and found one species, which appeared to him fit for the grinding of wheat, and brought home a sample of them, which he shewed to Mr. Alexander Ball, agent of the Alloa Mills, who agreed to make trial of a pair. They were built under his direction in the same manner as the French burr; and, on their being put to work, gave such satisfaction to the customers of the mills, as induced the Alloa Mill company to have another pair built, and totally lay aside the French burr mill-stones." It is suggested, that "the French burr stones are so porous, as to make it necessary to fill up the cavities with a preparation of alum: this considerable expence is saved by the uniform texture of the basaltes; and their superior excellence is so apparent, that upwards of 60 pair are now at work in several parts of the kingdom, and the demand for them is daily increasing." In addition it is stated, that "the basaltes mill-stones are not only excellent for manufacturing of flour, but for all kind of grist. The distillers give them a decided preference, and they grind oats in in a very complete ſtyle, as the meal is returned quite free of ſand, which is a great deſideratum for thoſe places where oat bread is in uſe. The diſcoverer of this uſe of the baſaltes, builds mill-ſtones of all ſizes on moderate terms, and is careful, from his experience as a miller, to build them of ſuch a grain as is moſt ſuitable for the particular purpoſes for which they are intended.

The following remarks are offered by Mr. Ferguſon on the ſize and velocity of mill-ſtones. The diameter of the upper ſtone is generally about ſix feet, the lower ſtone about an inch more; and the upper ſtone, when new, contains about 22½ cubic feet, which weighs ſomewhat more than 19,000 pounds. A ſtone of this diameter ought never to go more than 60 times round in a minute; for if it turns faſter, it will heat the meal. But according to Mr. Imiſon, the mill-ſtone ſhould turn twice round in a ſecond of time, and ſhould only be four feet and a half in diameter. It may probably be imagined, that the meal will be much heated by ſuch a rapid motion as he has recommended, but the effect is counteracted by diminiſhing the ſize of the mill-ſtone from ſix feet to four and a half. The velocity of the circumference of the ſmall mill-ſtone moving twice round in a ſecond, is only one-third greater than the velocity of the large mill-ſtone moving once round in a ſecond.

It may be noticed, that in the former of the above quarries mill-ſtones are raiſed which are of much larger ſizes than the French burrs, which may probably be an advantage in ſome caſes.

The modes of preparing mill-ſtones for the purpoſe of grinding have been deſcribed already, and *fig.* 6. of *Plate* XXXV. repreſents the ſurface of the under grinding mill-ſtone, the way of laying out the wads or channels: the wooden buſh is fixed into the hole in the middle, in which the upper end of the iron ſpindle turns round; and the caſe or hoops that ſurround the upper one, which ought to be two inches clear of the ſtone all round its circumference. B ſhews the upper grinding mill-ſtone, and iron croſs or rynd in its middle, in the centre of which is a ſquare hole that takes in a ſquare on the top of the iron ſpindle, to carry the mill-ſtone round: when the working ſides or faces of the mill-ſtones are laid uppermoſt, the wads muſt lie in the ſame direction in both, that when the upper ſtone is turned over, and its ſurface laid on the under one, then the channels croſs each other, which aſſiſts in grinding and throwing out the flour; the wads are alſo laid out according to the way that the upper ſtone revolves. In theſe the running mill-ſtone is ſuppoſed to turn *ſunways*, or what is called a right-handed mill; but if the ſtone revolves the other way, the channels muſt be cut the reverſe of this, and then it is termed a left-handed mill. See Mill.

The mill-ſtones which we find preſerved from ancient times, are all ſmall, and very different from thoſe in uſe at preſent. Thoreſby mentions two or three ſuch found in England, among other Roman antiquities, which were but twenty inches broad; and there is great reaſon to believe that the Romans, as well as the Egyptians of old, and the ancient Jews, did not employ horſes, or wind, or water, as we do, to turn their mills, but made their ſlaves and captives of war do this laborious work; they were in this ſervice placed behind theſe mill-ſtones, and puſhed them on with all their force.—Sampſon, when a priſoner to the Philiſtines, was treated no better, but was condemned to the mill-ſtone, in his priſon. The runner, or looſe mill-ſtone, in this ſort of grinding, was uſually very heavy for its ſize, being as thick as broad. This is the mill-ſtone which it is expreſsly prohibited in Scripture to take in pledge, as lying looſe it was more eaſily removed. The Talmudiſts have a ſtory, that the Chaldæans made the young men of the captivity carry mill-ſtones with them to Babylon, where there ſeems to have been a ſcarcity at that time; and hence, probably, their paraphraſe renders the text "have borne the mills, or mill-ſtones;" which might thus be true in a literal ſenſe. They have alſo a proverbial expreſſion of a man with a mill-ſtone about his neck; which they uſe to expreſs a man under the ſevereſt weight of affliction. This alſo plainly refers to this ſmall ſort of ſtones.

Mill-*Work*. Under this head we intend to treat of the parts and mechanical contrivances uſed in mills. Under the article Machinery, the reader will find obſervations of a ſimilar nature to thoſe of the preſent article, but applied to ſmaller and more delicate machines than thoſe which are uſually denominated mills.

The object of this article will therefore be, to give a general account of the moſt important pieces of mill-work, as cog-wheels, ſhafts, bearings, &c.; which parts being common to mills of all kinds, would, if minutely deſcribed under every head where they are employed, introduce a great many needleſs repetitions.

The different firſt movers of mills will be treated of, and deſcribed under their ſeveral heads of Steam-*Engine*, Water-*Wheels*, and Wind-*Mill;* and the acting machines of ſeveral kinds of mills, as clay-mill, grinding-mill, under Cutlery; fulling-mill, flour-mill, iron-mill, under Manufacture *of Iron*; oil-mill, cotton-mill, under Manufacture *of Cotton;* rolling-mill, ſpinning-mill, ſilk-mill, thraſhing-mill, water-mill, ſawing-mill, under Machinery *for manufacturing Ships' Blocks at Portſmouth*; Tilt *Mill*, &c. &c.

Cog-wheels are the moſt important and numerous parts of mill-work, few mills being without them, to modify the direction, and adapt the power of the firſt mover, which actuates the mill, to the working point, or the machine which performs the operations the mill is intended for. Moſt mills contain ſeveral different kinds of machines, or operative parts, all deriving their motions from the ſame ſource, or firſt mover. Thus, a flour-mill contains ſtones for grinding; dreſſing machines for ſifting the flour; ſack tackle, for drawing up the ſacks, &c.; all which are moved by the ſame firſt mover as a water-wheel, wind-mill, ſteam-engine, or horſe-wheel. But each of theſe machines requires to be moved with a different velocity to perform its work in the beſt manner; and it is the object of the mill-work to obtain theſe different velocities from the ſame firſt mover, chiefly by the means of wheels; which, therefore, from their importance, deſerve the firſt notice. There are a variety of cog-wheels, as ſpur-wheels, (or *gear* in the technical phraſe,) bevil-wheels, face-wheels or crown-wheels, pinions or nuts, trundles or lanterns; with a variety of other names which are local, but have the ſame ſignification with ſome of the above.

Spur-wheels are thoſe in which the teeth project from the periphery of the wheel, in the direction of radials (ſee *Plate* I. *fig.* 1. *of Mill-work*): they are ſo called, from the reſemblance to the rowel of a ſpur. A ſpur-wheel is uſed to communicate motion by its teeth to another, ſituated in the ſame plane; conſequently, the axes of the two are parallel to each other. The ſpur-wheel, at other times, works with *a pinion*, or nut (ſee *fig.* 2.), which is in fact a ſpur-wheel of ſmall ſize: at other times with a *trundle* or *lantern*. This is a pinion of peculiar conſtruction, conſiſting of two circular boards A, A, (*fig.* 3.) fixed, at ſome diſtance apart, upon its axis of motion or ſhaft B B, and united by a number of cylindrical pins *a*, *a*, called ſtaves, or rounds, which are arranged in a circle, and fixed parallel to the axis of the trundle between the two boards of it. The teeth of the wheel act

act upon these rounds to give motion to the trundle; the rounds, therefore, must be the same pitch or distance asunder as the cogs of the wheel. The number of the rounds of the trundle of course determine its diameter. Trundles have of late years fallen into disuse among mill-wrights, cast iron pinions being found much more preferable: they were sometimes used to work with spur-wheels, but more commonly with

Face-wheels, see *fig.* 4. In these, the teeth or cogs are fixed perpendicularly to the plane of the wheel, parallel, therefore, to its axis: they were used to work with another similar wheel, or with a trundle with a spur-wheel, or with a pinion, when the two axes were required to be perpendicular to each other, as shewn in *figs.* 3 and 4.

The crown or face-wheel has of late years been almost wholly superseded by bevil-wheels, which, in all situations where a wheel is required to turn another in a direction perpendicular or inclined to itself, are found vastly superior.

Bevilled or *Mitre-wheels*, see *fig.* 5. of the plate, have their teeth formed upon a conical surface, the angle of the cone being the same as the angle the axes C, D, of the two wheels A, B, make with each other. The introduction of this class of wheels into machinery is a very essential improvement, which has been wholly made within these thirty years. Bevil-wheels are of course always used to work with others of the same kind.

The manner of setting out the teeth of cog-wheels, in such a form that they shall act in the most equable manner upon each other, and with the least friction, has been a subject of much investigation among mathematicians and theoretic mechanics; but the practice and observation of the mill-wrights have produced a method of forming cog-wheels, which answers nearly, if not fully as well in practice, as the geometrical curves which theory has pointed out to be the most proper. This they have effected by making the teeth of the modern wheels extremely small and numerous. In this case, the time of action in each pair of teeth is so small, that the form of them becomes comparatively of slight importance; and the practical method of the mill-wrights (using arcs of circles for the curves) approximates so nearly to the truth, that the difference is of no consequence: and this method is the best, because it so easily gives the means of forming all the cogs exactly alike, and precisely the same distance asunder, which, by the application of any other curve than the circle, is not so easy. The method, which is extremely simple, is explained by *fig.* 1. The wheel being made, and the cogs fixed in much larger than they are intended to be, a circle, *a a*, is described round the face of the rough cogs upon its *pitch diameter*, that is, the geometrical diameter, or acting line of the cogs; so that when the two wheels are at work together, the pitch circles, *a*, *a*, of the two are in contact. Another circle, *b b*, is described within the pitch circle for the bottom of the teeth, and a third, *d d*, without it, for the extremities. After these preparations, the pitch circle is accurately divided into the number which the wheel is intended to have: a pair of compasses are then opened out to the extent of one and a quarter of these divisions, and with this radius arcs are struck on each side of every division, from the pitch line *a* to the outward circle *d d*. Thus, the point of the compasses being set in the division *e*, the curve *f g* on one side of the cog, and *n o* on one side of the other, are described; then the point of the compasses being set on the adjacent division *k*, the curve *l m* is described. This completes the curved portion of the cogs *e*, and this being done all round completes every tooth: the remaining portion of the cog within the pitch circle, *a*, is bounded by two straight lines drawn from the points *g* and *m* towards the centre; this being done to the cogs all round, the wheel is set out, and the cogs, being dressed or cut down to the lines, will be formed ready for work, every cog being of the same breadth; and the space between every one and its neighbour is exactly equal to the breadth, provided the compasses are opened to the extent of one division and a quarter, as first described.

Many different methods of forming teeth have been proposed, among them the following: Let the tooth *a* (*fig.* 6.) press on the tooth *b* in the point C; and draw the line F C D E perpendicular to the touching surfaces in the point C: draw A F, B E, perpendicular to F E, and let F E cut the line A B in D. It is plain from the common principles of mechanics, that if the line F E, drawn in the manner now described, always pass through the same point D, whatever may be the situation of the acting teeth, the mutual action of the wheels will always be the same. It will be the same as if the arm A D acted on the arm B D. In the treatises on the constructions of mills, and other works of this kind, are many instructions for the formation of the teeth of wheels; and almost every noted mill-wright has his own nostrums. Most of them are egregiously faulty in respect to mechanical principle. Indeed, they are little else than instructions how to make teeth clear each other without sticking. Dr. Hooke was, we think, the first who investigated the form of teeth which procured this constant action between the wheels; and in a very ingenious dissertation, published among the Memoirs of the Academy of Sciences at Paris, 1668, this gentleman shews that this will be ensured by forming the teeth into epicycloids. Mr. Camus, of the same academy, has published an elaborate dissertation on the same subject, in which he prosecutes the principles of M. De la Hire, and applies it to all the varieties of cases which can occur in practice. There is no doubt as to the goodness of the principle, and it has another excellent property, "that the mutual action of the teeth is absolutely without any friction." The one tooth only applies itself to the other, and rolls on it, but does not slide or rub in the slightest degree. This makes them last long, or rather does not allow them to wear in the least. But the construction is subject to a limitation which must not be neglected. The teeth must be so made, that the curved part of the tooth *b*, is acted on by a flat part of the tooth *a*, till it comes to the line A B in the course of its action; after which the curved part of *a* acts on a flat part of *b*, or the whole action of *a* on *b* is either completed, or only begins at the line A B, joining the centres of the wheels.

Another form of the teeth secures the perfect uniformity of action without this limitation, which requires very nice execution. Let the teeth of each wheel be formed by evolving its circumference; that is, let the acting face G C H of the tooth *a* have the form of a curve traced by the extremity of the thread F C, unlapped from the circumference. In like manner, let the acting face of the tooth *b* be formed by unlapping a thread from its circumference. It is evident that the line F C E, which is drawn perpendicularly to the touching surfaces in the point C, is just the direction or position of the evolving threads by which the two acting faces are formed. This line must, therefore, be the common tangent to the two circles or circumferences of the wheels, and will, therefore, always cut the line A B in the same point D. This form allows the teeth to act on each other through the whole extent of the line F C E, and, therefore, will admit of several teeth to be acting at the same time; (twice the number that can be admitted in Mr. De la Hire's method.) This, by dividing the pressure among several teeth, diminishes its quantity on any one of them, and, therefore diminishes the dents or impressions which they unavoidably

 make

make on each other. It is not altogether free from fliding or friction, but the whole of it can hardly be faid to be fenfible. The whole fide of a tooth three inches long, belonging to a wheel of ten feet diameter, acting on the tooth of a wheel of two feet diameter, does not amount to $\frac{1}{10}$th of an inch, a quantity altogether infignificant. Conical wheels, or bevilled gear, may be confidered as confifting of two cones rolling on the furfaces of each other: let B and C, (*fig.* 7.) be the bafes of two cones turning on their centres, having teeth cut on them diverging from the apex A to the bafes B and C. Thefe teeth will work freely into one another from the apex A to the bafes B and C, when turned round; but the teeth near the point of the cone being fmall and of little ufe, may be cut off at G and H. Thefe teeth may be made of any breadth, according to the ftrefs they are intended to bear; and this is of vaft importance, becaufe by this method they may be made to overcome a much greater refiftance, and work fmoother than a face-wheel and trundle of the common form. Befides, thefe kind of wheels are of fingular ufe to communicate motion in any direction, or to any part of a building, with lefs trouble and friction than wheels of any other conftruction.

We fhall now venture fome remarks upon the manner of conftructing wheel-work. Cog-wheels were formerly made of wood, and fome are ftill conftructed of that material; but of late years caft-iron wheels have been fubftituted, and found much fuperior in ftrength, accuracy, and durability. Wooden wheels are framed together in fegments ufually of three thickneffes, to break the joints upon each other. (See *fig.* 1.) The middle thicknefs is made in fix or eight pieces, and left on the infide with ftraight fides, *x*, *x*, into which the arms are fitted, and bolted againft it. On each fide this middle thicknefs, another is (X X, *fig.* 1.) placed with break joints, and all the three are bolted together to make a folid rim, in which the cogs are to be fixed by mortifes, the tenons or tails of the cog being held in their places by a pin driven through each. The arms of wooden wheels are made in different ways; fometimes they are mortifed through the fhaft, and the ends are notched in the middle of the fides of the octagonal pieces *x*, *x*, and laying againft the face of them behind, are bolted to them to make all faft. This manner of uniting the arms with the rim is fhewn at *l* (*fig.* 4.); but this method is not the beft, becaufe the mortifes weaken the fhaft very materially, and it is difficult to get fuch a wheel off if ever it is required, on a failure of the fhaft, &c. On this account, the method called clafp arms is much preferable: it is fhewn in *fig.* 1. Four arms E E, F F, are ufed, which are halved into each other, and form a frame as in the figure, leaving a fquare opening in the centre, and holding the rim of the wheel by their ends, which are bolted to the middle thicknefs of the rim, as fhewn in *fig.* 4. To fit on fuch a wheel as this, the fhaft is made up to a fquare, by fixing pieces of wood upon its fides; and the wheel being hung upon this, is made faft by wooden wedges driven in all round, the fquare formed between the arms being rather larger than the fhaft, by which means the wheel can be adjufted to come quite true by the wedging. Face-wheels, like *fig.* 4, have fometimes ftays or braces proceeding from the back of the rim to fome diftance along the fhaft, where they are received in mortifes, as fhewn by the dotted lines: thefe make the wheel exceedingly ftrong, and keep it very ftiff in the fquare upon its axis, which is very neceffary, as the action of the teeth of a face-wheel meeting a trundle, is to throw the wheel back upon its fhaft, which tendency thefe ftays effectually counteract. At other times, two fets of clafp arms are ufed for the fame end, one bolted on each fide of the middle thicknefs of the wheel, by the fame bolts which pafs through both, as well as the wheel, and unite the two fets like one, but of confiderable depth, fo that the wedging will have a greater effect to keep the wheel in the fquare. Small wheels are frequently made of plank, folid, without any arms. In this cafe the middle thicknefs is made of four pieces, leaving a fquare hole between them, and they are kept together by a circular ring of fegments, bolted on at each fide all round, and the joints overlapped. The conftruction of trundles (*fig.* 4.) has been fufficiently explained, except that they ufually have an iron hoop fitted round the circular boards to prevent them from fplitting: indeed many large face-wheels have the fame. Small pinions are made out of one block of wood, and the cogs are fitted into it much in the fame manner as the fpokes are let into the nave of a coach-wheel. Iron-wheels either have the cogs caft in the fame folid piece with the rim, or mortifes are left in the caftings for the reception of wooden cogs, as thefe are found to work much better. The wheel and its arms are fometimes caft in one piece, but for large wheels the rim and its arms are formed in two feparate pieces and fcrewed together. The reafon of this is, that in cafting a large and extended piece of iron, it frequently happens that fome parts will cool in the mould, and become folid before the others: confequently, from their contraction, thefe parts will be fhorter than others which have retained their heat and fluidity longer. This circumftance happening to the arms of a wheel, will either warp the rim out of a true circle, or fet the metal of one part upon a ftrain againft another, fo that the flighteft blow or jar will caufe them to fnap in fuch parts. All this danger is avoided by making them in feparate pieces, as in *fig.* 8: the end of each arm, as A B, has a flat expanded part, which lays againft a proper focket withinfide of the rim C D, and is bolted to it. One-half of this wheel is delineated, with wooden cogs fitted in, at C D; and the other half, F F, fhews the form of a rim, where the cogs and the arms *e f* are caft all in one piece. In the latter cafe the rim has a rib *g* withinfide it for ftrength, in the fame manner as all the arms have, and which is evidently fhewn by the figure. In fome fituations it is neceffary to fix wheels upon long fhafts while they are in their places, and cannot conveniently be taken down: in this cafe fuch wheels may be made in two halves bolted together. *Fig.* 9. is drawn as if it were two halves of different kinds put together in this manner; the joint being up the middle of the arms L, L, and the connecting bolts are plainly fhewn. By this method one wooden pattern, if very accurately made, will ferve for cafting both halves of the wheel. Cog-wheels are found to work with leaft friction, wear, or noife. When one has wooden, and the other iron cogs, dreffed exceedingly fmooth and true, the fmall wheel is ufually made with the iron teeth, and the large one with the wooden ones. When fuch wheels are firft fet to work, the cogs are fmeared with black lead mixed with tallow: this gives them a gloffy furface, which greatly diminifhes the friction. Hornbeam is found to be the beft wood for the cogs, as it is not liable to fplit or fplinter away by long wear. The cogs are held in by a pin driven through the tenon or tail, withinfide the rim of the wheel. The wooden cogs are dreffed by chiffels to the marks fet out, in the fame manner as wooden wheels; but the iron cogs are firft chipped with a cold chiffel and hammer, and then filed true. The great labour of doing this induced Meffrs. Boulton and Watts, fome years ago, to erect machinery for dreffing cogs. The wheel was provided with apparatus to hold it faft at the feveral divifions, and a ftrong flider, with a chiffel fixed in it, was forced between the rough cogs by the revolution of a camm or heart, with

with a ſufficient power to cut away a ſhaving, and form the cog perfectly at twice repeating the operation. Some mechanics diſpute the propriety of dreſſing iron cogs at all; they ſay, that the exterior ſurface of the caſtings have a kind of caſe-hardening, which is removed by the dreſſing, and a ſofter ſubſtance of metal expoſed for the acting ſurfaces. This is true, and the objection would have its full force, if it were poſſible to make caſtings of wheels perfectly true in the circle, and all the cogs preciſely the ſame ſize: but as the preſent ſtate of the founder's art cannot inſure this, it is beſt to chip and file the cogs; accuracy in the form of the teeth being a ſuperior conſideration to any quality of their ſubſtance. The wheel being made in either of theſe methods, muſt next be fixed, or *hung*, upon its ſhaft. Wheels are generally fixed faſt upon their ſhafts or axles before their teeth are ſet out; or, if this is not convenient, they are fixed on a temporary ſpindle to ſet them out. When the wheel is made of wood, it is fixed upon the ſhaft, or a temporary axis, and turned round upon its pivots, while a chiſſel is laid on ſome fixed ſupport to cut or turn its circumference to a true circle, or elſe to make a mark to which its rim may be reduced all round. The circumference is then divided, and mortiſes cut out for every cog; and when theſe are fixed in they are much larger than they are intended to be, that they may be ſet out, as above directed, and reduced to their true figure, without abſolutely depending upon the accuracy of the mortiſes which receive them. Iron wheels are, as before-mentioned, treated in a different manner, being caſt in the impreſſion of a truly circular pattern made of wood; the cogs caſt ſolid, with the rim or elſe mortiſes left all round for the reception of the wooden cogs: in either caſe the rim is a true circle, and muſt be fixed upon the ſhaft exactly by its centre, inſtead of forming the circumference to the centre, as in the wooden wheel. To do this, the centre hole through the iron wheel is made much larger than the ſhaft which is to go through it, and the ſpace all round is filled up by iron wedges driven in; ſo that by means of theſe the wheel can be fixed exactly true in the centre (or in the round), and alſo in the flat that is truly perpendicular to the axis. The manner of arranging the wedges is ſhewn in *fig.* 8, where eight wedges are ſhewn by *a, a, a, a*, &c. round the ſhaft R. It is needleſs to explain how the wheel can, by means of theſe, be ſet exactly true, when it is found by turning round upon the pivots of its ſhaft that any one ſide of the circumference is farther from the centre than another. For the purpoſe of ſetting it ſquare upon the ſhaft, each wedge-hole is provided with two wedges, one driven in from each ſide of the wheel, the two laying over each other in the notch or hole in the manner ſhewn at G. Thus, by gently driving one in, and the other a little outwards, the wheel may be very correctly rectified, if it has any deviation from the perpendicular. This is the uſual manner of hanging wheels, and for large wheels it is the only applicable method. *Plate* II. *figs.* 9 and 10, is a far ſuperior plan for ſuch iron wheels as are not too large or heavy to be turned in a lathe upon a chuck, ſo that the centre is expoſed, and may be bored through with a truly circular hole, and rather conical: of courſe the wheel is fixed upon the chuck, ſo that its circumference runs truly; and at the ſame time the centre is bored, the pitch circle is deſcribed upon the cogs, and ſometimes the ends of the cogs are turned to reduce them to a true circle, and alſo the ſides, that they may be exactly flat: for, as we have before obſerved, iron wheels, however true their teeth may be caſt, ſhould always have their cogs rather too large, and then be ſet out and dreſſed, by chiſſeling and filing, to make them perfectly correct to the lines thus deſcribed. But to return to *fig.* 9; the wheel being prepared, and its centre bored out, the ſhaft is turned, as uſual, to form its pivots, and, at the ſame time, the part which is to receive the wheel is turned conical, to fit the hole through the wheel, which being jambed thereon will certainly be true at once: and to prevent it from ſlipping round upon its axis various means are in uſe; ſometimes a mortiſe is formed through the ſhaft A, at the ſmall part of the cone, and a wedge *r* driven through, which is received in notches at the ſides of the hole through the central part of the wheel, ſo that it holds the wheel from turning round on the ſhaft, at the ſame time that it drives it hard, and fixes it upon the conical fitting. Another method is to cut a channel along the conical part of the ſhaft parallel to the axis of it, and another ſimilar one withinſide of the hole through the wheel; then a fillet or feather of iron *s*, (*fig.* 10.) being inſerted into the two grooves, effectually prevents the wheel from turning, unleſs the ſtrain is ſo great as to cut the feather in two through its whole length, which is eaſily prevented by making it of a proper thickneſs. Another method of fixing a wheel is to have a flaunch, or flat ſhoulder, formed upon the ſhaft, and the wheel is drawn up againſt this by two, three, or four ſcrew-bolts going through it, and alſo through the central part of the wheel, parallel to its axis. This plan is neither ſo neat, ſimple, nor ſtrong as the former. When a wheel is required to be ſometimes diſengaged from its axis, the conical or cylindrical fitting is very convenient. In this caſe, the wheel ſhould fit up againſt a flat ſhoulder, as *a*, in *fig.* 11, and at the oppoſite ſide ſhould have a collet, or ring *b*, to confine it, and kept up by a key going through to the ſhaft R. In this way the wheel will ſlip round freely upon its axis, and communicate no motion thereto, though it is in conſtant motion itſelf: but when they are required to be connected, a locking bayonet, or clutch-box, is uſed. Theſe pieces of mechaniſm are constructed in different forms; one of them is ſhewn in the figure. Strong arms A, A, are fixed faſt on the ſhaft R, juſt before the wheel either by a circular fitting with a fillet, by a ſquare, or they may be caſt with it. Through the extremities of theſe arms holes are drilled to receive the ſhanks *f, f*, of the locking bayonet, which are fixed by nuts faſt to an arm D, very nearly ſimilar to A A, but it ſlides on the ſhaft, and has a central part *g*, with a circular groove round it, in the manner of a pulley, and a fork embracing the central piece in this groove gives the means of ſliding the bayonets *f f*, and D, upon the ſhaft, ſo that the points of its ſhanks intercept the arms of the wheel, ſo as to carry it round with them and the ſhaft; but when the points of *f f* are drawn back clear of the arms of the wheel, it ſlips round freely upon the ſhaft. The clutch-box is rather different from this; it is a piece fitted upon the ſhaft with a fillet, ſo that it cannot ſlip round, but will ſlide endways upon it. The end of the piece is formed with ſeveral notches, or indentations acroſs its face, which meet ſimilar indentations in the face of the central part of the wheel, and thus unites the wheel and the ſhaft when the clutch is ſlid up to it; but the wheel is diſengaged when the clutch is drawn from it. The conſtruction of *bearings* for the ſupport of pivots at the ends of ſhafts or ſpindles, is a matter of great importance in mill-work. The old kind of bearing called braſſes is ſhewn in *fig.* 12. A lump of braſs *a*, with a ſemicircular notch in it, was let into the piece of timber A, which was to ſupport it; and two ſcrew-bolts *b, b*, were fixed through the timber, being half received in notches formed in the ſides or ends of the braſs *a*: the upper braſs, *b*, was exactly ſimilar to the lower, and over it a plate of iron, *d*, was placed, with two holes through it to receive the two bolts *b, b*, and keep them

them together: the nuts c, c, upon the tops of the bolts confined the upper brass down, and made all fast and tight. This kind of brass is not sufficiently strong or steady for all purposes, and, therefore, the bearing shewn in *fig.* 13. has taken its place: in this, $a a$ is a cast-iron plate, which is held by two or more bolts r, r, down upon the timber or framing of the mill: this piece of cast-iron has two pieces b, b. rising up from it, between which a piece of brass, l, is bedded, and has a semicircular notch in it. Another similar piece of brass is fixed into the cast-iron cap-piece B, which is fitted into the space between the two pieces b, b, and is drawn down by nuts upon the two bolts c, c. The brasses are prevented from getting out sideways by small fillets projecting from the middle of them, which are received into proper notches in the cast-iron work. In the same manner the cap B is fitted between the pieces b, b, with a tongue or fillet, and groove, so that it cannot deviate sideways, and then the bolts have only to draw the brasses down together. Sometimes a bearing of this kind is fitted up, so that it is adjustable in its position a little to adjust two wheels to work accurately with each other, or for other purposes where nicety is required. In this case, an iron plate, D, is bolted down to the framing, and the bearing, $a a$, lays upon it, the same bolts r, r, going through both, and also through the framing beneath; but the holes through which they pass in the piece $a a$ are oblong, to admit the whole bearing being adjusted sideways. This is done by two wedges o, o, inserted at the ends of the piece $a a$, between the two ends of D, which rise up for the purpose, as at $n n$. The bearing rests upon two wedges at g, g, and is drawn down upon them by the bolts r, r. By these two wedges it can be raised up at pleasure, and by the other two, o, o, at the ends, it can be adjusted endways to set the bearing in the exact position required; and the bolts r, r, when screwed fast, hold all tight. The best way to make the interior surface of the brasses for a bearing exactly true, is to have them cast solid, that is, the two halves of the brass in one, with a notch which very nearly, but not quite separates them. In this state it can be chucked in a chuck-lathe, and the inside bored or turned out true: then it may be sawn in two halves, and put into its place, to which it should have been previously fitted. Sometimes the bearing is all fitted together and screwed down in its place, and a borer is used to bore or broach out the hole for the brasses, the same as is employed to bore pump barrels. Brass is found, by experience, to be the best substance to form bearings for a cast-iron gudgeon, having the least friction, and, consequently, least wear, of any other substance which can be used. To diminish this friction still farther, friction-wheels are sometimes used. The manner of contructing these, when merely required to support a gudgeon, leaving its own weight to keep it down in its place upon them, is shewn in *fig.* 14. Here A A is an iron plate, which is to be bolted down upon the framing: it has holes through it to receive the friction-wheels B, B, and supports bearings a, a, for their pivots raised up to a proper height, and provided with sockets for brasses, in which the pivots of the friction-wheels are to lie. The two friction-wheels B, B, as is evident, lie by the side of each other, and the gudgeon, D, of the shaft they are to bear lies upon and between them, so that when it turns round it rolls upon them, or rather, their circumferences move with it, and, consequently, the pivots of the friction-wheels move so slowly, as to diminish the friction very materially, the proportion depending on the relation between the diameters of the wheels B and the gudgeon D. This is not the best kind of friction-wheels, though the simplest. *Plate* II. *fig.* 15. *of Mill-work*, contains a view of another kind, called friction-rollers: here A A is an iron plate bolted down to the framing, and an iron ring, B, rises up from it, all cast in one piece. The interior surface of this ring is turned in the lathe with the greatest accuracy, and the pivot or gudgeon C, which is also turned true, rests in the centre thereof, being supported by six rollers a, a, &c. arranged at equal distances round it, and of such a diameter as to exactly fill up the space all round between the gudgeon and the ring. The rollers, it is evident, must be made all of one exact diameter, and extremely true, and they must fill up the space: then the gudgeon being turned round acts upon these rollers, and turns them round also at the same time by this motion. As they have no fixed centre, they also roll round within the ring B, in the same direction as the motion of the gudgeon, but with a very slow motion, which will be in proportion to the relative diameters of the gudgeon C and the ring B. By this means nearly all the friction is avoided, nothing like the sliding of a gudgeon round upon its bearing taking place here; it is all rolling of one surface upon another: and as the contact of two cylinders, supposing them hard, is but a line, the friction, or more properly adhesion, is exceedingly small; and at the same time that the gudgeon is as strongly supported as possible: but this depends upon the hardness of the matter of the gudgeon, the rollers, and the ring B. If the ring and gudgeon are made of hard cast iron, and the rollers of steel at a spring temper, it will act extremely well, though the strain or weight upon the rollers be very great. For light strains softer substances might be used, but not to so good an effect.

The manner of keeping all the rollers at their relative distances from each other, in the ring B, that they may not run against each other, is yet to be explained. Each roller, as shewn at z, has a groove turned in it in the middle of its length, so as to reduce it to a small neck in the centre: then an iron ring, L, is provided, which has six holes drilled in it, in the proper positions for the centres of the rollers, that is at equal distances round a circle, which is as much less than the ring E as the diameter of the rollers, or the same quantity larger than the diameter of the gudgeon C. These holes are made to fit the small neck in the centre of the rollers, and to get them in, the holes are cut open from the outside of the ring, so as to become notches; then the rollers being put into them, are all in one cluster, and in this state are introduced into the ring E. They will now be kept at their proper distances asunder, and when the gudgeon C is introduced between them, they will all take their proper places, and lie truly parallel. It is to be observed that the holes or notches in the ring L, do not exactly fit the necks of the rollers, which have therefore considerable play, and but very little friction, for it is not essential to keeping the rollers at their relative distances that this ring should be used, but it will prevent the danger of their getting wrong by accident. To prevent any dust or dirt getting in, which would completely destroy the action of this ingenious mechanism, a circular iron plate is fitted into the ring B, on each side, and both are fixed by small screws going through the ring. One of the plates N must of course have a hole through the middle, to admit the gudgeon. The joints of these plates should be water tight, and then a quantity of oil being poured in, will remain in the bottom of the ring B, and every roller, as it passes, will be kept oiled; though this is no ways necessary to their action. The end plate, which is not perforated, will make a stop to prevent the gudgeon moving endways, and the two plates will keep the rollers from shifting their position on end; but to prevent friction, if ever they come in contact, the ends of the roller should be rather convex, as shewn at z, that they may touch in the centre

centre rather than the outſides; but they will never bear hard againſt the plate, having no drift that way.

A patent was taken out for theſe friction rollers many years ago, and a large manufactory was eſtabliſhed for making them for various purpoſes, as carriage and waggon-wheels, the gudgeons of heavy water-wheels, &c.: they were found to poſſeſs great advantages, having ſcarcely any ſenſible friction when in motion, but were liable to get out of order chiefly from the entrance of duſt, which occaſioned the rollers to wear out of the round more on one ſide than the others; and if once by this accident the rollers ſtood ſtill for an inſtant, the gudgeon wore a flat place in the two rollers beneath it, and they would never run round again: a very little time would wear this flat ſide ſo deep as to ſtop the rollers, becauſe of the very ſmall ſurfaces in contact with the gudgeons. For delicate purpoſes, where hardened ſteel can be employed for all the rollers and the ring, they are a moſt admirable contrivance, and the above objections will then apply very ſlightly; but, as before mentioned, their perfection and durability will ultimately depend upon the hardneſs of the ſubſtances employed.

Fig. 16. repreſents a ſuit of friction rollers for ſupporting the weight of a heavy vertical ſhaft, as a horſe-wheel, a horizontal wind-mill, a capſtan ſugar-mill, &c. A A is a plate ſupporting the weight of the ſhaft; it has a conical eminence upon it, and a hole in the centre of this, which exactly fits the pivot or gudgeon *c*, at the bottom of the ſhaft R: upon this gudgeon a conical plate B is formed, exactly of the ſame ſhape and ſize as the conical part of the plate A, and between theſe two plates three or four rollers *a*, *a*, are ſituated, and bear the weight of the ſhaft R, or whatever preſſes upon the plate B. The rollers are kept at proper diſtances aſunder by a ring, ſhewn ſeparate at L, with three arms, *n*, projecting from it, which being formed into ſpindles, paſs through the centres of the rollers *a*, and have collets and croſs keys to keep them on. In this manner, as the gudgeon and plate B turn round, the plate rolls upon the rollers *a*, *a*, keeping always in the true centre, by the end of the gudgeon *c* fitting the hole in the centre of the plate A A; but the weight is ſupported by the rollers *a*, *a*, which, at the ſame time that the upper plate rolls upon them, they roll upon the lower, and thus very conſiderably diminiſh the friction which any other kind of gudgeon would have in ſuch a ſituation.

Shafts.—In almoſt all modern mills, the ſhafts or ſpindles for the conveyance of motion, and ſupport of wheels, are made of iron, either wrought or caſt. Square ſhafts are the moſt common, but ſometimes octagon and round ones are uſed; and if they are very large, they are caſt hollow, like pipes, and the gudgeons fixed in at the ends by wedges; but the pivots ſhould always, if poſſible, be formed of the ſame piece of metal, as the ſlighteſt poſſible deviation from the ſtraight line cauſes them to ſtrain, and work very irregularly in their bearings. In wooden ſhafts this is impracticable, and it is one of the greateſt objections to the uſe of them. The beſt method of fixing gudgeons into wooden ſhafts is ſhewn in *fig.* 17. Here A is the gudgeon, made in caſt iron, turned true; it has four leaves, *a*, *b*, *c*, *d*, forming a croſs, which is let into the end of the wooden ſhaft R: the front edge of each leaf is conſiderably thinner than the back, ſo that a pair of ſtrong iron hoops *r r* being driven tight on the end of the ſhaft, cloſes the wood round the croſs, and holds it faſt, and the back of the leaves being wider than the front, it will not come out. As an additional ſecurity, ſcrews are ſometimes put in: theſe are put through holes in the arms of the croſs, which are then made flat the other way, and do not go ſo far into the wood. The ſcrews go into the timber a conſiderable diſtance, where a mortiſe is cut into the wood, to meet the end of the bolt, and an iron nut is dropped in, to ſcrew the bolt into, when it is turned round by a ſcrew driver. By this contrivance a gudgeon may be fitted into a wooden ſhaft very faſt, but ſtill it will never come into competition with iron ſhafts, when the gudgeon is made all in one ſolid piece with the whole of the ſhaft. A judicious mechanic will never make more than two bearings upon any one ſhaft, if it can be avoided, becauſe if the three, by any means, as the warping of the frame work, or other cauſe, get the ſmalleſt poſſible quantity out of the ſtraight line, they can never work well afterwards, but will always ſtrain and wear the bearings with great friction. In very extenſive mills, ſuch as woollen and cotton mills, breweries, &c. when the buildings are of great length, it becomes neceſſary to join ſeveral ſhafts together in length, to reach from one end to the other of a mill. The manner of making the joinings is of ſome conſequence: it is neceſſary that every ſhaft ſhould have a bearing at each end, and conſequently that the connection of the ends of every one ſhould be made by uniting the ends of the ſhafts which project beyond their bearings. This can be done in various ways: one is by having the ends of each of the ſhafts provided with circular heads (ſee A B *fig.* 18.), which have teeth in one, and correſponding indentations in the other, to receive them, and thus one is made to turn the other about, at the ſame time that if any ſlight ſettlement of the building or other cauſe depreſſes one of the bearings, or raiſes another, ſo as to put the two ſhafts out of the perfect ſtraight line they ought always to preſerve; theſe joints will admit the ſlight flexure, and ſtill communicate the motion of one ſhaft to the other.

As this accidental ſettlement in large buildings is almoſt unavoidable in ſome degree, care ſhould be taken to make ſuch joints as will admit of a trifling bending. Sometimes the ends of the ſhaft are made circular, and turned quite true in the lathe; then a metal tube or collar is fitted truly upon both to cover the joint, and connect them, a bolt being put through each end, which unites both ſhafts with the collar, and thus by means of it cauſes one to turn the other round. This method is ſometimes uſed to ſave the great expence of having a bearing at each end of every length of ſhaft, one bearing to each length being then ſufficient, the other end of the ſhaft being ſupported by this collar, connecting it with the end of the adjacent length juſt where it projects beyond its bearing. But this is not a good method, as the ſhafts are apt to bend and work with ſo much friction in the bearings, if they get the leaſt out of the ſtraight line, becauſe theſe kind of joints will not admit any flexure of the ſhaft, or if they do, they will only bend on one ſide, whereas it is neceſſary for the joint to bend ſucceſſively on all ſides, when the bearings are not preciſely in a ſtraight line. *Plate* III. *fig.* 19. repreſents a coupling-box, uſed by Mr. Murray of Leeds, for connecting the lengths of a long line of ſhaft which are to carry a heavy ſtrain: it is ſo made that it will communicate the motion in the manner of an univerſal joint, if they ſhould be out of the line. Let A, B, be the two ſhafts to be united; C, D, their necks or collars which lay in the bearings: the ends projecting beyond theſe have boxes E, F, fixed on them, either by a ſquare with wedges, or by a round part with a fillet: one of theſe boxes, E, has a piece projecting from the inſide of it on each ſide, and extending into the other box, as is ſhewn at *a a*, (No. 2.), which is an inſide view: the other box, F, has two ſimilar pieces projecting from it at *b b* into the other box E: within the boxes an iron croſs *c c d d* is ſituated; it has ſcrews fixed into the ends of the croſs, and by theſe the motion is communicated: thus, the pieces *a*, *a*, when the ſhaft A and box E are turned round in the direction of the arrow (No. 2.) act againſt the ſcrews *c*, *c*, of the croſs, and turn

it

it about: at the fame time the other two ferews *d, d*, at the other arms of the crofs prefs againft the pieces *b, b*, which belong to the box F and fhaft B, thus turning them round: the crofs is placed quite detached in the boxes, and thus acts as an univerfal joint, to communicate the motion of one to the other: the ferews *c c, d d*, at the ends of the crofs are only put in that the acting points may be made of fteel, and made fmooth to have but little friction in thefe parts. Another method of uniting fhafts by Mr. Murray is fhewn at *fig.* 20: it has the advantage of requiring only one bearing for every length of fhaft, whereas the above method requires one for each end of every length. A, B, reprefent the two fhafts; each has a pivot formed at the end: thefe pivots are fitted into a coupling piece C D E, which is bored out truly to fit them infide, and the outfide turned true, with a neck D D, which is received and fitted into a bearing: the two fhafts A, B, are connected with the coupling piece D, at C and E, by means of a crofs key *l m*, put through each fhaft, and the ends of them received in notches made withinfide of the coupling piece at C and E, where it receives the ends of the fhafts. It is to be obferved that the fhafts do not fit tight in thefe parts E and C, but only in the pivots *a, b*, within, by which means they have liberty of a little motion, and this without ftraining the bearing in which D runs, becaufe it is only the fhort coupling piece which is received therein; and confequently, any trifling deviation from the ftraight line will not ftrain it, becaufe of the play allowed in the fittings.

The univerfal joint, called alfo Hooke's joint, from its inventor Dr. Hooke, is a method of uniting fhafts, which permits them to be rather inclined to each other. This is fhewn in *fig.* 21, where A, B, are the two fhafts, with necks to be received in bearings: each fhaft beyond this is formed into a fork, as C and D; and thefe are united by a crofs of iron E, or fometimes a ring, in which four pins are inferted, and pafs through holes in the ends of the forks. On one or other of thefe pins the joint will bend in any direction, on the fame principle as a compafs hangs in its gombals, and will communicate a rotative motion from one fhaft to the other, when they are rather inclined; but this inclination fhould be fmall, or elfe the joint will not act well, or without great friction, and irregularity of motion. If an angle of more than 15 degrees from the ftraight line is required, a pair of flightly bevilled wheels are beft.

The regulation of the velocity of a mill is a matter of confiderable importance, to preferve an uniformity of motion, either when the force of the firft mover is fluctuating, or when the refiftance or work of the mill varies in its degree: either or both of thefe caufes will occafion the mill to accelerate or diminifh its velocity; and in many inftances it will have a very injurious effect upon the operations of the mill. Thus, in a mill for fpinning cotton, wool, flax, &c. driven by a water-wheel, are a multiplicity of movements, many of which are occafionally difengaged, in different parts of the mill, for various purpofes. This tends to diminifh the refiftance to the firft mover, and the whole mill accelerates. Or, on the other hand, the head of water, which drives the wheel, may be liable to rife and fall fuddenly, from many caufes, which great and rapid rivers are fubject to, and caufe fimilar irregularities in the fpeed of the wheel. For fuch cafes, judicious mechanics have adopted contrivances, or regulators, which counteract all thefe caufes of irregularity; and a large mill, fo regulated, will move like a clock, with regard to its regularity of velocity. Thefe regulators are ufually termed *governors*, and are made on different principles. Thofe moft generally ufed are called flying-balls, operating by the centrifugal force of two heavy balls, which are connected and revolve with a vertical axis. *Fig.* 22. reprefents the fimpleft form of this ingenious apparatus: A A is the vertical axis, which is conftantly revolving by the machinery; at *a a* two arms or pendulums, *a b, a b*, are jointed, and carry at their extremities a heavy metal ball each, as *b b*; from the pendulums two chains or iron rods, *d, d*, proceed, and fufpend a collar *e*, which flides freely up and down the axis, and has a groove formed all round it, in which the end of a forked lever, D, is received; and thus the rifing and falling of the collar, *e*, produces a correfponding motion of the end of the lever D; but the collar is always at liberty to turn round with the axis freely within the fork, at the extremity of the lever. The operation of the governor is this: when the vertical axis is put in motion, the centrifugal force of the balls, *b, b*, caufes them to recede from the centre; and as this is done both together, they caufe the collar, *e*, and the end of the lever to rife up: the balls fly out to a certain height, and there they continue as long as the axis preferves the fame velocity; as it is the property of a pendulous ball, like *b*, to make a greater effort to return to the perpendicular, in proportion as it is removed farther from it, in confequence of the fufpending rod being more inclined, and bearing lefs of its weight. The weight of the balls to return to the axis may be confidered as a conftantly increafing quantity; while the quantity of the centrifugal force, caufing them to recede from the axis, depends exactly upon the velocity given them. But this velocity increafes as they open out, (independently of any increafed velocity of the axis,) in confequence of their defcribing a larger circle. The combination of thefe oppofitely acting forces caufes the governor to be a moft fenfible and delicate regulator. Thus: fuppofe the balls hanging perpendicular, put the axis in motion with a certain velocity, the centrifugal force will caufe the balls to fly out; and this increafing their velocity, (by putting them farther from the centre, and caufing them to revolve in a larger circle,) gives them a greater centrifugal force, which would carry them ftill farther from the centre, but for the counteracting force, *viz.* the weight of the balls tending to return. This is, as before ftated, an increafing quantity, and confequently thefe oppofite forces come to a point where they balance each other; that is, the balls fly out till their weight to return balances the centrifugal force. But if the flighteft alteration takes place in the velocity of the axis, the equilibrium is deftroyed by the increafe or diminution of the centrifugal force, and the balls alter their diftance from the centre accordingly, and by elevating or depreffing the end of the lever, operates upon fome part of the mill to rectify the caufe of the irregularity. In a fteam-engine, the lever acts upon a vane or door fituated in the paffage of the fteam from the boiler to the cylinder; and if the mill lofes in velocity, from an increafe of refiftance, the balls fall together a little; and the confequent fall of the lever opens the door or throttle valve a little wider, and gives a ftronger fupply of fteam to reftore the mill to its original velocity. On the other hand, if the mill accelerates, the balls open out and then clofe the vane, fo as to moderate the fupply of fteam. See a more full defcription of this under STEAM-*Engine*.

A water-wheel is not fo eafily regulated by the governor, becaufe the fhuttle of a large wheel requires a much greater force to raife or lower it, when the water is preffing againft it, than the lever, D, can at any time poffefs; it therefore becomes requifite to introduce fome additional machinery, which has fufficient power to move the fhuttle, and this is thrown, in or out of action, by the flying balls. The fimpleft contrivance, and that which we believe was the regulator firft ufed for a water-wheel, was erected at a cotton mill at Belper, in Derbyfhire, belonging to Mr. Strutt. A fquare

A ſquare well, or large ciſtern, was ſituated cloſe by the water-wheel: it had a pipe leading from the mill-dam into it, to admit water; and another pipe from it to the mill-tail, to take the water away: both were cloſed at pleaſure by cocks or ſluices. Within the well was a large floating cheſt, very nearly filling up the ſpace: it of courſe roſe and fell with the water in the ciſtern, and had a communication by rack and wheel-work with the machinery for drawing the ſhuttle, ſo that the rise and fall of the floating cheſt elevated and depreſſed the ſhuttle of the wheel. The lever of the governor was connected with the cocks in the two pipes, in ſuch a manner that when the mill was going at its intended velocity, both of the cocks were ſhut; but if the water-wheel went too ſlowly, the falling of the balls and deſcent of their lever, D, opened the cock in the pipe of ſupply, and, by letting water into the well, raiſed the float, and, with it, the ſhuttle, to let more water upon the wheel, till it acquired ſuch a velocity that the balls began to open out again, and thus ſhut the cock: on the other hand, if the mill went too faſt, the balls opened the pipe of exit from the well, and then the ſinking of the float cloſed the ſhuttle till the true velocity was reſtored.

Since this firſt application of the regulator to the water-wheel, the manner of its operation has been greatly varied; and as the ſame mechaniſm is applicable to any kind of mill-work, we ſhall give a ſlight ſketch of it. Suppoſe A, *fig.* 23, an axis, receiving its motion from the mill by wheel-work; it is provided with a pair of governors, *a b*, *a b*, conſtructed like thoſe before deſcribed; and at the lower part of the ſpindle is a bevilled wheel, R, turning two others, B and C, ſituated upon one ſpindle, D, which goes away, and communicates motion to the racks of the ſhuttle; the wheels, B and C, are neither of them fixed to the ſpindle D, but both ſlip round freely upon it, turning in contrary directions, as they receive motion from the oppoſite ſides of the wheel R. A locking clutch, *d*, is fitted upon the ſpindle between theſe two wheels, B, C, and can, by moving it one way or the other, be made to lock either one of the wheels to the ſpindle D, at the ſame time that it leaves the other diſengaged. The locking-box is moved by means of a lever, ſhewn in *fig.* 24; the arm *m*, having a fork to embrace a groove in the box; the lever is fixed on a vertical axis *n*, which has at the upper end two other levers, *o*, *p*: theſe lay one on each ſide of the vertical axis A, but at different heights, as is evident from the figure. The collar *e*, which is raiſed up when the balls fly out, is fitted upon a ſquare part of the ſpindle A, and is formed like a ſnail or camm, which will act upon either of the levers, *o* or *p*, according to the height at which it hangs upon its ſpindle. Now when the mill is going with its true velocity, this camm, *e*, is at ſuch a height that it is beneath one lever, *o*, and above the other, *p*, ſo as to interfere with neither; conſequently the locking-box, *d*, remains detached: but on any alteration in the velocity of the mill and the axis A, the balls open or ſhut, as before explained, and the camm, *e*, either riſes or falls, and then it preſſes againſt one of the levers, *o* or *p*, and by puſhing it away from the axis, it moves the lever *m*, and the locking-box *d*, up to one of the wheels, B or C, which it locks to the axis D, and turns it round in the direction of that wheel's motion, by which it either raiſes or depreſſes the water-wheel's ſhuttle, as is required. This apparatus may, it is plain, be applied to any other kind of mill-work.

Governors or flying-balls are very frequently uſed in the wind-mills employed for grinding flour: the variable force of this firſt mover renders ſome ſuch regulator neceſſary, to increaſe the reſiſtance, by allowing a greater feed of corn, when the mill moves too quickly, and thus in ſome degree counteracting the irregularity. If the mill moves too ſlowly, the balls tend to diminiſh the feed, and at the ſame time they raiſe the upper ſtone, to ſet them at a greater diſtance aſunder, that they may require leſs power to drive them, and conſequently ſuffer the mill, as nearly as it can, to retain its full velocity, though the motive force is greatly diminiſhed. This application of the governor was, we believe, firſt made by the ingenious captain Hooper of Margate, who invented the horizontal wind-mill. (See WIND-*Mill.*) It is a very great advantage, and no wind-mill ſhould be without them. Many wind-mills are provided with flying-balls, which, by very ingenious mechaniſm, clothe and unclothe the ſails juſt in proportion to the ſtrength of the wind.

In many mills it is of conſequence to be able to detect ſmall variations in the velocity, and to aſcertain the quantity of them; for the governor only corrects the irregularities, without ſhewing any ſcale of them. In caſes where this is required, it may be done by a very ingenious inſtrument, invented by Mr. Bryan Donkin of Fort-Place, Bermondſey. He received a gold medal from the Society of Arts, Manufactures, and Commerce, in 1810, for this inſtrument, which he calls a tachometer.

A front view of this inſtrument is repreſented in *fig.* 25, and a ſide view in *fig.* 26, of *Plate* II. X Y Z, *fig.* 25, is the vertical ſection of a wooden cup, made of box, which is drawn in elevation at X, *fig.* 26. The whiter parts of the ſection, in *fig.* 25, repreſent what is ſolid, and the dark parts what is hollow. This cup is filled with mercury up to the level L L, *fig.* 25. Into the mercury is immerſed the lower part of the upright glaſs tube A B, which is filled with coloured ſpirits of wine, and open at both ends, ſo that ſome of the mercury in the cup enters at the lower orifice, and, when every thing is at reſt, ſupports a long column of ſpirits, as repreſented in the figure. The bottom of the cup is faſtened by a ſcrew to a ſhort vertical ſpindle D, ſo that when the ſpindle is whirled round, the cup (whoſe figure is a ſolid of revolution) revolves at the ſame time round its axis, which coincides with that of the ſpindle.

In conſequence of this rotation, the mercury in the cup acquires a centrifugal force, by which its particles are thrown outwards, and that with greater intenſity, according as they are more diſtant from the axis, and according as the angular velocity is greater. Hence, on account of its fluidity, the mercury riſes higher and higher as it recedes from the axis, and conſequently ſinks in the middle of the cup; this elevation of the ſides and depreſſion in the middle increaſing always with the velocity of rotation. Now the mercury in the tube, though it does not revolve with the cup, cannot continue higher than the mercury immediately ſurrounding it, nor indeed ſo high, on account of the ſuperincumbent column of ſpirits. Thus the mercury in the tube will ſink, and conſequently the ſpirits alſo; but as that part of the tube which is within the cup is much wider than the part above it, the depreſſion of the ſpirits will be much greater than that of the mercury, being in the ſame proportion in which the ſquare of the larger diameter exceeds the ſquare of the ſmaller.

Let us now ſuppoſe, by means of a cord paſſing round a ſmall pulley F, and the wheel G or H, or in any other convenient way, the ſpindle, D, is connected with the machine whoſe velocity is to be aſcertained. In forming this connection, we muſt be careful to arrange matters, ſo that when the machine is moving at its quickeſt rate, the angular velocity of the cup ſhall not be ſo great as to depreſs the ſpirits below,

C, into

C, into the wider part of the tube. We are also, as in the figure, to have a scale of inches and tenths applied to A C, the upper and narrower part of the tube, the numeration being carried downwards from zero, which is to be placed at the point to which the column of spirit rises when the cup is at rest.

Then the instrument will be adjusted, if we mark on the scale the point to which the column of spirits is depressed when the machine is moving with the velocity required. But, as in many cases, and particularly in steam-engines, there is a continued oscillation of velocity; in those cases we have to note the two points between which the column oscillates during the most advantageous movement of the machine.

Here it is proper to observe, that the height of the column of spirits will vary with the temperature, when other circumstances are the same. On this account the scale ought to be moveable, so that, by slipping it upwards or downwards, the zero may be placed at the point which the column reaches when the cup is at rest, and thus the instrument may be adjusted to the particular temperature with the utmost facility, and with sufficient precision. The essential parts of the tachometer have now been mentioned, as well as the method of adjustment; but certain circumstances remain to be stated.

The form of the cup is adapted to render a smaller quantity of mercury sufficient than what must have been employed either with a cylindrical or hemispherical vessel. In every case two precautions are necessary to be observed. First, that when the cup is revolving with its greatest velocity, the mercury in the middle shall not sink so low as to allow any of the spirits in the tube to escape from the lower orifice; and that the mercury, when most distant from the axis, should not be thrown out of the cup. Secondly, that when the cup is at rest, the mercury shall rise so high above the lower end of the tube that it may support a column of spirits of the proper length.

Now, in order that the quantity of mercury, consistent with these conditions, may be reduced to its minimum, it is necessary, first, that if M M (*fig.* 1.) is the level of the mercury at the axis when the cup is revolving with the greatest velocity, the upper part M M X Y of the cup should be of such a form as to have the sides covered only with a thin film of the fluid; and secondly, that, for the purpose of raising the small quantity of mercury to the level L L, which may support a proper height of spirits when the cup is at rest, the cavity of the cup should be, in a great measure, occupied by the block K K, having a cylindrical perforation in the middle of it for the immersion of the tube, and leaving sufficient room within and around it for the mercury to move freely, both along the sides of the tube and of the vessel.

The block, K K, is preserved in its proper position in the cup or vessel X Y Z, by means of three narrow projecting slips or ribs, placed at equal distances around it, and is kept from rising or floating on the mercury by two or three small iron or steel pins inserted into the underside of the cover, near the aperture through which the tube passes. It would be extremely difficult, nor is it by any means important, to give to the cup the exact form which would reduce the quantity of mercury to its minimum; but we shall have a sufficient approximation, which may be executed with great precision, if the part of the cup above, M M, is made a parabolic conoid, the vertex of the generating parabola being at that point of the axis to which the mercury sinks at its lowest depression, and the dimensions of the parabola will be determined in the following manner. Let V G (*fig.* 27.) represent the axis of the cup, and V the point to which the mercury sinks at its lowest depression: at any point, G, above V, draw G H perpendicular to V G; let n be the number of revolutions which the cup is to perform in 1″, at its quickest motion; let v be the number of inches which a body would describe uniformly in 1″, with the velocity acquired in falling from rest through a height = to G V, and make $G\,H = \frac{v}{3{\cdot}14\,n}$. Then the parabola to be determined is that which has v for its vertex, V G for its axis, and G H for its ordinate: at G the cup has a lid to prevent the mercury from being thrown out of it, an event which would take place with a very moderate velocity of rotation, unless the sides were raised to an inconvenient height; but the lid, by obstructing the elevation of the sides of the cup, will diminish the depression in the middle, and, consequently, the depression of spirits in the tube: on this account, a cavity is formed in the block immediately above the level L L, where the mercury stands when the cup is at rest, and thus a receptacle is given to the fluid which would otherwise disturb the centrifugal force, and impair the sensibility of the instrument.

It will be observed, that the lower orifice of the tube is twined upwards. By these means, after the tube has been filled with spirits, by suction, and its upper orifice stopped with the finger, it may easily be conveyed to the cup, and immersed in the quicksilver, without any danger of the spirits escaping, a circumstance which otherwise it would be extremely difficult to prevent, since no part of the tube can be made capillary, consistently with that free passage to the fluids which is essentially necessary to the operation of the instrument.

We have next to attend to the method of putting the tachometer in motion, whenever we wish to examine the velocity of the machine. The pulley F, which is constantly whirling during the motion of the machine, has no connection whatever with the cup, so long as the lever, Q R, is left to itself. But when this lever is raised, the hollow cone T, which is attached to the pulley, and whirls along with it, is also raised, and, embracing a solid cone on the spindle of the cup, communicates the rotation by friction. When our observation is made, we have only to allow the lever to drop by its own weight, and the two cones will be disengaged, and the cup remain at rest.

The lever, Q R, is connected, by a vertical rod, to another lever S, having at the extremity, S, a valve, which, when the lever, Q R, is raised, and the tachometer is in motion, is lifted up from the top of the tube, so as to admit the external air upon the depression of the spirits. On the other hand, when the lever, Q R, falls, and the cup is at rest, the valve at S closes the tube, and prevents the spirits from being wasted by evaporation.

It is, lastly, to be remarked, that both the sensibility and the range of the instrument may be infinitely increased; for, on the one hand, by enlarging the proportion between the diameters of the wide and narrow parts of the tube, we enlarge, in a much higher proportion, the extent of scale corresponding to any given variation of velocity; and, on the other hand, by deepening the cup, so as to admit, when it is at rest, a greater height of mercury above the lower end of the tube, we lengthen the column of spirits which the mercury can support, and, consequently, enlarge the velocity which, with any given sensibility of the instrument, is requisite to depress the spirits to the bottom of the scale. Hence the tachometer is capable of being employed in very delicate philosophical experiments, more especially as a scale might be applied to it indicating equal increments of velocity.

velocity. But, in the present account, it is merely intended to state how it may be adapted to detect, in machinery, every deviation from the most advantageous movement.

MILLAH, in *Geography*, a mountain of Algiers; 15 miles S.W. of Tiffesh.

MILLAINS, according to Mr. Wingate, are the third subdivision of the primes in Gunter's line; and express the thousandth part of such primes.

MILLAR, John, in *Biography*, professor of law in the university of Glasgow, was born, in 1735, in the parish of Shotts, in Lanerkshire. He received his grammar education at the school of Hamilton, whence he was removed at the age of eleven to Glasgow. He was designed for the church, but the freedom of his enquiries having inspired him with a disinclination to fetter himself by subscription to articles of faith, he turned his thoughts to the bar, and his father acquiesced in the change. After he had finished his studies at Glasgow, he passed about two years in the family of lord Kames as tutor to his son, and derived much information and improvement from his connection with that eminent lawyer. At this period he contracted an acquaintance with David Hume, to whose metaphysical opinions he became a convert, though he materially differed from him upon political topics. In 1760 Mr. Millar began to practise at the bar. He was regarded as a rising young lawyer, when he thought proper to terminate his professional career by becoming a candidate for the vacant professorship of law at Glasgow. To this post he was appointed in 1761, and immediately began to execute its duties. Previously to his appointment the students of the law-course seldom exceeded four or five in number, but his reputation produced such an accession in a few years, that they frequently amounted to forty, and the pupils upon his lectures on government were much more numerous. He lectured in English, and spoke fluently with the assistance of mere notes only. By this method his lectures were rendered full of variety and animation, and at the conclusion of each he was accustomed to explain the difficulties and objections that had presented themselves to his pupils, in a free and familiar conversation. His business as professor was that of commenting upon the institutions and pandects of Justinian, but to this he subjoined a course of lectures on jurisprudence, or the general principles of law, as existing in the codes of all civilized nations: he likewise employed an hour thrice a week in lectures on government, and twice a week on the law of Scotland. A spirit of investigation had given birth to a literary society among the clergy and professors of Glasgow, of which Mr. Millar became an active member. Few men were more ready at discussions of the philosophical kind, and all the branches of science connected with the study of the human mind were extremely familiar to him. In 1771 he published a treatise on "The Origin of the Distinction of Ranks," which contained a view of the changes produced in the several relations of society by the gradual progress of civilization and improvement. It was well received by the public, and has gone through several editions. The copy now before us is one of the third edition, and was published in 1781. The treatise is divided into distinct chapters, which are subdivided into several sections, and in these subjects of much interest and great importance are discussed. The first chapter treats "Of the Rank and Condition of Women in different Ages;" the second "Of the Jurisdiction of a Father over his Children:" the third and fourth "Of the Authority of Chiefs and Sovereigns:" the fifth "Of the Changes produced in the Government of a People, by their Progress in Arts and in polished Manners:" the sixth "Of the Authority of a Master over his Servants."

Mr. professor Millar's enquiries into the English government, which made an important part of his lectures, together with a zealous attachment to the principles of liberty, led him to publish in the year 1787 the first volume of an "Historical View of the English Government," in which he traces the progressive changes in the property, the state of the people, and the government of England, from the settlement of the Saxons to the accession of the house of Stuart. This volume, which is replete with ingenious and profound speculations, would have been followed by a second, bringing down the history to the present time, had not the events which, soon after the publication of this work, passed on the theatre of Europe, so completely arrested the attention of the public, as almost to sink the importance of past forms of government, in the superior interest of those which were *expected* to arise!

Mr. Millar was an early, active, and persevering advocate for the abolition of the slave-trade, which, in his opinion, could never be palliated, far less justified, by any regulations, either respecting the transport of slaves from Africa to the West Indies, or their treatment, however mild, after their arrival. While he considered domestic slavery as the greatest curse that can befal a nation; as equally subversive of the morals of all ranks in society, he was by no means indifferent to the evils of political slavery. He viewed the attempt to tax America, as an attack on the just rights of the Colonies, and he dreaded the subjugation of that country, as a decisive step towards the overthrow of British freedom. When the French revolution, to which we have already alluded, astonished the world, he was one of those who, without entering into the wild speculations it occasioned, saw in prospect the benefits it apparently promised to Europe; and on that account hailed it as the happiest event that could have happened to the human race. To the deep regret, excited by succeeding horrors, there was, we are told, always joined in his mind, a sentiment of the most profound indignation against that coalition of continental kings, to which he thought they might be justly ascribed.

Among the parties that have divided the present reign, Mr. Millar attached himself to that of the Whigs, and particularly to that branch of them which had first the marquis of Rockingham, and afterwards Mr. Fox at their head. He always warmly supported their principles through all the vicissitudes of administration and public opinion. He was ever suspicious of power, and was a zealous friend to all attempts for restraining the increase of the power of the crown. It was probably in consequence of his jealousy of authority, that, in the limited degree in which he still followed the profession of an advocate, he made it a constant practice to appear on the circuits as counsellor for criminals; and few pleaders surpassed him in the acuteness with which he examined evidence, and the force with which he addressed the feelings of juries. Mr. Millar's researches were by no means confined to politics and law. He was an able and profound metaphysician: his acquaintance with the works of imagination, both ancient and modern was also very extensive, and his criticisms were at once ingenious and solid, evincing an admirable union of acuteness of understanding with an elegant and correct taste. He died on the 30th of May 1801, at the age of 69, leaving behind him several manuscripts, from which, in 1803, were printed, in two volumes, his posthumous works, consisting of an historical view of the English government from the accession of the house of Stuart, and some separate dissertations connected with the subject. Of the style of Mr. Millar's works, it is sufficient praise to say in the words of his biographer, that, "perhaps it would be impossible to find a sentence which can require a second perusal to be distinctly understood." Monthly Magazine, vol. ii. See also "An Account of the Life and Writings of John Millar," esq. prefixed to the fourth edition "Of the Origin of the Distinction of Ranks."

MILLARES, or MILLAS, in *Geography*, a town of Spain, in the province of Valencia, on the Xucar; 18 miles N.W. of St. Felipe.

MILLAS, a town of France, in the department of the Eastern Pyrenées, and chief place of a canton, in the district of Perpignan; 9 miles W. of Perpignan. The place contains 1361, and the canton 7029 inhabitants, on a territory of 137½ kilometres, in 9 communes.

MILLEA, in *Botany*, a genus named by Cavanilles in honour of Mr. Julian Milla, head gardener of the Royal Botanical Garden at Madrid.—Cavan. Ic. v. 2. 76. Willd. Sp. Pl. v. 2. 62.—Class and order, *Hexandria Monogynia*. Nat. Ord. *Coronariæ*, Linn. *Lilia*, Juss.

Gen. Ch. *Cal.* Perianth none. *Cor.* of one petal, funnel-shaped; tube elongated, straight; limb spreading, deeply cloven into six, ovate segments, the alternate ones narrower, and tipped with a short, hooked appendage. *Stam.* Filaments scarcely discernible; anthers six, oblong, erect and approaching each other, almost sessile, opposite to the segments of the corolla, and inserted into the upper part or throat of the tube. *Pist.* Germen superior, on a very long stalk, triangular, inclosed in the tube; style thread-shaped, prominent; stigmas three, globular, covered with thick hairs. *Peric.* Capsule oblong, triangular, of three valves and three cells. *Seeds* many in each cell, ovate, pointed, compressed into the shape of a little bag.

Obs. Cavanilles says that the germen being superior, the tube elongated and straight, the anthers nearly sessile and approaching each other, added to the deficiency of a calyx and nectary, are sufficient marks to render our present plant distinct from *Pancratium*, *Amaryllis*, *Crinum* and *Agapanthus*, to all which genera in other respects it seems to have some affinity.

Eff. Ch. Corolla funnel-shaped; with a flat limb, deeply six-cleft. Anthers inserted into the throat of the tube. Germen stalked. Capsule of three cells, with many seeds.

1. M. *biflora*. Willd. n. 1. Cavan. Ic. v. 2. t. 196.—A native of Mexico. It flowers and bears seed in the garden at Madrid in October. *Root* an ovate bulb, with very fleshy oblong fibres, covered with a thin, reddish skin. *Radical-leaves* a foot high or more, awl-shaped, sometimes furrowed on the inner side, smooth and generally longer than the scapus. *Stalks* scarcely a foot high, round, stiff, generally forked and two-flowered. *Bracteas* at the division of the stalk, three, short, acute, withering. *Corolla* white, each segment of the limb streaked at the lower part with green. *Seeds* numerous, black. The analogy of the *Tigridia Pavonia* helps us to understand this root, which Cavanilles appears to have incorrectly described.

MILLEFOLIUM, Millefoil or Yarrow, so denominated from *mille*, a thousand, in allusion to the multitude of divisions which compose its leaves. (See ACHILLEA.) The name is likewise, for the same reason, applied to an aquatic genus, called Water Millefoil. See MYRIOPHYLLUM.

MILLENARII, MILLENARIANS, in *Ecclesiastical History*, a sect among Christians, chiefly in the primitive church, who hold that Jesus Christ is to come again, and reign on earth for the space of a thousand years; during which time, the faithful are to enjoy all manner of temporal blessings; and at the expiration of this term, the day of judgment is to take place.

The Millenarii are also called *Chiliasts*, *Chiliastæ*, from the Greek χιλιας, *mille*, *a thousand*.

This opinion of the Millenarii is very ancient, and may be traced back almost as far as the time of the apostles. It had its origin from a passage in the Apocalypse too literally understood, in which mention is made of Christ's reign on earth, &c.

The opinion of S. Papias, in the second century, to whom Eusebius ascribes the origin of this notion of a millennium, says M. Launoy, touching the new kingdom of Jesus Christ on earth, after the resurrection, was held for near three centuries, before it was charged as erroneous; as appears from ecclesiastical history. It was allowed of, and followed, under various interpretations, by several of the greatest men among the primitive fathers, as Irenæus, Justin Martyr, Lactantius, Tertullian, &c. Papias, to whom this opinion is ascribed, is represented by Eusebius himself a very credulous person, and it is certain his authority deserves no implicit confidence. From the second dialogue of Justin Martyr with Trypho, we have evidence that the doctrine of the millennium had not in his time the universal reception which Mr. Gibbon the historian, with a view of serving his own purpose, has supposed. Many Christians of pure and pious principles rejected it. This appears from the testimony of Justin, in a passage which has been misunderstood by Mede and Tillotson in consequence of the substitution of ου for αυ. See Thirlby's ed. of Justin, A.D. 1722, and Jebb's ed. A.D. 1719.

Towards the close of the second century, the credit of this opinion began to decline, principally through the influence and authority of Origen, who opposed it with the greatest warmth, because it was incompatible with some of his favourite sentiments.

Nepos, an Egyptian bishop, endeavoured to restore this opinion to its former credit, in a book written "against the Allegorists," for so he called, by way of contempt, the adversaries of the millenarian system. But Dionysius of Alexandria, a disciple of Origen, stopped the growing progress of this doctrine by his private discourse, and also by two learned and judicious dissertations concerning the "divine promises." Jerom is also said to have opposed this millenary reign of Christ. The ancient Millenarians generally held, according to the account of the learned Dr. Whitby, that the temple, or the city of Jerusalem, should be rebuilt, and that the land of Judea should be the habitation of those risen saints, who were to reign on earth a thousand years; that this resurrection was not to be confined to the martyrs only, but that all the just were then to rise and reign with Christ; and that this reign should also extend to the just who were found alive at this first resurrection; that Jesus Christ shall then come down from heaven, and be seen on earth, and there reign with his servants; and that they shall then fare deliciously, and enjoy the richest wines and most delicious fruits, build houses, plant vineyards, and eat the fruits of them, and propagate their species.

Dr. Whitby has clearly proved, that this opinion of the millennium was never generally received in the Christian church, and that there is no just ground to think it was derived from the apostles. Indeed, if we examine their writings critically and candidly, we shall find that they never predicted this event to others, nor cherished the expectation of it in themselves. The passages which seem to countenance this opinion are contradicted by others, which are altogether inconsistent with it; so that the apostles never entertained the delightful hope of seeing their master coming again into the world. It is evident that St. John, who survived all the other apostles, could not have had any such expectation; since in the book of the Revelation the future events of the Christian church, which were not to take place, many

many of them, till a long period of years after his death, and some of which have not yet been accomplished, are there minutely described. St. Peter likewise strongly intimates, that the day of the Lord might be said to be at hand, though it was at the distance of a thousand years, or more. St. Paul, in his second epistle to the Thessalonians, labours to remove the erroneous opinion that had been adopted by some, who expected the speedy coming of Christ; he describes a great corruption of the Christian church, which was to happen before the day of the Lord, and this appears by the express language of his prophecy to comprehend circumstances, which did not occur till many ages after they were predicted. But allowing, says bishop Watson, that the apostles did expect that Christ would come in their own time, their mistake in this respect ought not in anywise to diminish their authority as preachers of the gospel. They might be proper witnesses of the life and resurrection of Christ, though they were not acquainted with every thing which might have been known, though, in particular, they were ignorant of the precise time when our Lord would come to judge the world. It can be no impeachment, either of their integrity as men, or their ability as historians, or their honesty as preachers of the gospel, that they were unacquainted with what had never been revealed to them; that they followed their own understandings, where they had no better light to guide them; speaking from conjecture, when they could not speak from certainty; of themselves, when they had no commandment of the Lord. There is therefore no ground for the reflections of Mr. Gibbon, tending to invalidate the truth of Christianity and the doctrine of a future state, and founded on what he conceives to have been the opinion of the apostles and of ancient Christian writers, concerning the millennium. Watson's Apology for Christianity.

The millennium, according to the learned commentator Dr. Whitby, is a glorious state of the church, commencing after the fall of antichrist; and the subsequent conversion of the Jews to the Christian faith, in which it shall flourish in peace and plenty, in righteousness and holiness, and in a pious offspring, for a thousand years, under the undisturbed, though not personal government of Christ, over both Jews and Gentiles, which shall then be united into one church.

MILLENBACH, or MILBACH, in *Geography*, a town of Transylvania; 20 miles W. of Hermanstadt. N. lat. 46° 6'. E. long. 23° 14'.

MILLENNIUM, compounded of *mille, a thousand*, and *annus, a year*, a term literally signifying a *thousand years;* chiefly used for the time of our Saviour's expected second appearance, and reign on earth.

Mr. Whiston, in several of his writings, has endeavoured to support the notion of a millennium. According to his computation it was to have commenced about the year 1720. See MILLENARII.

MILLEPEDA, in *Conchology*, the name given by authors to a species of *Strombus*; which see.

MILLEPEDES, or SLATERS, in *Zoology*, well known insects, formerly used on many occasions in medicine. This insect is otherwise called *asellus*, being a species of *oniscus*, in English the *wood-louse*. (See ASELLUS and ONISCUS.) Mr. Ray describes seven different species of this insect, some of which we see every day, others are more rare. The blue kind, which rolls itself up into a ball, is the proper medicinal kind; though there is another sort of a pale brownish-grey, smaller, flatter, and thinner than the former, and having the last division of the body not annular but pointed, and a forked tail, which is of the same quality. They are found in cellars, on roofs of houses, old walls, and under stones and logs of wood in cold moist places. They are rather more than half an inch in length, whitish on the belly, with seven pairs of legs, each terminated by a sharp horny claw. The head is somewhat pyramidal, and furnished with two articulated feelers; and the upper part is guarded by a callous, brownish, livid-coloured, jointed armour, consisting of 14 semicircular slates, within which the insect rolls itself like a ball when touched; like some other insects it casts the skin, and carries the young in valvular follicles under the abdomen.

Millepedes are so generally known among the vulgar, that most persons seem to be masters of their medicinal uses, and take them in many cases without any other direction. They were formerly regarded as expectorant, diuretic, and abstersive, and occurred frequently in prescriptions for disorders in the kidnies, and also in obstructions of the viscera, and particularly in the jaundice; and in many other diseases. Although they are retained in the list of Materia Medica, the good sense of modern practitioners has nearly exploded the use of them.

The *millepedes præparatæ* of the shops, when they were considered as a medicine of importance and beneficial efficacy, were reduced to powder, either by inclosing them in a thin canvas cloth, and suspending them over hot spirit of wine in a close vessel, till they were killed by the steam and rendered friable; or by including them in a proper vessel and drying them with a very gentle heat. The prepared millepedes, or slaters as they are called, have a fetid odour, and a sweetish nauseous taste.

There were also several chemical preparations of millepedes, as spirit, volatile salt, oil, and wine of millepedes.

The college of Edinburgh formerly directed two ounces of live millepedes to be slightly bruised, and digested for a night in a pint of Rhenish wine, after which the liquor is to be pressed through a strainer.

MILLEPORA, in *Natural History*, a genus of the class Vermes, and order Zoophyta. The animal is an hydra or polype; coral mostly branched, and covered with cylindrical turbinate pores. There are 34 species, chiefly inhabitants of the Mediterranean: but some are found on our own coasts, especially in Cornwall, and a few are scattered through the seas of America, India, and Polynesia.

Species.

ALCICORNIS. This species is branched, compressed, straight, with scattered and scarcely visible pores. It inhabits the Indian and American seas, and is frequently found incrusting pieces of rock, gorgonia, and cocoa-nuts; dull white with sometimes a yellowish tinge, smooth, solid, stony, sometimes brittle, with very minute pores.

CÆRULEA. This is flat, rough, divided into thick plates bending different ways, the tops of which are sometimes lobed, and both sides furnished with cylindrical substellate pores. It is found in vast masses in the Indian ocean; the laminæ or plates are generally half an inch thick, and full of minute pores between the star-like cells. It appears to be an intermediate species between the madrepores and the millepores.

ASPERA. Somewhat compressed, with eminent pores, which are sometimes cleft. It inhabits the Mediterranean seas. It is erect, pointing two ways, roundish, with crowded pores at the branches, cleft on the lower side.

SOLIDA. Turbinate, with crowded angular pores. Found on the shores of Gothland. Tubes of pores with transverse divisions within.

TRUNCATA. Dichotomous, erect, with truncate branches. It

It inhabits the Mediterranean and North seas. Is of a yellowish-grey colour, and appearing as if covered with a coat of varnish, very brittle, within greyish, the branches are divaricate, the pores are placed in a quincunx order.

MINIACEA. Very minute, branching into small lobes, and covered with small pores. This species is found in the Mediterranean and Indian seas. It is a beautiful little coral, and the smallest of its genus, being seldom above a quarter of an inch high; the whole surface, when magnified, appears full of minute, white, blind spiracles, and on the tops of the lobes are several scattered holes surmounted with a margin; the base is broad, and with this it adheres to shells, rocks, and other corals.

* CERVICORNIS. This is a little compressed, dichotomous, with cells on both sides, tubular, and prominent florets. It inhabits the Mediterranean and Cornish coasts; is from five to six inches high; is of reddish or yellowish-brown, within whitish, branched like the horns of a stag, and appearing as if covered with a varnish; a few of the pores are divided at the base, which are narrow, and of a brittle texture.

* SKENEI. Compressed, and slightly branched, with cells on both sides, disposed in alternate rows; cells turbinate, with a gaping mouth and covered with a helmet, the under lip furnished with a small tooth. It is found near Aberdeen, adhering to the rocks; of a bright shining white colour, and appearing as if covered with silver varnish.

PUMILA. This is depressed, with scattered irregular retuse branches every where porous and roughish. It inhabits the Mediterranean, on shells and rocks; is about three inches high, solid, and very much branched, pale grey, and within whitish.

COMPRESSA. This species is furnished with a stem slightly branched, and a little compressed, branches distant, pores every where a little prominent and rough. It inhabits the Mediterranean.

* LICHENOIDES. Caulescent, decumbent, with waved nearly opposite denticulate branches; pores a little prominent on the upper side, and striate beneath. It inhabits the Mediterranean and European coasts, on stones and other marine substances; milk-white, very brittle, and about two inches long.

VIOLACEA. Flat, branching, with erect flexuous round branches, a little compressed, with a porous suture encompassing the margin. It inhabits the South-sea islands; is about three inches high; fine violet blue, with two rows of small pores each side the margin, besides the line of larger ones surrounding it; the surface is rough with a few clusters of little studs.

TUBULIFERA. This species is solid, branched, with tubular scattered pores; the branches are confluent, with tapering rough extremities. It inhabits the Sicilian seas; is about four inches high, white, solid; the trunk and branches smooth.

* FASCIALIS. Membranaceous, flat, narrow, branched, flexuous, with pores on both sides. It is found on the coast of the Isle of Wight, as well as in the Mediterranean, and grows in irregular masses; the branches are flat, narrow, and irregularly subdivided, which coalesce, twist, and branch out again, leaving hollow spaces between them. It is about six inches in diameter.

* FOLIACEA. This is, as its name imports, foliaceous, flexuous, uniting sometimes at the extremities, and is covered with pores on both surfaces, so small as to be scarcely visible. Found growing to an oyster-shell at the Isle of Wight; is from three to twelve inches long, white and stony.

ZEYLANICA. This is composed of thin concrescent irregularly divided membranes, with rows of oblong cells on each side. It is of a white colour, and is found in the Indian ocean.

FORNICULOSA. Crustaceous, with rows of vaulted cells furnished with a small ringent lip, and closed by a membrane. Is found in South America, adhering to other corallines; resembles the Flustra foliacea, and is thought by some to be a cellepore.

CRUSTULENTA. Crustaceous, somewhat branching, and irregularly shaped, with rows of oblong cells closed by a membrane, and very entire divisions. It inhabits the salt dykes of Holland, and the Atlantic; is of a greyish-white colour, and forming sub-globular masses.

EROSA. This also is crustaceous, with open cells pectinate at the lateral margin. It is found in the American ocean, affixed to rocks; the cells have erect subulate teeth, about four on each side.

RETICULATA. Membranaceous, with depressed linear branches rough on the upper surface, with prominent pores. It inhabits the Mediterranean and West Indies; is white, brittle, horizontal, convolute, and much branched; the reticulate branches growing in an undulate manner, and coalescing occasionally; the upper surface is rough, with pointed pores, the under surface is striate.

* CELLULOSA. Membranaceous, reticulate, funnel-formed, irregularly waved, and plaited at the margin, with numerous pores on one side. It is found in the Mediterranean and European seas, fixed to marine substances, and resembles a piece of lace, consisting of a flat erect undulated membrane covered with large regular perforations, sometimes disposed in a cup-shaped form, at other times running into loose folds with a waved margin like a ruffle; is about three inches high, solid, brittle, white or yellowish-grey, with very vivacious polypes.

CLATHRATA. Umbilicate, reticulate, with flat branches that are porous on one surface. It inhabits the Indian ocean, and is thought to be an intermediate species between the Cellulosa and Lichenoides; it is white and seated on a solid centre.

RETICULUM. Composed of branched cancellate threads. It is found in the Mediterranean, covering the surface of shells and the roots of fuci; resembles a spider's web, and is composed of fine capillary threads.

SPONGITES. Caulescent, erect, with angular imbricate branches; it resembles a sponge; is about a foot long: the pores are not visible.

CORIACEA. Sub-membranaceous, semi-orbicular, and nearly horizontal, with a few pores on the lower surface. It inhabits the Atlantic and Numidian seas, covering the stems of the Fucus cartilagineus, and forming covers for the chambers of other corals.

CALCAREA. Branched, milk-white, solid, with tapering sub-divisions. It inhabits the Mediterranean; is four inches high. The branches grow smaller towards the end, and are usually regularly sub-divided.

* POLYMORPHA. Crustaceous, solid, irregularly shaped, but generally branched and tuberculate, and without visible pores. This is found in most of the European seas, and is the common coral of the shops: in many places it grows in such abundance, that it is burnt for manure; its colour is either red, yellowish, or greenish, and is but seldom white! It was formerly much used in medicine as an absorbent. It is sometimes shaped like the kernel of a walnut, often in large compressed masses, sometimes like a small bunch of grapes, but most frequently in short and rather irregular

 ramifications

ramifications of a chalky tuberculate appearance, and ftony fubftance.

Decussata. Compofed of cretaceous erect laminæ, or plates, croffing one another, and uniting differently in different places. It is found on the coaft of Portugal, in maffes about five or fix inches wide.

* Alga. This confifts of thin femicircular plates, difpofed horizontally: it inhabits the Cornifh coaft, adhering to and frequently entirely covering the Polymorpha, and is either red, purplifh, yellow, or whitifh; extremely thin and brittle, with femicircular plates of various fizes, conftantly growing horizontally, with their margins bending over, rendering them convex on the upper fide, and concave beneath.

* Pumicosa. Irregularly fhaped, brittle, rough, and compofed of fharp-pointed roundifh cells. It inhabits the Britifh coafts, and is frequently found incrufting many of the Sertularia in fmall irregular maffes, appearing very like white fand ftrongly united together; the branches are generally cylindrical, each about half an inch long; the cells are placed round about in alternate order, fhaped like an helmet juft opening, with a hole in the middle.

* Tubulosa. This is a parafitic plant, cruftaceous, pale purple, with fmall tubular cells difpofed in tranfverfe rows or whorls. It inhabits the Mediterranean and Britifh coafts, and is found frequently encompaffing the ftem of the Sertularia falcata.

Pinnata. Dichotomous, erect, with tubular pores difpofed in a pinnate order. Inhabits the Mediterranean: when frefh caught it is greyifh, though fometimes green, is about an inch high, and very brittle.

* Liliacea. Creeping proftrate, in obtufe linear divifions, with tubular pores on the upper furface difpofed in tranfverfe rows. It inhabits the Mediterranean and Cornifh coafts, and refembles, in fome refpects, the Tubulofa, but is white.

Carduncculus. This is irregularly fhaped, membranaceous, with concentric wrinkles, and central triangular pyramidal tubes. It is found in the Mediterranean, adhering to the Sertularia; it is minute, white, fub-pellucid, and refembling the flower of a thiftle.

MILLER, Philip, in *Biography*, a celebrated gardener and botanift, was born in 1691. His father had the fuperintendance of the Phyfic Garden at Chelfea, belonging to the Apothecaries' Company, and founded by fir Hans Sloane; to which appointment he himfelf fucceeded in the year 1722. In this fituation he became diftinguifhed by his practical knowledge of plants, and efpecially by his fkill in their cultivation. The latter was evinced in a paper, communicated by himfelf to the Royal Society in 1728, and printed in the 35th volume of the Philofophical Tranfactions, on "a method of raifing fome exotic feeds," which had been judged almoft impoffible to be raifed in England. This confifted in allowing them to germinate in a bark bed, previoufly to their being planted in earth. By this means alone, feveral hard-fhelled nuts can be made to vegetate in our ftoves; and indeed the practice is founded on a judicious obfervation of nature's operations. Two years afterwards, Mr. Miller made known, for the firft time, the prefent popular mode of caufing bulbous plants to flower in water.

In 1730 he publifhed anonymoufly a thin folio, accompanied with twenty-one coloured plates, after the drawings of Van Huyfum, entitled "A Catalogue of trees, fhrubs, plants, and flowers, both exotic and domeftic, which are prepared for fale in the gardens near London." The preface is figned by a fociety of gardeners, amongft whom the name of Miller appears. The work is much more than a mere catalogue, the generic characters being given in Englifh, and many horticultural and economical remarks fubjoined. Moft of the plates contain figures of feveral different plants. This publication is mentioned by Haller, who was uninformed refpecting its real author, in his *Bibl. Bot.* v. 2. 229.

In 1731 appeared the firft edition of the "Gardener's Dictionary," in folio, the moft celebrated work of its kind, which has been tranflated, copied and abridged, at various times, and may be faid to have laid the foundation of all the horticultural tafte and knowledge in Europe. It went through eight editions in England, during the life of the author, the laft being dated 1768. This forms a very thick folio volume, and follows the nomenclature and ftyle of Linnæus; the earlier ones having been written on Tournefortian principles. A much more ample edition has been publifhed within a few years, making four large volumes, under the care of the Rev. Prof. Martyn. In this all the modern botanical difcoveries are incorporated with the fubftance of the 8th edition. Linnæus has juftly remarked, that Miller's was a botanical as well as a horticultural dictionary. We cannot but think that it has proved a powerful means of introducing a tafte for fcientific botany, amongft thofe who at firft had recourfe to it merely as cultivators.

This work had been preceded, in 1724, by an octavo of two volumes, called "The Gardener's and Florift's Dictionary," and was foon followed by "The Gardener's Kalender," a fingle octavo volume, which has gone through numerous editions. One of thefe, in 1761, was firft accompanied by "a fhort introduction to a knowledge of the Science of Botany," with five plates, illuftrative of the Linnæan fyftem. Miller had been trained in the fchools of Tournefort and of Ray, and had been perfonally acquainted with the great Englifh naturalift, of which he was always very proud. No wonder therefore if he proved flow in fubmitting to the Linnæan reformation and revolution, efpecially as fir Hans Sloane, the Mecænas of Chelfea, had not given them the fanction of his approbation. At length more intelligent advifers, Dr. Watfon and Mr. Hudfon, overcame his reluctance, and, his eyes being once opened, he was no longer behind-hand in deriving advantage from fo rich a fource. He became a correfpondent of Linnæus, and one of his warmeft admirers. Although it does not appear that he had any direct communication with Micheli, he was chofen a member of the Botanical Society of Florence, which feems to indicate that they were known to each other, and probably communicated through Sloane and Sherard, as neither was acquainted with the other's language. Miller maintained an extenfive communication of feeds with all parts of the world. His friend Houfton fent him many rarities from the Weft Indies, and Miller but too foon inherited the papers of this ingenious man, amongft which were fome botanical engravings on copper. Of thefe he fent an impreffion to Linnæus; and fuch of them as efcaped accidents, afterwards compofed the *Reliquiæ Houftonianæ.* See Houstonia.

In 1755 our author began to publifh, in folio numbers, his "Figures of Plants," adapted to his dictionary. Thefe extended to three hundred coloured plates, making, with defcriptions and remarks, two folio volumes, and were completed in 1760. They comprehend many rare and beautiful fpecies, there exhibited for the firft time. The commendable defign of the writer was to give one or more of the fpecies of each known genus, all from living plants; which as far as poffible he accomplifhed. His plates have more botanical diffections than any that had previoufly appeared in this country.

Miller was a fellow of the Royal Society, and enriched its Tranfactions

Tranfactions with feveral papers. The moft numerous of thefe were catalogues of the annual collections of fifty plants, which were required to be fent to that learned body, from Chelfea garden, by the rules of its foundation. Thefe collections are preferved in the Britifh Mufeum, and are occafionally reforted to for critical enquiries in botany. He wrote alfo on the Poifon Afh, or *Toxicodendrum*, of America, which he believed to be the Japanefe Varnifh tree of Kæmpfer; a pofition controverted by Mr. Ellis. (See Ellis.) The latter appears to have been moft in the right, which may account for a certain degree of ill humour betrayed by Mr. Miller in the courfe of the difpute. It is fcarcely confiftent with the ufual candour of the amiable Dr. Pulteney, that in his "Sketches of the Progrefs of Botany in England," he rather difcovers a partiality to Miller on this fubject. We cannot account for his omitting all account of fo great a man as Ellis, in that valuable work.

Miller continued to attend to his duties and his favourite purfuits to an advanced age, but was obliged at length, by his infirmities, to refign the charge of the garden. He died foon after, at Chelfea, December 18, 1771, in his 81ft year, and was interred in the burying-ground in the King's road, with his wife, by whom he had, if we miftake not, feveral children. One of them, Mr. Charles Miller, fpent fome time in the Eaft Indies, where he acquired a handfome fortune, and is, we believe, now living in England. This gentleman made fome experiments on the cultivation of wheat, an account of which was given by Dr. Watfon to the Royal Society. They were intended to fhew the wonderful produce to be obtained by divifion and tranfplantation, and have often been repeated. An account of the ifland of Sumatra, by Mr. C. Miller, is printed in vol. 68th of the Philofophical Tranfactions. The fifter of Philip Miller married Ehret, and left one fon. See Ehretia.

In the courfe of his refidence at Chelfea, Miller collected, principally from the garden, an ample herbarium, which was purchafed by fir Jofeph Banks. He fent many dried fpecimens to Linnæus. Pulteney's Sketches. Haller Bibl. Bot. Works of Miller. Dryandr. Bibl. Banks.

Miller, James, an Englifh dramatic writer, was born in the year 1703. He was defigned for bufinefs, and received an education fuitable to it, but feeling a repugnance to that fort of employment he went to Wadham college, Oxford, and having completed the ufual courfe he took orders. While at the univerfity he wrote a famous comedy, entitled "The Humours of Oxford," which was performed in 1729. He was author of feveral other pieces, of which the laft was a tragedy, entitled "Mahomet." This had a confiderable run, and before its popularity was at all abated, the author died in 1743. He publifhed a volume of fermons, and poems. Biog. Dram.

Miller, *Lady*, an accomplifhed woman, of fome literary talents, who publifhed letters from Italy, fix vols. 8vo. She refided at Bath-Eafton, near Bath, where fhe entertained feveral ingenious perfons, who compofed a collection of poems, which was afterwards publifhed. She died in 1781.

Miller, an admirable performer on the baffoon, who flourifhed in the middle of the laft century. The concertos which he performed during many years, at Vauxhall, Hickford's Room, the Swan, Caftle, and King's Arms concerts, and the folo parts allotted him by Handel in his oratorios and concertos, always excited attention, were heard with delight, and juftly applauded for the fweetnefs of his tone, and neatnefs of his execution.

Miller's, in *Geography*, a fettlement in Kentucky, on a branch of Licking river; 32 miles N.E. of Lexington.

Miller's *Bay*, a bay on the S. coaft of Jamaica, N. of Portland Point.

Miller's *Town*, a town of Northampton county, in Pennfylvania, pleafantly fituated on a branch of Little Lehigh river; 47 miles N.W. by N. of Philadelphia; containing about 40 houfes.—Alfo, a town in Shenandoah county, in Virginia; 32 miles S. of Winchefter.

Miller's *Thumb*, in *Ichthyology*, an Englifh name for the fifh called alfo the bull-head, and by authors the cottus; being the Cottus *gobio* of Linnæus; which fee.

MILLERIA, in *Botany*, received its name from Dr. Houfton, and was firft publifhed by Prof. Martyn, fen., in honour of their common friend, the celebrated curator of Chelfea garden. (See Miller.) Linnæus, in adopting the name, obferves, *Crit. Bot.* 80, that "this American plant, whofe clofe-fhut calyx entirely furrounds and protects its one or two feeds, is well beftowed on a man who fpared no pains in procuring rare American feeds, and in contrivances for preferving and communicating them."—Linn. Gen. 443. Schreb. 579. Willd. Sp. Pl. v. 3. 2328. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 1. v. 3. 266. Juff. 187. Lamarck Illuftr. t. 710. Gærtn. t. 168. Houft. Ic. ined. f. 13. (Randia; ibid. f. 14.)—Clafs and order, *Syngenefia Polygamia-neceffaria*. Nat. Ord. *Compofitæ oppofitifoliæ*, Linn. *Corymbiferæ*, Juff.

Gen. Ch. *Common Calyx* of one leaf, very large, in three deep fegments, clofed together in a flattifh-triangular form, permanent; the two *innermoft* equal, nearly ovate, acute, flat; the *outer* one twice as large, roundifh, pointed, flat, heart-fhaped at the bafe, moft deeply feparated. *Cor.* compound, half radiant: *united florets* two, within the fmaller fegments of the calyx: *female* folitary, within the larger one: the former of one tubular, erect, five-toothed petal: the latter ligulate, erect, obtufe, concave, with one or two notches. *Stam.* (in the united florets) Filaments five, capillary; anthers as many, erect, linear, connected laterally by the middle, acute, as long as the corolla. *Pift.* (in the fame) Germen oblong, very thin; ftyle thread-fhaped, the length of the petal; ftigmas two, linear, weak, obtufe, fpreading: (in the female floret) Germen large, triangular; ftyle thread-fhaped, the length of the petal; ftigmas two, briftle-fhaped, long, reflexed. *Peric.* none, except the clofed common calyx, become coriaceous and coloured. *Seed* to the united florets none: in the female ones folitary, oblong, obtufe, triangular, tapering downward. *Down* none. *Receptacle* very minute, naked.

Obf. *M. quinqueflora* has the female floret three-cleft; the united ones four in number; calyx accompanied by five membranous internal leaves; ftyle fimple in the united florets, cloven in the female.

Eff. Ch. Receptacle naked. Down none. Common Calyx of three permanent valves. Corolla femi-radiant.

1. M. *quinqueflora*. Five-flowered Milleria. Linn. Sp. Pl. 1301. Mant. 478. (M. dichotoma; Cavan. Ic. v. 1. 58. t. 82. M. annua erecta, foliis conjugatis, floribus fpicatis luteis; Mart. Decad. 41. t. 41.)

β. M. *maculata*. Mill. Dict. ed. 8. n. 2. (M. annua erecta ramofior, foliis maculatis, profundiùs ferratis; Mart. Decad. 47. t. 47. f. 2.)

Leaves heart-fhaped. Flower-ftalks forked. Calyx double.—Native of Vera Cruz, Panama and Mexico. Sent to Chelfea garden in 1731 by Houfton, but now loft, having no beauty to fecure the attention of cultivators in general. Linnæus had it at Upfal, and Cavanilles at Madrid. This is an annual ftove plant, flowering in autumn. *Stem* five or fix feet high, fquare, branched, leafy. *Leaves* oppofite, ftalked, heart-fhaped, broad, ribbed, roughifh, flightly toothed

toothed or serrated, tapering at the base. *Flowers* small, yellow, in terminal, leafy, slender, forked panicles. The *leaves* of the variety β are more strongly serrated, of a darker green, and blotched with black. The number of *florets* varies.

2. M. *biflora*. Two-flowered Milleria. Linn. Sp. Pl. 1301. Hort. Cliff. t. 25. (M. annua erecta minor, foliis parietariæ, floribus ex foliorum alis; Mart. Decad. 47. t. 47. f. 1.)—Leaves ovate. Flower-stalks simple, terminal, aggregate. Calyx single.—Native of the country near Campeachy, from whence it was sent by Houston in 1730.—Rather smaller, and less showy than even the former. The *leaves* are ovate and triple-ribbed. *Flowers* pale yellow, very small, in terminal tufts.

Willdenow's *M. Contrayerba*, n. 3. Cavan. Ic. v. 1, 2. t. 4, is our *Flaveria capitata* (see FLAVERIA); and his *angustifolia*, n. 4. Cavan. Ic. v. 3. 12. t. 223, is of the same genus. Perhaps *Flaveria* ought to be sunk in *Milleria*, Cavanilles having found a radiant floret. Their habits however are not similar. S.

MILLE-ROCHES, ISLE AU, in *Geography*, a small island of Upper Canada, in the river St. Laurence, containing from 6 to 700 acres of good soil. N. lat. 45° 5′. W. long. 75° 40′.

MILLEROLLE, in *Commerce*, an oil measure at Marseilles = 4 escandaux = 64 Paris pintes, or $15\frac{3}{4}$ English gallons nearly, and weighing about 136 poids de table, or 122lb. avoirdupois. The wine measure of the same denomination is = 4 escandaux = 60 pots; and 4 millerolles of wine = 63 English gallons nearly; and $3\frac{1}{2}$ millerolles are reckoned = a Bourdeaux hogshead.

MILLERS, or PAYQUAGE, in *Geography*, a river of the Massachusetts, which runs W. by S. and falls into Connecticut river, between Northfield and Montague.

MILLERY, a town of France, in the department of the Rhône and Loire; seven miles S. of Lyons.

MILLES, JEREMIAH, in *Biography*, a learned divine and antiquary, was born at High Cleer, in Hampshire, in 1713, of which place his father was minister. He succeeded Dr. Lyttleton as dean of Exeter, and also as president of the Society of Antiquaries, to whose Archæologia he was a great contributor. Dr. Milles was a zealous champion for the genuineness of the Rowley poems, of which he printed an edition in 4to., with glossarial annotations. This work laid him open to the attacks of the critics, who were sceptical on these supposed relics of antiquity. The dean died in 1784.

MILLESSOW, in *Geography*, a mountain of Bohemia, in the circle of Leitmeritz.

MILLET, in *Botany*. See MILIUM.

MILLET, the common name of a plant which grows naturally in India, whence it was first imported into Europe. It is greatly cultivated in Italy, Spain, and the southern parts of France, for the food of men as well as that of poultry. It may also be raised in this climate. This is a plant that delights in a light sandy soil, prepared in the same manner as for maize; and in such lands it branches out into many stalks, sometimes thirty or forty, not unlike reeds either in their shape or leaves, of which there is one at each joint. The top of each stalk is terminated by a large, loose panicle, which hangs on one side, with a chaffy flower, which is succeeded by a small round seed, about the bigness of turnip or cabbage seed, of a yellowish-white colour in one variety, and of a dark red inclining to black in another, which are the small millet, and the large, a distinction which some make, as only varieties of the same species. It is likewise said to thrive extremely well in strong land; but will not do in stony ground, or where the bottom is of either a chalky or clayey nature.

Miller advises, that it should be sown in the beginning of April, that it may ripen in August; but in warmer climates, the general rule is to sow it either between the middle and the end of May, or about Midsummer. The former crop is reaped at the end of September, and the latter about the end of October. The seed is usually sown in furrows, very thin, and covered with the plough or rake. The largest sort should be sown thinnest, because it branches most. When the plants are about a month old, the ground should be stirred round them with a hand-hoe, as well to lay fresh earth to their roots, as they require much nourishment, as to clear them from weeds, which they afterwards prevent by over-topping them. At the same time, the millet plants should be thinned out wherever they grow too close, so as to leave, in general, about six inches between each plant. Nothing more is necessary to be done till harvest, except that, when it begins to ripen, great care must be taken to protect it from birds, which would otherwise soon devour it. The returns of this crop are very great; it is not easily hurt by drought or rain, nor is it subject to blight. Frequent showers of rain are of great service to it whilst in its young growth.

As soon as the crops are ripe, the panicles of the plants are cut off near the uppermost joints of the stalks with a knife, and put into baskets or sacks, in which they are carried home, when they are then laid up in heaps covered with old cloths, and after remaining in that situation five or six days, spread upon the barn floor, threshed out with a flail, and cleansed like other sorts of grain. Great care must be taken to dry it well in the sun, before it is laid up in the granary; as it soon spoils if the least moisture be left in it; being of all grains the most difficult to keep, unless it be thoroughly dry; but on the other hand, none keeps longer, or better, after it has been well dried. It is not liable to the weevil; but it should be turned from time to time in the granary. It has been constantly found that the late sown crops are the most defective, and that their panicles are smaller than those of the same grain sown at an earlier period.

But the small white millet is the most delicate, and the best for puddings, &c. The red is larger and coarser, and used for pigeons, poultry, and swine, after being ground to meal; it is very good fodder for cattle, either green or after its grain is threshed out. From its numerous roots, large size, and quick growth, it is a sort of crop that exhausts the soil greatly, and of course must be well guarded against in that respect.

The common millet was originally brought from the eastern countries, where it is still greatly cultivated: from whence we are furnished annually with this grain, which is by many persons greatly esteemed for puddings, &c. This is seldom cultivated in England, but as a curiosity in small gardens, or for poultry, as its seeds generally ripen well.

Millet is reckoned by Pliny the most fertile of all grain; one grain of it producing three Roman sextaries.

Millet is cooling, drying, and binding, somewhat windy, and not easily digested; a strong decoction of it with figs and raisins, mixed with wine, and drank warm in bed, is a very good sudorific, though it is seldom used.

Millet, by consent of authors both ancient and modern, is refrigerating and drying; it is of bad juice, difficult of digestion, binds the belly, and generates flatulencies; it is however well known to be a very grateful food to many nations at present. In former times it served to make bread, under a dearth of better corn, as we are assured by Dioscorides,

corides, Pliny, Galen, and others of the ancients. Among the Italians, says C. Bauhine, loaves are made of millet, which are yellow, and eaten hot by many, not out of necessity, but for their sweetness; but when this bread is grown hard, it is quite black. Of the flour of millet and milk, the Italians make fine cakes, which must be eaten as soon as dressed, or else they become glutinous, and ungrateful to the taste.

A pudding prepared of millet, boiled in milk, with an addition of butter, and sugar sprinkled over it, is much in request among the Germans at present; and these puddings have been long ago introduced into England, and are still in fashion.

The flour of millet was formerly used in fomentations, for the gripes, and for pains of the head and nerves; it was applied externally in bags, because the use of it in cataplasms was difficult, on account of its friability. If the membrane of the brain happens to be wounded, it is excellently conglutinated, says Archigenes, by infusing thereon the juice of calaminth, and sprinkling it with dry flour of millet. A decoction of millet, with figs and raisins, is called, by Heurnius, a noble sudorific and diuretic. Or, take of a decoction of millet, boiled till it bursts, four ounces; white wine, two ounces: let the patient take it hot. Chesneau.

Millet is diuretic and astringent; the seeds are of extraordinary service in diseases of the lungs, and exulcerations of the kidnies: made into a cataplasm, they are anodyne and resolvent. Hist. Plant. adscript. Boerhaave.

MILLET, *Indian*. See HOLCUS.

MILLEVANT, in *Geography*, a town of Prussia, in the province of Pomerelia; 16 miles S.S.E. of Dantzic.

MILLEVILLE, ALESSANDRO, in *Biography*, an excellent organist, born at Ferrara, much celebrated in Italy at the beginning of the seventeenth century. He was successively patronized by the king of Poland, the emperor of Germany, and the duke of Ferrara. He was also a voluminous composer, as appears by all the catalogues of the time; in which we find the following list of his works: Messe e Salmi a 3 voci. Concerti a 2, 3, & 4 voci, libro 1. Motetti a 3, 4, 5, & 6 voci, libro 7mo. Novelli fiori a 2 & 3 voci, libro 6. Litanie di B. V. a 3 voci: and, lastly, he published at Venice, 1622, a work intitled "Gemme Sacre," and in the same city, 1629, another book of motets. Walther.

MILLEVILLE, in *Geography*, a town of Sweden, in the province of Warmeland; 25 miles S. of Carlstadt.

MILLIARE, or MILLIARIUM, among the Romans, denoted *a mile*, consisting of a thousand paces, *mille passus*; whence the name.

In the Roman empire, the milliaria, in all the great roads, were marked with stones, or columns erected for that purpose; commencing from a column in the heart of the city, called *milliare aureum*.

Those columns were also hence denominated *milliary columns*.

MILLIARIA COHORS. See COHORS *Equitata*.

MILLICO, GIUSEPPE, of Naples, in *Biography*, arrived in England 1772, from Vienna, where he had acquired great applause as a singer and actor, in Gluck's operas of "Orfeo," "Alceste," and "Paride ed Elena," and as a singing master, by making Gluck's niece one of the most expressive singers then alive.

This judicious performer and worthy man, who was not an Adonis in person, and whose voice had received its greatest beauties from art, found the musical part of our nation in no favourable disposition towards him. The admirers of Tenducci and Guadagni, as well as the Cocchi, Guglielmi, Giardini, Vento, and Bach parties, however hostile in other particulars, all agreed in decrying every part of that opera in which their favourite had no concern. Sacchini, who arrived here soon after, was involved in these cabals. None of the friends of their predecessors would allow that Millico could sing or the new master compose. Violent and virulent means were used to poison, or at least to shut the ears of the unprejudiced public; but not with much success. Indeed, at first both the music and performance were frequently hissed: but, at length, Sacchini's compositions were generally allowed to be admirable, and Millico's importance was manifested by a crouded house at his benefit, composed of the first persons for taste and rank in the kingdom; and at the end of the next season, several who had boldly pronounced that neither Sacchini could compose nor Millico sing, would have given a hundred pounds if they could have recalled their words, or made their acquaintance forget they had been guilty of such manifest injustice and absurdity.

The canzonets of his composition, in singing which he used to accompany himself on a small harp slung over his shoulder, are still as *musicadi camera*, elegant and pleasing. Not many years after he left this country, where he remained two seasons, he was afflicted with blindness; but being received in the chapel royal at Naples, he performed in that melancholy state a considerable time, till other infirmities came on, when he threw himself into a convent to end his days. He was living when the French invaded Naples; but whether the turbulence of the times suffered him to live or die in peace, we are unable to affirm.

MILLIGRAMME, in *Commerce*, a French measure of weight = .0154 English grains. See WEIGHT.

MILLILITRE, a French measure of capacity = .06103 English cubic inches. See MEASURE.

MILLIMETRE, a French measure of length = .03937 English inches. See MEASURE.

MILLING, in the *Manufactories*, an operation called also *fulling*.

MILLING, or *throwing of silk*, is the last preparation of silk before dyeing; serving to twist it, more or less, according to the work for which it is intended.

To prepare the silk for milling, they first put it in boiling water, inclosed between two linen cloths. The mill is a square machine, composed of several pieces of wood, mortised in each other, so as to form a kind of large cage, in the centre of which are two wheels placed parallel over each other, whose axis bears on two posts. When the machine is simple, a single man turns these wheels by means of a little cog, in which they catch, and a large handle.

The wheels, put in motion by the handle, communicate their motion to eight windles, or reels, or even more, according to the largeness of the machine; on the slights or arms of which the silk is wound from off two rows of bobbins placed on each side of the machine; each row at the height of one of the two wheels in the centre. These bobbins have their motion by means of leathern thongs, which bear on little cylinders of wood that support them, and turn at length on the two wheels at the centre; so that the silk on each bobbin twists as it winds, and forms its separate skain.

The smallest wheel moves two hundred of these bobbins, over which a single person is sufficient to inspect, to put new bobbins or spoils in lieu of those discharged of their silk, and to knot the ends when they break. See WINDING *of Silk*.

MILLINGTONIA, in *Botany*, a supposed new genus, consecrated by the younger Linnæus, to the memory of sir Thomas

Thomas Millington, Savilian profeffor at Oxford, who is recorded by Grew to have firft fuggefted to him that the anthers of plants were their male organs.—Linn. Suppl. 45. Schreb. 425. Willd. Sp. Pl. v. 3. 382. (where the name is thrice written *Mallingtonia*, by mere inattention.) Juff. 138. Clafs and order, *Didynamia Angiofpermia*. Nat. Ord. *Perfonatæ*, Linn. *Bignoniæ*, Juff.

The fruit being unknown, the generic character in the *Supplementum* has always been incomplete, and is now found infufficient to diftinguifh the plant in queftion from *Bignonia*, to which genus it is referred by Dr. Roxburgh.

Bignonia fuberofa. Roxb. Coromand. v. 3. 11. t. 214. (Millingtonia hortenfis; Linn. Suppl. 291.)—Koenig firft obferved this fine tree in the gardens of the Rajah at Tanfchuhr, or Tanjore, but did not meet with the fruit. His manufcript however does not imply that none is ever produced there. From hence fome plants were brought to Madras, and one to Calcutta, where Dr. Roxburgh informs us it is now an elegant tree, about thirty feet in height, bloffoming at the clofe of the rainy feafon, and ripening feeds in March. The *trunk* is ftraight, with a light afh-coloured, deeply cracked, fpongy bark. *Leaves* oppofite, repeatedly pinnate, about two feet long; leaflets ovate, pointed, fmooth, ferrated in Roxburgh's figure, but in his defcription, like the Linnæan fpecimens, entire, and conveying fome idea of the foliage of Catalonian Jafmine. *Panicles* terminal, large, crofs-branched, many-flowered, fmooth. *Flowers* two inches long, tubular, flender, white, delightfully fragrant; their upper lip erect, cloven half-way down; lower in three equal, ovate, three-ribbed, reflexed fegments. *Pod* a foot long, not an inch broad, compreffed, nearly fmooth, pointed at each end. *Seeds* winged.—The native country of this plant has not yet been afcertained.

Millingtonia is now applied as the name of a new Eaft India genus in *Diadelphia Decandria*, by Mr. Donn in *Hort. Cant.* ed. 5. 180. Of this we prefume Mr. Brown to be the author, and that it will be defined in the new edition of Mr. Aiton's *Hortus Kewenfis*. Three fpecies are enumerated by Mr. Donn, *M. trinervia*, *ftricta*, and *femialata*; all ftove fhrubs, which feem not yet to have flowered at Cambridge. This genus is placed between *Hedyfarum* and *Indigofera*.

MILLION, in *Arithmetic*, the number of ten hundred thoufand; or a thoufand times a thoufand.

A million of gold, or million of money, is fometimes underftood of a million of pounds; and fometimes of a million of crowns.

Million *Bank*. See Bank.

MILLMOTH, in *Natural Hiftory*, the name of an infect approaching to the nature of the beetle, but having no fheath wings. It is common in the abode of millers and bakers, and other perfons who deal in meal.

MILLOT, Claude-François-Xavier, in *Biography*, a well-known French writer, was born at Befançon in 1726. He was brought up among the Jefuits, and devoted himfelf to the duties of the pulpit; but when the period for public exertion arrived, either the weaknefs of his voice, or a natural timidity, convinced him that he could not make progrefs as a public orator. He, therefore, undertook a profefforfhip of hiftory at Parma, by the recommendation of the prince. He filled this office with high reputation, and upon his return to France was appointed preceptor to the duke d'Enghien. He died in the year 1785, at the age of 59. D'Alembert faid of the abbé Millot, that he was the perfon of all others whom he had known, that had "the feweft prepoffeffions and the feweft pretenfions." In fociety he was modeft and rather referved in his manners, but every thing which he faid was fenfible and judicious. His works alfo exhibit the fame candour and cool judgment which were vifible in his converfation. They are chiefly hiftorical abridgments, written with care and correctnefs, in a natural and rather elegant ftyle. The principal are: "Elemens de l'Hiftoire de France, depuis Clovis jufqu'à Louis XV.," 3 vols. 12mo.; "Elemens de l'Hiftoire Univerfelle, "9 vols. 12mo.; "Memoires Politiques et Militaires pour fervir à l'Hiftoire de Louis XIV. et de Louis XV.," &c. He publifhed alfo "L'Hiftoire des Troubadours," in 3 vols. which work was chiefly drawn from the papers of M. de Sainte Palaye; fome "Difcourfes" read before the academy of which he was a member, and a tranflation of felect harangues from the Latin hiftorians.

MILLOWITZ, in *Geography*, a town of Bohemia, in the circle of Saatz; 10 miles W. of Saatz.

MILLSTREET, a poft-town of Ireland, in the county of Cork, chiefly remarkable for a good inn, at which travellers to Killarney ufually pafs a night. It is 134 miles S.W. from Dublin.

MILLTOWN, a town of America, in the ftate of Delaware; two miles from Wilmington.—Alfo, a town in Northumberland county, Pennfylvania, on the E. fide of the W. branch of Sufquehannah river, containing about fixty houfes; 14 miles N. by W. of Sunbury.

Milltown, a poft-town of Ireland, in the county of Kerry, which promifes to become a good market town by the exertions of fir William Godfrey, and the convenience of water carriage, the tide bringing floops up the Mang very near to this town. It is 169 miles S.W. by W. from Dublin, and nine miles N.W. from Killarney. Carlifle.

MILLVILLE, a poft-town of Cumberland county, New Jerfey; 196 miles N.E. from Wafhington.

MILLWOOD, a poft-town of Frederick county, Virginia; 68 miles from Wafhington.

MILNTHORP, or Milthorp, a fea-port and market-town in the parifh of Heverfham, Kendal ward, Weftmoreland, is fituated near the mouth of the Can, at the diftance of five miles from Kendal, and 251 from London. It confifts chiefly of one ftreet, which is pretty well built; and at the E. end there are fome good houfes, in pleafant and open fituations. This town is the only fea-port in the county, and has feveral veffels belonging to it, which trade principally to Liverpool, Port Glafgow, and Annan in Scotland. Here are three rope-yards, two paper-mills, one flax-mill, and one cotton-mill. The market day is Friday, and there is an annual fair on Old May day. A very handfome bridge is thrown acrofs the river Betha, which flows through the town. The refident population here, according to the parliamentary returns of 1801, amounted to 968 perfons; 459 males, and 509 females, of which number 113 were returned as employed in agriculture, and 170 in trade and manufactures.

The country around this town is pleafingly diverfified with hill and dale, and embellifhed by a variety of elegant manfions. Of thefe that of Dallam Tower, the feat of Daniel Wilfon, efq. is the moft confpicuous. It is fituated at the foot of a hill, which rifes rapidly from its bafe, and is covered to the fummit by a profufion of trees. In front extends a fine park, adorned with wood, the ground of which rifes as it recedes from the houfe. At Beerham-hill, near this manfion, is a waterfall on the river Beele, well deferving the attention of the curious traveller. Houfman's Topographical Defcription of Cumberland, Weftmoreland, &c. 8vo. Carlifle's Topographical Dictionary, 4to.

MILO, in *Biography*, a name that frequently occurs in the Roman claffics: we fhall notice three perfons of note.

One was celebrated at Crotona, in Italy. It is said that he carried on his shoulders a young bullock four years old, and afterwards killed it with a single blow of his fist. He was seven times crowned at the Pythian games, and six times at Olympia.—The second was Titus Annius, a native of Lanuvium, who attempted to obtain the consulship at Rome. Clodius the tribune opposed his views, yet Milo would have succeeded, had not an unfortunate circumstance taken place between his suite and that of Clodius as he was going to the country. Clodius and eleven of his servants were killed, and the body of the murdered tribune was carried to Rome and exposed to public view. Cicero, as is well known to every classical student, undertook the defence of Milo, but with no effect; he was condemned and banished to Massalia.—A third of this name was a general of the forces at Tarentum, and that he might not forget the duty and allegiance which he owed to his sovereign, Pyrrhus sent him, as a present, a chain, which was covered with the skin of Nicias the physician, who had perfidiously offered the Romans to poison his sovereign for a sum of money.

Milo, anciently *Melos*, in *Ancient Geography*, one of the largest and most elevated islands in the southern part of the Grecian Archipelago. According to Thucydides, it was independent, and enjoyed perfect freedom long before the Peloponnesian war. The inhabitants, strongly solicited by the Athenians on the one hand, and on the other attached to the Lacedæmonians, from whom they had descended, wished, in the midst of this terrible war, to remain quiet and to observe a wise neutrality. At this conduct the Athenians were so irritated, that they dispatched Nicias with a fleet of sixty ships, and 2000 land forces to punish them for refusing to furnish their quota of troops. Nicias ravaged this island, but failed with his feeble army to take the town, which was defended by all the inhabitants, assembled for this purpose. Some time after the Athenians sent two other generals, with a more numerous army, who were not more successful than Nicias; but at length, when Philocrates brought fresh troops, the Miliots were reduced to the greatest extremity, and obliged to surrender. The Athenians, implacable in their resentment and ferocious in their vengeance, massacred, without discrimination, all the men who were capable of bearing arms, and made slaves of the women and children, whom they carried away to Attica. They then sent 500 persons to repeople the island, and to take possession of the property of those whom they had murdered. In the mean time, the Athenians, conquered in their turn by Lysander, commander of the Lacedæmonian troops, and compelled to surrender at discretion, found themselves constrained to recal their colony; and those who remained of the unfortunate Miliots were then enabled to return, and to reinvest themselves with the property which had been taken from them. This island, like all those of the Archipelago, passed under the dominion of the Romans; it afterwards made part of the empire of the East. Marco Santo united it, with all the Cyclades, to the duchy of Naxos; and it was in process of time detached from this duchy in favour of Francesco Crispo; and at length subjected to the Ottoman empire, under which it has lost, together with its liberty, its importance.

Milo is about sixty miles in circumference; it is divided in its middle, and almost through its whole breadth, by a deep bay: this is one of the finest harbours in the Mediterranean, sufficiently spacious to contain a fleet, and to keep the ships belonging to it sheltered from all winds. The anchorage is excellent, particularly at the head of the gulf and near the E. coast; the bottom has a fine sand, and vessels come to anchor there in from 12 to 18 fathom water. Small craft can approach nearer the coast, and carry out moorings to the rocks of one of the grottoes. Another anchorage, more convenient, and also less exposed to the action of the winds and the violence of the sea, lies on the W. coast, in a cove called "Patricha."

The entrance of the harbour first mentioned faces the N.W.; it is very wide, and ships approach very near to the coasts that form it, without risk. To the starboard, or right, they have Cape Veni, and to the left Cape Lerida; the gulf then contracts between Cape San Dimitri and Cape Bombarda. As the latter, a high mountain, in the form of a sugar-loaf, bears on its summit a village, called "Sifour," surrounded by walls, whence it has the name of Castro: here the pilots for the Archipelago reside. As the air here is pure and wholesome, it is more populous than the capital of Milo, and the inhabitants exhibit signs of vigour and health, not common in other parts of the island. It is not improbable that the principal place of the isle of Milo was near the scite of Sifour, which commands an extensive prospect; more especially as the ancient habitations of the Archipelago are built on eminences the most lofty, and the most rugged of access. Near this place are considerable ruins, fragments of columns of Parian marble, and subterraneous galleries, antique catacombs, which furnish funeral inscriptions, vases, idols, and medals, and other remains of a considerable city. The women of Sifour, or Sefours, employ themselves the whole year in knitting cotton stockings, and making coarse calicoes. The men cultivate the earth, or are mariners. Near this place, on the summit of a hill, is at present a church of Caloques, built, as Olivier conceives, on the ruins of a temple. However, the capital of the island is a town of the same name, situated on a plain formerly not inferior to any other of the Archipelago, but now presenting scarcely any thing but ruins. Scarcely do forty families drag on their unfortunate existence, with consumptive aspects, in a town which reckoned 5000 inhabitants within its walls. At the beginning of the last century, Tournefort discovered, in 1700, that the air of Milo was insalubrious, and that the inhabitants were subject to dangerous disorders; but the unwholesomeness of the air must have increased very much since that epoch. In traversing the island to the monastery of St. Marino, Mount St. Elias, the most lofty point in the island, and the volcanic mountain of Calamo, the country presents various traces of its volcanic origin. At the distance of a quarter of a league from Milo alum is formed, which has been mentioned both by ancient and modern writers. In the same grotto that furnishes this alum, are also found crystals of gypsum, but the heat is such as not to admit its being examined for any long time. The baths called "Loutra" were also situated in this quarter. The water is strongly charged with alum and marine salt. These baths were anciently much frequented by Greeks, who repaired hither from all the Cyclades in order to obtain relief in disorders of the skin, as well as in rheumatism and palsy. Spacious grottoes occur frequently, and in these are subterraneous caverns, full of turnings and twinings, and into which the descent is steep and laborious. The chambers which they contain appear to have been formerly used as habitations and places of concealment.

Near the scite of an ancient town, called "Clima" by the modern Greeks, are sepulchres or catacombs, in which, at an unknown period, the inhabitants of Milo deposited their dead. Each of these catacombs generally contains seven sarcophagi five and a half or six feet long, and a foot or fifteen inches deep, surmounted by an arch and dug in the rock. The whole island indicates a subterraneous conflagration; and in feveral places the ground which refounds under your feet apprizes you that it covers vaft cavities. Every appearance teftifies, that the ftones and pebbles which are found here have been thrown up by the explofion of a volcano; boiling waters iffue on all fides; pumice ftones are fcattered abroad; fulphur is formed in abundance, and fhews itfelf on the furface of the ground. Neverthelefs, the vegetable earth, which moftly covers the ifland, gently warmed by fubterraneous heat, is very productive. Corn and cotton are here of an excellent quality; the vines yield good wine, and the trees afford delicious fruits; but the quantity of lands that lie fallow announces an exceffive diminution in the population, as well as the criminal indifference of the government. Ships ftill come to Milo to fetch away a great quantity of the folid lava, of which mill-ftones are made, which are tranfported to feveral countries of the Levant, particularly to Egypt and Conftantinople. The ifland likewife contains many mines of iron and ferruginous pyrites, from which no advantage is derived. Under a liberal adminiftration other valuable articles might be found, and the ifland might even ceafe to be an unhealthy abode. The whole population at prefent does not amount to 500 perfons, and this fmall number would daily decreafe, if it was not kept up by emigrants from the Morea, where diftrefs conftrains them to feek new habitations, and who are attracted to Milo with a view of cultivating the lands. The captain-pacha has fome difficulty in levying 2500 piaftres by way of impoft. N. lat 36° 40′. E. long. 24° 30′. Sonnini and Olivier.

MILOPOTAMO, in *Geography*, a town and fortrefs of the ifland of Candia; 28 miles W.N.W. of Candia.

MILORRA, a fmall ifland in the Eaft Indian fea, between Ternate and Tidor.

MILOSLAW, a town of the duchy of Warfaw; 20 miles S.S.W. of Gnefna.

MILPHOSIS, μιλφωσις, a Greek word ufed by the ancient medical writers, as a name of the difeafe of the eye-lids, by which the hairs fall off from them, and the edges become red and tumid.

MILREA, or MILREE, in *Commerce*, a money of account in Portugal, fo called, becaufe 1000 reas, or rees, are = 1 milree. In the notation of accounts, the milrees are feparated from the rees by a croffed cypher, called "Cifraon," and the milrees from the millions by a colon; thus, Rs. 2 : 700 ⊕ 500, means two thoufand feven hundred mil. and five hundred rees. As the crufado of exchange, or old crufado, is 400 rees, the new crufado, 480 rees, the teftoon, 100, and the vinten or vintem, 20 rees; the milree is = $2\frac{1}{2}$ old crufados = $2\frac{1}{12}$ new ditto = 10 teftoons = 50 vintens. The milree valued in gold is worth $67\frac{1}{4}d.$ fterling, and the fame in filver is worth $68\frac{3}{4}d.$ fterling. The milree is alfo a gold coin, ftruck for the Portuguefe poffeffions in Africa in 1755; it weighs $19\frac{3}{4}$ grains, and contains, in pure gold, 18.1 grains, and is valued at $3s.\ 2\frac{1}{2}d.$ fterling. See COIN.

MILSTATT, or MUHLSTADT, in *Geography*, a town of the duchy of Carinthia, fituated on the Milftatter fee: 40 miles N. of Goritz. Milftatter fee is a lake of Carinthia, 9 miles E. of Saxenburg.

MILT, in *Anatomy*, a popular name for the fpleen.

MILT, or *Melt*, in *Natural Hiftory*, the foft roe in fifhes; thus called becaufe it yields, by expreffion, a whitifh juice refembling milk. See ROE.

The milt is properly the feed, or fpermatic part of the male fifh.

The milt of a carp confifts of two long whitifh irregular bodies, each included in a very thin fine membrane. M. Petit confiders thefe as the tefticles of the fifh wherein the feed is preferved: the lower part, next the anus, he takes for the veficulæ feminales. Vide Mem. Acad. R. Scien. anno 1733, p. 291.

In the milt of a living cod-fifh there are fuch incredible numbers of thofe fmall animalcules found in the male feed of all animals, that in a drop of the juice of it, no more in quantity than a fmall grain of fand, there are contained more than ten thoufand of them; and, confidering how many fuch quantities there are in the whole milt of one fuch fifh, it is not exceeding the bounds of truth to affirm, that there are more animals in one milt of it, than there are living men at one time upon the whole face of the earth. However ftrange and romantic fuch a conjecture may appear at firft fight, a ferious confideration, and calculation, will make it appear very plain. A hundred fuch grains of fand as here mentioned, will make about an inch in length; therefore in a cubic inch there will be a million of fuch fands.

The milt of one of thefe fifhes is frequently about the quantity of fifteen cubic inches, it muft therefore contain fifteen millions of quantities as big as one of thefe fands; and if there be ten thoufand animals in each of thofe quantities, there muft be, in the whole, a hundred and fifty thoufand millions: which is a number vaftly exceeding the number of mankind, even though we were to fuppofe the whole earth as populous as Holland. See Philofophical Collections, p. 4. See *Fecundity of* FISH.

MILT *Wafte*, or *Ceterach afplenium*, in *Botany*. (See ASPLENIUM.) The leaves are recommended as a pectoral fimilar to maidenhair, or Afplenium trichomanes; to which they have been frequently joined in infufions and apozems; and likewife as an aperient in obftructions of the vifcera. They poffefs likewife a diuretic virtue, and appear to gently carry off fand, cleanfe the kidnies, and allay pains in the urinary paffages. The way of ufing them is to drink infufions of them in the morning, as tea, with the addition of fuch other medicines as particular cafes may require. See CETERACH, ASPLENIUM, and TRICHOMANES.

MILTENBERG, in *Geography*, a town of Germany, on the Maine; 26 miles N.E. of Heidelberg.

MILTHORP. See MILNTHORP.

MILTIADES, in *Biography*, a celebrated Athenian general, the fon of Cimon, and grandfon of Miltiades, who founded an Athenian colony on the Thracian Cherfonefus. After the affaffination of Stefagoras, in the colony, Miltiades was fent from Athens to take the command, and having got into his power the principal men of the Cherfonefians, he made himfelf mafter of the whole diftrict, and married the daughter of the king of Thrace. When Darius I., king of Perfia, undertook an expedition againft the Scythians, and throwing a bridge acrofs the Danube marched into their country, he entrufted the guard of the bridge to the Ionian Greeks, the commanders of whom he had attached to himfelf, by raifing them to the fupreme authority in their feveral cities. Miltiades, who was one of them, excited by that fpirit of Grecian patriotifm, to which every other duty was made fubfervient, urged the other leaders to break down the bridge, in order that a prince fo entirely inimical to Grecian liberty might never return in fafety. His counfel was approved by all the reft except Hyftiæus the Milefian, who had influence enough to prevent its taking effect. Miltiades, judging it imprudent to await the monarch's return, embarked for Athens, and in his way took poffeffion of the ifle of Lemnos for his countrymen. Darius, after his return from his Scythian expedition, having refolved upon the conqueft of Greece, fent Mardonius at the head of a powerful army to invade it. When he had arrived at the

the plains of Marathon, within ten miles of the capital, Athens, the alarm of the citizens became extreme, and in their despair they took the resolution to march out to meet the foe, with such troops as they could assemble, soliciting, at the same time, succours from the other Grecian states. But of the battle of *Marathon*, we have already given an account under that article. Miltiades, who was unquestionably the grand instrument in obtaining this victory, was next entrusted with a strong armament fitted out for the reduction of some of the islands which had taken part with the Persians. He sailed to Paros, and laid siege to its capital, but either a false alarm of the approach of the Persian fleet, or an unsuccessful attempt to gain the place, in which he was wounded, caused him to return without effecting his purpose. The disappointment of the Athenians was so great, that Miltiades was accused of treason before the assembly of the people, who, forgetting his past services, by which they had been delivered from a foreign yoke, condemned him to death. Upon, however, the payment of a heavy fine, he was exempted from capital punishment, but was thrown into prison, where, to the everlasting disgrace of his countrymen, he died of a broken heart, in the year after the battle of Marathon. Corn. Nepos. Univer. Hist.

MILTON, John, in *Biography*, the father of our great poet, though a scrivener (or banker) by profession, was a voluminous composer, and equal in science, if not genius, to the best musicians of his age; in conjunction, and on a level with whom, his name and works appeared in numerous musical publications of the time, particularly in those of old Wilbye; in the "Triumphs of Oriana," published by Morley; in Ravencroft's "Psalms;" in the "Lamentations," published by sir William Leighton; and in MS. collections, still in the possession of the curious The late Mr. T. Warton, in his notes on the Minora of Milton, tells us, from the MS. Life of the Poet, by Aubrey, the antiquary, in the Mus. Ashm. Oxon. that "Milton's father, though a scrivener, was not apprenticed to that trade: having been bred a scholar, and of Christ-church, Oxford; and that he took to trade in consequence of being disinherited." Mr. Warton therefore observes, that Milton, in his Latin epistle to his father, addresses him in a language which he understood. Aubrey adds, "that the elder Milton died very old in 1647, and was interred from his house in Barbican, in St. Giles's church, Cripplegate; where the great poet was afterwards buried, near his father, in 1674."

His son celebrates his musical abilities in an admirable Latin poem, "Ad patrem," where, alluding to his father's musical science, he says, that Apollo had divided his favours in the sister arts between them; giving music to the father, and poetry to the son.

"Nec tu perge, precor, sacras contemnere musas,
Nec vanas inopesque puta, quarum ipse peritus
Munere, mille sonos numeros componis ad aptos,
Millibus et vocem modulis variare canoram
Doctus, Arionii merito sis nominis hæres.
Nunc tibi quid mirum, si me genuisse poetam
Contigerit, charo si tam prope sanguine juncti
Cognatas artes, studiumque affine sequamur?
Ipse volens Phœbus se dispertire duobus,
Altera dona mihi, dedit altera dona parenti,
Dividuumque Deum genitorque puerque tenemus."
Ver. 56. usque 66.

His effusions of gratitude for the education he had received from his parent's bounty, and his apology for cultivating poetry, of which he gives a charming eulogium, seem to contain ideas as beautiful and sublime, as any in his Paradise Lost.

Milton, John, the most illustrious of English poets, was descended from an ancient family settled at Milton, in Oxfordshire. His father, who had been brought up in the Roman Catholic religion, and by embracing the Protestant faith had been disinherited, came to London and followed the profession of a scrivener, and marrying a woman, exemplary for her numerous virtues and extensive charities, had two sons and a daughter; *viz.* John, the subject of this article, Christopher, and Anne. Of the two latter, Christopher, applying himself to the study of the law, became a bencher of the Inner Temple, and at an advanced period of his life was knighted, and raised by James II., first to be a baron of the exchequer, and afterwards one of the judges of the court of Common Pleas. During the civil war he followed the royal standard, and effected his composition with the victors by the prevailing interest of his brother. In his old age he retired from the fatigues of business, and closed, in the country, a life of study and devotion. His sister, Anne, married Mr. Edward Philips, a native of Shrewsbury, who, coming to London, obtained the lucrative place of secondary in the crown office in chancery: by him she had several children, of whom Edward and John only survived to maturity; the former became the biographer, after having, with his brother, been the pupil of his uncle, our author. By a second husband, Mr. Agar, she had two daughters, of whom Mary died young, and of the other, Anne, nothing more is known, than that she was living in the year 1694.

John Milton, the subject of the present article, was born at his father's house, in Bread-street, London, on the 9th of December, 1608. His promise of future excellence was made at a very early period: every incitement to exertion, and every mode of instruction adapted to the disposition and powers of the child, were employed, and no means, probably, were omitted to expand the intellectual Hercules of the nursery into the full dimensions of that mental amplitude for which he was intended. The portrait of him was painted, when he was only ten years old, by the celebrated Cornelius Jansen; hence we may infer that the son, who was made the object of so flattering a distinction by a father, in competent, but by no means in affluent circumstances, could not have been a common child. Of himself, at this period, he gives the following account. "My father destined me, when I was yet a little boy, to the study of elegant literature, and so eagerly did I seize on it, that from my twelfth year, I seldom quitted my studies for my bed till the middle of the night. This proved the first cause of the ruin of my eyes; in addition to the natural weakness of which organs, I was afflicted with frequent pains in my head. When these maladies could not restrain my rage for learning, my father provided that I should be daily instructed in some school abroad, or by domestic tutors at home." "How great," says Dr. Symmons, "are the obligations of Britain and the world to such a father, engaged in the assiduous and well directed cultivation of the mind of such a son." Some part of his early education was committed to the care of Mr. Thomas Young, a puritan minister, and native of the country of Essex, afterwards chaplain to the English merchants at Hamburgh, a man whose merits are gratefully commemorated by his pupil in a Latin elegy. About the age of fifteen he was sent to St. Paul's school, of which Mr. Alexander Gill was then master, and there he began to distinguish himself by his intense application to study, and his poetical talents. Ardent in his love of knowledge, he was regardless of pleasure, and even of health, when they came into competition with the prevailing paſſion of his ſoul, and we are conſequently not ſurprized by the extraordinary and brilliant reſult which ſoon flaſhed upon the world. It is conjectured that it was at this early period he imbibed the ſpirit of devotion which actuated his boſom to his lateſt moments. For this he was probably indebted to his father, who would naturally be ſolicitous to ſtamp upon the tender boſom of his ſon, that conviction and feeling of duty which were impreſſed ſo deeply on his own, and which he had exhibited in his abjuration of thoſe errors in which he had been educated. He intended his ſon for the church, and on that account would be more anxious to incline him to devotional principles and practice. The ſentiments and the warmth thus communicated to the mind of the youth, would unqueſtionably be ſtrengthened by the leſſons and example of his preceptor, Mr. Young, in whom religion was carried to enthuſiaſm. To Milton's devotional turn of mind we are probably indebted, not merely for the ſubject, but for a great part of the ſublimity of the Paradiſe Loſt. On the 12th of February, 1624-5, he was entered a penſioner at Chriſt's college, Cambridge, under the tuition of Mr. W. Chappel. Of his courſe of ſtudies in the univerſity little is known, but he gave proof of the extraordinary ſkill he had acquired in writing Latin verſe, by ſeveral exerciſes preſerved among his works, and which are of a purer claſſical taſte than any preceding compoſitions of the kind by Engliſh ſcholars. It appears that ſome part of his conduct brought upon him academical puniſhment; but whatever were the cauſe, he felt no ſhame on account of it, but refers ſpontaneouſly to the circumſtance in the following lines:

> "Nec duri libet uſque minas perferre magiſtri
> Cæteraque ingenio non ſubeunda meo.
> Si ſit hoc exilium patrios adiiſſe penates
> Et vacuum curis otia grata ſequi."

Which have been tranſlated by his biographer.

> "And ill my ſoul a maſter's threats can bear,
> With all the fretting of the pedant's war.
> If this be baniſhment—all cares aloof—
> To live my own beneath a father's roof—
> Still let an idle world condemn or not,
> Mine be a truant's name,—an exile's lot."

From theſe lines, the enemies of Milton have inferred that he was ſubjected to corporal puniſhment, and that he was diſmiſſed from his college for irregularity of conduct. Dr. Symmons has, with a proper degree of indignation, vindicated completely the character of Milton from theſe vile aſperſions. Our limits will not permit us to follow him through the ſteps of the arguments, but they appear perfectly ſatisfactory. The doctor, ſpeaking of the calumnies ſpread on this ſubject, ſays, "In oppoſition to this pretended evidence, ſtand the records of our author's univerſity, and the force of his own poſitive declarations. By the former of theſe, which prove that he took his bachelor's degree as ſoon as it could be taken, it is made highly probable, if not abſolutely certain, that he loſt no term; and by the latter we are aſſured that he was not only exempted from puniſhment during his continuance at Cambridge, but in that ſeat of learning was an object of affection and reſpect."—And again, "With reſpect to Milton, we may be confident that no immorality could be the cauſe of his puniſhment. Religion, as we know, took early poſſeſſion of his boſom, and he who, with weak eyes and an aching head, could conſecrate one-half of the night to ſtudy, cannot be ſuſpected of ſtealing the other half from repoſe, for the purpoſe of confounding it with exceſs, or of polluting it with debauch. A mind, indeed, like his, exulting in the exerciſe of its higher powers, and intent on the purſuit of knowledge, could not, without a violation of its nature, ſubmit to licentious indulgencies. The cultivation of intellect not only diveſts the attention from ſenſual pleaſure, but inſpires a pride which ſubdues its faſcination: and while the ſpectacle of the world exhibits innumerable inſtances of men of genius hurrying into exceſſive gratification, it ſcarcely preſents us with one, under the influence of the ſame unfortunate error, among the aſſiduous votaries of knowledge."

Milton probably became obnoxious to the governors of his college by the bold avowal of his puritan opinions, which he had imbibed from his tutor Young, or by his diſlike to the diſcipline of the eſtabliſhed religion, or to the plan of education purſued in the univerſity; hence he might loſe the favour of his ſuperiors in the college, and be expoſed to their cenſures without incurring the ſlighteſt loſs of character, or ſuſtaining the moſt trifling diminution of general eſteem.

He took the degrees of bachelor and maſter of arts, the latter in 1632, when he left the univerſity. In the ſeven years of his academical life, his vigorous and ardent genius broke out in frequent flaſhes, and evidently diſcloſed the future author of "Comus" and "Paradiſe Loſt." He was a poet when he was only ten years old, and his tranſlation of the 136th pſalm evinces his progreſs in poetic expreſſion at the early age of fifteen. He renounced his original purpoſe of entering the church, for which he aſſigns as a reaſon, "that coming to ſome maturity of years, he had perceived what tyranny had pervaded it, and that he who would take orders, muſt ſubſcribe ſlave, and take an oath withal, which, unleſs he took with a conſcience that could retch, he muſt either ſtrain, perforce, or ſplit his faith; I thought it better to prefer a blameleſs ſilence before the office of ſpeaking, bought and begun with ſervitude and forſwearing." This denotes a mind reſolved to think and act for itſelf, and it cannot be doubted that Milton was already marked with that firm unyielding temper, which, in ſome degree, is a neceſſary concomitant of a ſuperior mind. He now returned to his father, who had retired from buſineſs, to a reſidence at Horton, in Buckinghamſhire, and there paſſed five years in a courſe of claſſical ſtudy, and in the compoſition of ſome of his fineſt miſcellaneous poems. This was the period of his Allegro and Penſeroſo, his Comus and Lycidas. "L'Allegro and Il Penſeroſo," ſays Dr. Symmons, "were certainly written at Horton, and probably at no long period before the Lycidas, which was the laſt of our author's works while he reſided with his father. They were compoſed in the happieſt humour of the poet's mind, when his fancy was all ſun-ſhine, and

> ——— no cloud, or, to obſtruct her view,
> Star interpoſed.

We may contemplate them not as the effects or qualities, but as the very ſubſtance of poetry, as its "hidden ſoul untied, and brought forward to our ſight." In comparing the merits of theſe pieces, Dr. S. gives the preference to Il Penſeroſo. "The portrait of contemplation," ſays he, "the addreſs to Philomel; the image of the moon wandering through heaven's pathleſs way; the ſlow ſwinging of the curfew over ſome wide-watered ſhore; the flaming of the night lamp in ſome lonely tower; the unſphering of the ſpirit of Plato to diſcloſe the reſidence of the unbodied ſoul; the arched walks of twilight groves; the myſterious dream by the murmuring waters; the ſweet muſic of the friendly ſpirit of the wood; the pale ſtudious cloiſter; the religious light thrown through the ſtoried windows; the pealing organ, and finally the peaceful hermitage—

form together such a mass of poetic imagery as was never before crowded into an equal space: the impression made by it on the imagination is to be felt and not explained." The pale and studious cloister having been objected to, in one of Mr. Wharton's criticisms, Dr. Symmons remarks, that the word *pale*, as an epithet to cloister, is most happily poetic, and as holding a large and animated picture to the imagination. It shews the ghostly light of the place, the sickly cheek of timorous superstition, and the wan and faded countenance of studious and contemplative melancholy.

In 1638, having obtained his father's consent to improve himself by foreign travel, Milton set out for the continent. At Paris he was received with distinction by lord Scudamore, the ambassador from England, by whom he was introduced to the notice of the illustrious Grotius, who then resided in the French capital, as the minister of Christina, the queen of Sweden. After the delay of a few days at Paris, he renewed his progress, and pursued the direct road to Nice, where a vessel received and landed him at Genoa. From this city he passed immediately through Leghorn and Pisa to Florence, and on the banks of the Arno he made what may be regarded as his first pause. Here he resided two months, and by the brilliancy of his conversation, and mildness of his manners, made himself the object of very general admiration. Here he obtained admission into those private academies, which had been instituted by the Medici for the advancement of literature, and for the cementing of friendships among its votaries. The English bard could in this place enumerate in the list of his friends all the great, the respectable, and deeply learned men of Italy, who appear to have been lost in surprise at the spectacle, presented to them, of a native of Britain, a country just emerging, as they imagined, from barbarism, who to an acquaintance, not superficial, with all the sciences, united a profound knowledge of classical and Italian letters; whose mind was at once sublime and deep, accurate and comprehensive, powerful and acute; patient to follow judgment in the gradual investigation of philosophical truth, yet delighted to fly with the more aerial offspring of the brain on the high and expatiating wing of imagination. During this visit to Florence he saw and conversed with the great Galileo, that memorable victim of priestley ignorance and superstition. "There it was," says Milton, "that I found and visited the famous Galileo, grown old, a prisoner to the Inquisition, for thinking in astronomy otherwise than the Franciscan and Dominican licensers thought." On his leaving Florence, our traveller proceeded through Sienna to Rome, and then visited Naples, where he was kindly received by Manso, marquis of Villa. At Rome he was introduced, by Holstenius, the learned keeper of the Vatican library, to the attentions of cardinal Barberini, who at that time possessed the whole delegated sovereignty of Rome under his uncle, Urban VIII. At a great musical entertainment which the cardinal gave, he looked for our traveller among the crowd at the door, and brought him, almost by the hand, into the assembly. It is supposed, that it was at this concert Milton was first struck with the charms and the inimitable voice of Leonora Baroni, which had been made the general theme of their praise by the contemporary poets of Italy: and she is probably the person who has been celebrated by Milton in her own language, and who was the object of his love in his Italian sonnets.

At Naples the attentions paid to Milton were of the most flattering nature; the marquis of Villa not only conducted him through the viceroy's palace, and to a sight of all that was worthy to be shewn in the city, but honoured him also with some familiar and very friendly visits. The imprudent freedom, with which Milton had discovered his sentiments on the subject of religion, was the only circumstance which deprived him of a still more unreserved intercourse with this elegant and accomplished nobleman. Having completed his intended residence at Naples, he began to make preparations for the execution of the remaining part of his plan of travel, which extended to Sicily and Greece; but while he was engaged in this business he received letters from England, acquainting him with the distracted state of his country, and with the near prospect of a civil war; he determined to return. "As I was desirous," he says, "to pass into Sicily and Greece, the melancholy intelligence from England of the civil war recalled me; for I esteemed it dishonourable for me to be lingering abroad, even for the improvement of my mind, when my fellow-citizens were contending for their liberty at home." He, however, resolved to revisit Rome, where he remained two months; and whenever his religion was attacked, he scrupled not to vindicate its principles with spirit and ardour, even within the precincts of the sacerdotal palace. From Rome he went to Florence, and his second visit to this city, which the kindness of his friends made a species of home to him, was of equal duration with his first. When he departed from Florence, he crossed the Apennines, and travelled through Bologna and Ferrara to Venice. He spent a month in viewing the curiosities of this celebrated city, and then pursued his returning course through Verona and Milan, over the Alps, and by lake Lemanus to Geneva. Here he contracted an acquaintance with two learned divines, John Diodati and Frederic Spanheim. He now returned through France to England, having been absent about fifteen months. On his arrival he found the civil commotions of his country hastening to a crisis, and as he had expressed impatience to be present on the theatre of these disputes, it has been thought extraordinary that he did not instantly take upon himself some active part. But his tastes and habits were altogether literary, and he had been long pondering upon some subject of English poetry worthy of his genius, and capable of being made a passport to the immortality to which he aspired. For the present, therefore, he fixed himself in the metropolis, undertook the education of his sister's sons, of the name of Philips. Shortly after he was applied to by several parents to admit their children to the benefit of his tuition, to which he assented, and by this means he has exposed himself to the title of school-master, which his enemies, and the enemies of human happiness and intellectual improvement, who employed it as a term of reproach, conceived to be of a nature to degrade him. He took a house in a garden in Aldersgate-street, and opened an academy for board and education. Here, in his little circle of scholars, he was usefully, if not splendidly, engaged; and he could not perhaps conceive, while he was essentially promoting the highest interests of some of his species, that he was degrading himself in the estimation of the rest. In his conduct to his pupils, he was familiar and free where he could be so, and was never rigid but by compulsion. His form of instruction respected things more than words, and attempted to communicate knowledge when the understanding was, perhaps, incapable of receiving more than the key which opened the important gate. Instead of the common classics, he put into the hands of his scholars such Latin and Greek authors as treated on the arts and sciences, and philosophy. These were ill calculated to render learning pleasant to beginners, and from the imperfect state of ancient science, such a course was as likely to inculcate error as truth. He performed the

duties

duties of inftruction with great affiduity, and fet the example of hard ftudy and fpare diet to his pupils, whom he feems, in fome refpects, to have difciplined with the feverity of old times.

Milton did not very long continue inactive in the public caufe, and his principles made it no matter of doubt which fide he fhould efpoufe in the contentions of his country. Confcious of his own proper ftrength, and fenfible that genius armed with knowledge was a power of far greater and more extenfive efficiency than the bodily force of any individual, he accordingly decided in favour of the pen againft the fword; and ftationed himfelf in the clofet, where he was himfelf a hoft, rather than in the field, where every mufcular private man would have been his fuperior. In the year 1641 he publifhed four treatifes relative to church government, in which he attacked epifcopacy, and fupported the caufe of the Puritans. Thefe were followed by another in the next year, relative to the fame controverfy, and he reckoned among his antagonifts fuch men as bifhop Hall and archbifhop Ufher. His father, who had been molefted in his refidence by the king's troops, came to live with him, and fpent his latter years, in tranquillity, under his fon's roof. In 1643, Milton married Mary, daughter of Richard Powell, efq., a magiftrate in Oxfordfhire. This was a very unfuitable connection, for the father-in-law was a zealous royalift, and the daughter had been accuftomed to the jovial hofpitality of the country gentlemen of that party. After a month's experience of her new life, the lady fighed for the gaieties which fhe had left, and obtaining permiffion, by the earneft requeft of her relations, for a fhort abfence, fhe revifited her native place. Here fhe continued during the remainder of the fummer, nor could the letters, meffages, and remonftrances of her hufband bring her back. Incenfed at her neglect and ill treatment of him, he began to confider her conduct as a defertion of the nuptial contract, and refolved to punifh it by repudiation. He foon found arguments to juftify it to the world, and publifhed, in 1644, "The Doctrine and Difcipline of Divorce," which was followed by "The Judgment of Martin Bucer concerning Divorce." By thefe writings the fury of the Prefbyterian clergy was inftantly kindled, and they procured the author to be fummoned before the houfe of lords, but that body did not choofe to enter into the queftion, and foon difmiffed him. The Prefbyterians were now left without any confolation for the lofs of an able friend, and the excitement of a formidable enemy. Milton now was irrevocably alienated from their caufe, and he foon fully difcovered that many of thefe pretended zealots of liberty fought only their own aggrandizement, and the power of impofing upon others a yoke which they had themfelves been unable to bear. On the fubject of divorce he makes out a ftrong cafe, and appealed to the whole tenour of the fcripture; the laws of the firft Chriftian emperors; the opinions of the moft eminent among the early reformers; and endeavours to fhew that by the laws of God, and by the inferences of the moft virtuous and enlightened men, the power of divorce ought not to be rigidly reftricted to thofe caufes which render the nuptial ftate unfruitful, or which taint it with fpurious offspring. Regarding mutual fupport and comfort as the principal objects of this union, he contends, that whatever defrauds it of thefe ends effentially vitiates the contract, and muft neceffarily juftify its diffolution.

Milton, in conformity to this theory, refolved practically to act upon it, and began to pay his addreffes to a young lady of great accomplifhments, the daughter of a Dr. Davies. The rumour of the intended alliance effected what his remonftrances had been unable to do; as he was paying a vifit to a neighbour, he was furprifed with the fudden appearance of his wife from another room, who threw herfelf at his feet and implored forgivenefs. After a fhort ftruggle of refentment, he relented, and took her again to his bofom. The reconciliation was lafting and fincere, and Milton nobly fealed it by opening his houfe to her father and brothers, when they had been driven from home by the triumph of the republican arms. He was now obliged to take a larger manfion, and removed to Barbican. In this afylum his wife's relations continued, till the queftion refpecting their property was adjufted with the government, and till a period fubfequent to the death of Milton's father. Under the preffure of thefe domeftic embarraffments, and of the public intereft, the intellect of our author, obedient to a heart actuated by the pureft benevolence, was bufy in promoting the welfare of the human race. In the year 1644, he imparted to the world his ideas on the fubject of education, and defended, with a power which has never been exceeded, that guardian of liberty and truth, the freedom of the prefs.

His "Tractate on Education," addreffed to Mr. Hartlib, the friend of fir William Petty, contains his thoughts on that important fubject. From this it appears, he conceived it poffible to initiate the young ftudent into fcience and language by the fame procefs, and to make an acquaintance with things the immediate refult of an acquaintance with words. Between the years of twelve and twenty-one, the pupil is to be led through various languages from grammar to ethics, logic, rhetoric, politics, law, theology, criticifm, and the practice of compofition. Geography was to exhibit to him the furface of the globe, and the principles of aftronomy were to unfold to him the heavens; natural philofophy, comprehending anatomy and phyfiology, was to make him converfant with the phenomena of nature, and with the wonders of his own frame; the mathematics were to introduce him to the fciences of architecture, engineering or gunnery, fortification, and navigation. With this kind of education, Milton's pupil was to be accomplifhed, and fit for any duty to which his country might fummon him, in the pulpit or at the bar, in the fenate or the field. During the courfe of thefe ftudies, the body of the ftudent was to receive its due fhare of cultivation, to be maintained in health by temperance, and to be invigorated by exertion. This little piece is written in an eafier and purer ftyle than the preceding works of its author; but in every fpecies of merit it muft yield to another compofition, produced nearly at the fame time, by the fame pen, and addreffed to the parliament, with the title of "Areopagitica, or a fpeech for the liberty of unlicenfed printing." The Prefbyterians, on their rifing into power, forgot the principles which they had profeffed in their adverfity; and, declaring againft unlimited toleration, difcovered by their readinefs to violate the rights of others, that their tendernefs was only for their own. Againft thefe apoftates to the caufe of liberty, Milton advanced as the champion of free difcuffion; and the effect of his zeal in this inftance, for the interefts of genuine liberty, has received the unanimous acclamation of the world. Though his controverfial, and other engagements, had for fome time fufpended the exertion of his poetical talents, yet he did not fuffer his character as a poet to fink into oblivion, and in 1645, he publifhed his juvenile poems in Latin and Englifh. In 1646, Milton's wife produced her firft child, and in the following year, in which his father died, the Powells returned to their own manfion, and his houfe was refigned once more to literature. In this houfe, in which his fecond daughter Mary was born, he did not continue long, but exchanged it for one of fmaller dimenfions in High Holborn. His next removal was occafioned by his acceptance of the office of Latin fecretary, which rendered a fituation nearer to Whitehall an object of convenience

Milton's principles of the origin and end of government, carried him to a full approbation of the trial and execution of the king, which was the final cataftrophe of the civil wars; and in order to conciliate the minds of the people, which were agitated by the outcries, as well of the Prefbyterians as the loyalifts againft that act, he publifhed early in 1649, a work, entitled "The Tenure of Kings and Magiftrates," proving that it is lawful, and that it hath been fo held through all ages, for any who have the power, to call to account a tyrant or wicked king, and, after due conviction, to depofe and put him to death, if the ordinary magiftrate have neglected or denied to do it. He foon after attempted to fupport the new order of things, by a pamphlet animadverting upon the revolt of the Scotch Prefbyterians, fettled at Belfaft, from the parliament. With the view of preferving the republican fpirit of the nation, he alfo employed himfelf in compofing "A Hiftory of England" from the earlieft periods, of which he wrote fix books, but left the work unfinifhed. His progrefs was ftopped by an appointment to the Latin fecretaryfhip to the council of ftate. Scarcely was Milton feated in his new office, when he was fummoned by the government to the difcharge of a duty, well adapted to the extent of his powers, and one of confiderable importance; it was to write an anfwer to the famous royal work, as it was then fuppofed to be, entitled "Icon Bafilikè," or the portraiture of his facred majefty in his folitudes and fufferings. Milton chofe for the title of his work "Iconoclaftes," or Image-breaker: this piece, fays his biographer, Dr. Symmons, "may be regarded as one of the moft perfect and powerful of Milton's controverfial compofitions. Preffing clofely on its antagonift, and tracing him ftep by ftep, it either expofes the fallacy of his reafoning, or the falfehood of his affertions, or the hollownefs of his profeffions, or the convenient fpeciousnefs of his devotion. In argument, and in ftyle compreffed and energetic, perfpicuous and neat, it difcovers a quicknefs which never miffes an advantage, and a keennefs of remark which carries an irrefiftible edge." This work was firft printed in 1649, and a fecond edition of it appeared in the following year; it was publifhed again in London in 1652, in a French tranflation, and was anfwered in 1651, in a work, entitled "Icon-aclaftes," or the Image unbroken, and alfo forty years afterwards in another piece, called "Vindiciæ Carolinæ." We have in the article GAUDEN fhewn that the "Icon-Bafilikè" was written by that prelate, and not by king Charles, to whom it was generally imputed. This has been fatisfactorily proved by the affertions of the two fons of the king, *viz* Charles II. and James II.; by letters of the lord chancellor Hyde, and Dr. Gauden himfelf; and by the fpecific depofitions of the doctor's friend Dr. Walker, and of his widow. Doubts of the real author of the "Icon Bafilikè" were entertained almoft immediately upon its publication by Milton, and by other perfons. Milton probably had no doubt whatever of its fpurioufnefs, but was without any fpecific evidence to bring home the charge, he therefore anfwered the book, and its arguments, without regard to the writer, for he exprefsly fays, "But the matter, here confiderable, is not whether the king, or his *houfhold rhetorician*, have made a pithy declamation againft tumults, but firft, whether there were tumults or not, &c." It was alfo, in the year 1649, attacked as the work of a clergyman who was looking to preferment as a reward, in an able piece, entitled "Icon-alethinè," or the true image. To this work is prefixed a frontifpiece, in which, on a curtain being drawn afide, is difcovered a dignitary of the church of England in his full canonical drefs, and beneath are infcribed the following lines:

"The curtain's drawn; all may perceive the plot,
And him, who truly the black babe begot.
Whofe fable mantle makes me bold to fay,
A Phæton Sol's chariot ruled that day.
Prefumptuous prieft! to fkip into the throne;
And make the king, his baftard iffue own!
The author therefore hath conceived it meet,
The doctor fhould do penance in this fheet."

On the appointment of Milton to the office of Latin fecretary, he removed to a lodging at Charing Crofs, and afterwards to apartments in Scotland Yard. Here his wife prefented him with a third child, a fon, who died in his infancy. In 1652 he changed his refidence to Petty France, which he occupied for eight years, till the crifis of the reftoration, a handfome houfe opening into St. James's park.

Scarcely had Milton finifhed his reply to the "Icon Bafilikè," than he was called upon to juftify the principles of the commonwealth in England, in oppofition to Salmafius, an honorary profeffor in the univerfity of Leyden, who had been hired by Charles II. to write a work in favour of the royal caufe, which he entitled "Defenfio Regia." Salmafius was, by much, a more powerful antagonift than Dr. Gauden, and the conteft was to be decided in a more ample field, than that in which Milton had engaged with the "Icon Bafilikè." The powers of his mind were now to be exhibited to Europe, and the whole circle of the civilized and Chriftian community was to witnefs his triumph or defeat. In 1651, he performed the tafk allotted him in a work under the title of "Defenfio pro Populo Anglicano;" in this he exercifed all the powers of Latin rhetoric, as well to juftify the republican party, as to confound and vilify the celebrated fcholar againft whom he took up his pen. By this, notwithftanding the party virulence, with which, by the cuftom of the times, it was debafed, he acquired a high reputation both at home and abroad. He was vifited on the occafion by all the foreign ambaffadors then in London, was complimented by feveral eminent fcholars on the continent, and received, as a remuneration for his labours, a thoufand pounds from the Englifh government. His book was generally read by literary enquirers of all parties, while, on the other hand, the work of Salmafius was condemned and fuppreffed by the ftates of Holland. One fource of triumph arofe to Milton's enemies; in confequence of this controverfy, his intenfe application to ftudy deprived him of that fight, which had been for fome years declining. His phyficians had warned him, that the exertion neceffary to accomplifh fuch a work would probably induce total blindnefs, but his attachment to the public caufe of his country and the world, made him readily fubmit to any privations which were merely perfonal, fo that he might render that fervice which the exigencies of the times required.

That fuch were his motives, we have his own declarations, in a fine fonnet addreffed to his friend Cyriac Skinner, which our readers will thank us for tranfcribing.

"Cyriac, this three years day, thefe eyes, though clear
To outward view, of blemifh or of fpot,
Bereft of light, their feeing have forgot;
Nor to their idle orbs doth fight appear
Of fun, or moon, or ftar throughout the year,
Or man or woman;—yet I argue not
Againft Heaven's hand or will, nor bate a jot
Of heart or hope; but ftill bear up and fteer

Right

Right onward What supports me, doſt thou aſk?
  The conſcience, friend, to have loſt them overplied
In liberty's defence, my noble taſk,
  Of which all Europe rings from ſide to ſide:
This thought might lead me through the world's vain maſk,
  Content, though blind, had I no better guide."

And in plain proſe he ſays, in his "Second Defence," "When the taſk of replying to the defence of the king was committed to me, at a time when I had to contend with ill-health, and when one of my eyes being nearly loſt, my phyſicians clearly predicted, that if I undertook the laborious work, I ſhould ſoon be deprived of both; undeterred by the warning, I ſeemed to hear a voice, not of a phyſician, but of ſome internal and more divine monitor; and conceiving that by ſome fatal decree, the alternative of two lots was propoſed to me, that I muſt either loſe my ſight, or muſt deſert a high duty, the two deſtinies occurred to me, which the ſon of Thetis reports to have been ſubmitted to him by his mother, from the oracle of Delphi. Reflecting, therefore, with myſelf, that many had purchaſed leſs good with greater evil, and had even paid life as the price of glory, while to me the greater good was offered at the expence of the leſs evil, as merely by incurring blindneſs, I might ſatisfy the moſt honourable demand of duty; which, intrinſically of more worth even than glory itſelf, ought to be the firſt and deareſt object of every man's regard; I determined to dedicate the ſhort enjoyment of my eye-ſight, with as much effect as I could to the public advantage."

Among the attentions paid to Milton at this time, he was particularly pleaſed with thoſe of Leonard Philarus, a learned Athenian, who had attained to high rank in Italy, and was now employed by the duke of Parma on an embaſſy to the court of Paris. Struck with the ability and ſpirit of Milton's compoſition, this illuſtrious Greek ſent him his portrait, with a letter of panegyric to the defender of the Engliſh commonwealth. On a viſit which Philarus ſoon afterwards made to England, he waited upon Milton, then reduced to a ſtate of total blindneſs, and mutual friendſhip was the conſequence of their perſonal intimacy. When Philarus returned to Paris, he was led, by the celebrity of Thevenot, the phyſician, particularly renowned at that time for his acquaintance with the diſeaſes of the eye, to communicate a hope to Milton of the recovery of his ſight. The letters in which our author acknowledges the kindneſs of his friend on this and other occaſions are preſerved in Dr. Symmons' life of him.

His intellectual powers, however, ſuffered no diminution from this abridgment of the ſenſitive faculties, and he purſued, without intermiſſion, both his official and controverſial employments. In 1652 a book was publiſhed at the Hague, entitled "Regii ſanguinis clamor ad cœlum adverſus parricidas Anglicanos;" the author was Peter Moulin the younger. Milton replied to it in his "Second Defence," to which we have already referred, and which was entitled "Defenſio ſecunda pro Populo Anglicano." In this was a high panegyric upon Cromwell, who had now aſſumed the ſupreme power with the title of Protector. "Milton's ſubſervience and attachment to this uſurper," ſays one of his biographers, "is the part of his conduct which it is the moſt difficult to juſtify. When the wiſeſt and moſt conſcientious of the republicans had become ſenſible of his arts, and had openly oppoſed his ambitious projects, it might have been expected that the mind of Milton would neither have been blinded by his hypocriſy, nor overawed by his power. If the general tenour of his character will exonerate him from the ſuſpicion of intereſted motives on this occaſion, it muſt be ſuppoſed that he was dazzled with the greatneſs of Cromwell's actions, and was convinced that his ſuperiority alone could allay that contention of parties which threatened ruin to the cauſe that had proved victorious in the field. Milton, beſides, was a zealous friend to religious liberty, for which he ſaw no refuge from the intolerance of the Preſbyterians, except in the moderation of the protector. It may be added, that the very paſſage in which he addreſſes Cromwell with the loftieſt encomium, contains a free and noble exhortation, that he ſhould reſpect that public liberty, of which he conſiders him as the guardian."

Milton's office as Latin ſecretary, chiefly regarded tranſactions with foreign nations, in which it is admitted that Cromwell was meritoriouſly attentive to the honour and intereſt of his own. In 1652 he loſt his wife, and his blindneſs, in a ſhort time, induced him to marry again. His ſecond wife was Catharine, the daughter of captain Woodcock of Hackney, who, unfortunately for him, died within a year in child-bed, greatly regretted by her huſband, who has conſecrated her memory by a beautiful ſonnet, ſuppoſed to be the reſult of a dream, immediately after her deceaſe, in which are the following lines:

Methought I ſaw my late eſpouſed ſaint,
* * * * * *
* * * * * *
Came, veſted all in white, pure as her mind:
  Her face was veiled, yet to my fancied ſight
Love, ſweetneſs, goodneſs in her perſon ſhined
  So clear, as in no face with more delight.
But Oh! as to embrace me ſhe inclined,
  I waked;—ſhe fled, and day brought back my night.

Employment was his reſource againſt the gloom of his condition; and after he had concluded his controverſial warfare, he took up his ſuſpended "Hiſtory of England," which he carried on to the conqueſt: he alſo collected materials for a Latin Theſaurus, intended as an improvement upon that of R. Stephanus.

In the buſineſs of his office he had coadjutors; but the moſt important matters were ſtill committed to him, and from his pen proceeded a Latin memorial of great ſtrength and elegance, ſtating the reaſons for the war which the protector declared againſt Spain. A remonſtrance which he drew up concerning the perſecution of the Proteſtants in Savoy, ſtrongly expreſſed his deteſtation of religious tyranny.

After the death of Cromwell, when the fluctuations of government threatened general anarchy, he was induced to give his advice on civil and eccleſiaſtical topics in ſome ſmall publications, one of which was entitled "A Ready and Eaſy Way to eſtabliſh a Free Commonwealth, and the Excellence thereof, compared with the Inconveniences and Dangers of re-admitting Kingſhip." This, as its title imports, was intended rather to expoſe the evils neceſſarily conſequent to the nation's relapſe into its old vaſſalage under kings, and to demonſtrate the preference of a republican to a monarchical government, than to propoſe any juſt model of a popular conſtitution. In this work, as well as in another, entitled "Brief Delineations, &c." he ſhews that he was fearful of an unqualified appeal to the people, and deems them incapable of determining with wiſdom for their own intereſts. It was, however, in vain to contend by pamphlets againſt the national inclination. The king returned in triumph, and Milton was diſcharged from his office, and for a time lay concealed in the houſe of a friend in St. Bartholomew's Cloſe, near Smithfield. Here his privacy from the world was perfect, till after the paſſing of the act of oblivion, in the exceptions of which he was not comprehended, aſcertained

tained his ſafety, and re-inſtated him in ſociety. To whom he was indebted, in this emergency, for his preſervation, is not known with certainty; but it ſeems probable that his life was ſaved principally by the earneſt and grateful interpoſition of ſir William D'Avenant, who had himſelf been formerly preſerved by the mediation of Milton, when ordered by parliament, in 1651, to trial, before the high court of juſtice. (See DAVENANT, WILLIAM.) Milton's name firſt occurs in the proceedings of the new government, in an addreſs from the houſe of commons to his majeſty, that he would iſſue his proclamation to call in Milton's "Defences of the People," and "Iconoclaſtes," together with a book of Goodwyn's, and cauſe them to be burnt by the common hangman, and alſo that the authors ſhould be proſecuted by the attorney-general. The books were accordingly burnt, but the authors were returned as having abſconded.

Now, reduced in his circumſtances, and under the diſcountenance of power, Milton removed to a private habitation, near his former reſidence in the city. But ſcarcely had he left his concealment when he was taken into cuſtody, by an order of the houſe of commons, from which he was diſmiſſed by paying his fees. In 1662, he was reſiding in Jewinſtreet, and from this he removed to a ſmall houſe in the Artillery-Walk, adjoining Bunhill Fields, where he continued during the remaining part of his life.

While living in Jewin-ſtreet, he married his third wife, Elizabeth Minſhull, the daughter of a gentleman of Cheſhire. He was now to reſume that poetical character which, for many years, had been ſunk in that of the controverſialiſt and politician. Undiſturbed by contentions and temporary topics, his powerful mind was left in repoſe, to meditate upon the great ideas which had indiſtinctly riſen to its view, and the reſult of its energies was the "Paradiſe Loſt." Much diſcuſſion has taken place concerning the original conception of this grand performance, but hitherto it has not been traced. It is certain that at the time when he firſt formed the reſolution of writing an epic poem, which was at an early period, he thought of ſome ſubject in the heroic times of Engliſh hiſtory; but the religious turn of his mind, and his aſſiduous ſtudy of the Hebrew ſcriptures, produced a final preference of a ſtory derived from the Old Teſtament. He compoſed in blank verſe, on account of the facility with which he could pour forth the ſtrains that ruſhed into his mind with the force and rapidity of inſpiration. His nephew Philips had the peruſal of it, from the very beginning, in parcels of ten, twenty, or thirty verſes at a time, which, being written by any perſon that was near at hand, probably wanted correction as to the orthography and pointing. This gentleman ſays, upon the authority of Milton, that his vein never happily flowed but from the autumnal equinox to the vernal, and that whatever he attempted at other times was never to his ſatisfaction. The exact time occupied in the compoſition of the Paradiſe Loſt is not known; it was finiſhed in 1665, when Milton, to avoid the contagion of the plague, through the kindneſs of his friend Elwood, a quaker, made a retreat to Chalfont, in Buckinghamſhire. It was firſt printed in 1667, in ten books, and he received from the bookſeller five pounds for the copyright, with a contingency of ten more, depending on the ſale of two other editions, and which he lived to receive. Theſe fifteen pounds, however, purchaſed only the bookſeller's right to the ſeveral editions for which they were paid, as Milton's widow ſold the irrevertible copyright of the work which had been bequeated to her, for eight pounds, to the ſame bookſeller, Samuel Simmons, who, almoſt immediately, diſpoſed of what was thus wholly transferred to him, for twenty-five pounds to Aylmer, another bookſeller, from whom it paſſed, at a conſiderable advance, to Jacob Tonſon. Much has been ſaid of the deplorably low price advanced for this immortal work, "but," ſays Dr. Symmons, "if we would regard ourſelves placed in the middle of the ſeventeenth century, and immerſed in all the party violence of that miſerable period, we ſhould rather be inclined to wonder at the venturous liberality of the bookſeller, who would give even this ſmall conſideration for the poem of a man living under the heavieſt frown of the times, in whom the *poet* had long been forgotton in the polemic, and who now tendered an experiment in verſe, of which it was impoſſible that the purchaſer ſhould be able to appreciate the value, or ſhould not be ſuſpicious of the danger. It is certain that the world was, at that period, incapable of doing it juſtice, and it was long before it took a ſecure place among thoſe productions which continually riſe in eſtimation, and are unlimited by time or place. Milton, conſcious of its merits, anticipated his final ſucceſs, and was, in that expectation, ſupported amidſt temporary diſcouragements." The thirteenth edition was printed, with a life by the author, in 1727, by Eliſha Fenton, who was a ſcholar, a poet, and a man of worth, though not without his failings. See FENTON.

In 1671 Milton publiſhed his "Paradiſe Regained," written upon the ſuggeſtion of his friend Elwood, who, on having read the Paradiſe Loſt in manuſcript, and being aſked by the author how he liked it, anſwered, in his quaint way, "Thou haſt ſaid much here on Paradiſe Loſt; but what haſt thou to ſay of Paradiſe Found?" When the latter poem was finiſhed, he put it into the hands of Elwood, ſaying, in a pleaſant tone, "this is owing to you, for you put it into my head by the queſtion you put to me at Chalfont." This was probably regarded by the author as the theological completion of the plan commenced in Paradiſe Loſt, and he viewed it with the partial fondneſs of an aged parent for his lateſt offspring. But in point of grandeur and invention its inferiority is extremely apparent, yet modern criticiſm has pronounced it by no means unworthy of the genius of Milton, allowance being made for the narrow compaſs of the ſubject, and his particular purpoſe in writing it.

At the ſame time that this was publiſhed, appeared his tragedy of "Sampſon Agoniſtes," compoſed upon the ancient model, and never intended for the ſtage. It cannot be ſaid to entitle the author to a place among thoſe dramatic writers who have diſtinguiſhed themſelves by the talent of moving the paſſions, or of delineating the character; but its moral and deſcriptive beauties are not inconſiderable. The impreſſion made on the author's mind by the ſufferings of his party, and by his own depreſſed ſtate, may be diſtinctly traced in ſome of its pathetic and animated ſtrains, ſuch as in thoſe that follow:

"God of our fathers! what is man!
That thou towards him with hand ſo various
Or, might I ſay, contrarious,
Temper'ſt thy providence through his ſhort courſe
Not evenly, as thou ruleſt
The angelic orders, and inferior creatures mute,
Irrational and brute.
Nor do I name of men the common rout,
That wand'ring looſe about
Grow up and periſh, as a ſummer fly.
Heads without name, no more remembered;
But ſuch as thou haſt ſolemnly elected,
With gifts and graces eminently adorned,
To ſome great work, thy glory,
And people's ſafety, which in part they effect:

Yet towards these, thus dignified, thou oft
Amidst their height of noon,
Chang'st thy countenance and thy hand, with no regard
Of highest favours past
From thee on them, or them to thee of service.
Not only dost thou degrade them, or remit
To life obscured, which were a fair dismission,
But throw'st them lower than thou didst exalt them high."

With the Sampson Agonistes Milton's poetical account closes; but writing was become so much a habit with him, that he was continually making additions to his works in prose. In 1672 he published "A System of Logic, after the Manner of Ramus;" and in the following year he ventured again in the field of polemics, with "A Treatise of true Religion, &c. and the best Means to prevent the Growth of Popery." The latter was become the dread of the nation, and Milton was among the most zealous of its opponents. The principle of toleration which he lays down is agreement in the sufficiency of the scriptures; and he denies it to the Papists, because they appeal to another authority. So imperfect was Milton's notion of religious liberty: it is, however, to his credit, that even in this he was contending with popery, avowedly patronized by the duke of York, and secretly countenanced by the king. "The danger," says his biographer, "which at this instant awakened the fears of Milton, became not long afterward so palpable and striking as to excite the nation, united in one great effort for its safety, to depose the Catholic bigot who occupied and abused the throne."

In the same year Milton published a second edition of his youthful poems, with his "Tractate on Education," in one volume, in which he included some pieces not comprehended in the edition of 1645. In 1674 he gave the world his familiar letters and some college exercises, the former with the title of "Epistolarum Familiarum Liber unus," and the latter with that of "Prolusiones quædam oratoriæ in Collegio Christi habitæ." The next exercise of his pen, was, it is said, to translate into English the declaration of the Poles, on their elevating John Sobieski to their elective throne, but Dr. Symmons is doubtful of the fact; thinking it much more certain that in some part of the same year he wrote "A brief History of Muscovy," which was published at a period of about eight years after his death. With this work terminated his literary labours; for the gout, which had for many years afflicted him, was now appointed to terminate his valuable life. He sunk tranquilly under an exhaustion of the vital powers on the eighth of November, 1674, when he had nearly completed his sixty-sixth year. His remains were carried from his house in Bunhill Fields to the church of St. Giles, Cripplegate, with a numerous and splendid attendance, and deposited in the chancel near those of his father. No monument marked the tomb of this great man, but one was erected to his memory in Westminster Abbey, in 1737, at the expence of Mr. Benson, one of the auditors of the imprest. His bust has since been placed in the church where he was interred, by the late Samuel Whitbread, esq.

In the July preceding his death, Milton had requested the attendance of his brother Christopher, and in his presence made a disposition of his property by a formal declaration of his will. This mode of testament, which is called *nuncupative*, was set aside, on a suit instituted by his daughters. By this nuncupative will he had given all his property to his widow, assigning nothing to his daughters, but their mother's portion, which had not yet been paid. On this account, and from exacting from his children some irksome services, such as reading to him in languages which they did not understand, which were necessities resulting from his blindness and his indigence, he has been branded as an unkind father. But the nuncupative will, discovered some years since, shews him to have been amiable, and injured in that private scene, in which alone he has generally been considered as liable to censure, or rather, perhaps, as not entitled to affection. In this will, published by Mr. Warton, and in the papers connected with it, we find the venerable parent complaining of "unkind children," as he calls them, for leaving and neglecting him because he was blind, and we see him compelled, by their injurious conduct, to appeal against them even to his servants. By the deposition of one of those servants, it is certain, that his complaints were not extorted by slight wrongs, or uttered by capricious passion on trivial provocations: that his children, with the exception of the youngest, would occasionally sell his books to the dunghill women, as the witness calls them. That these daughters were capable of combining with the maid-servant, and of advising her to cheat her master, and their father, in her marketings; and that one of them, Mary, on being told that her father was married, replied, "that was no news; but if she could hear of his death that would be something."

We cannot better conclude our account of Milton than in the words of his liberal and eloquent biographer, Dr. Symmons, to whose work we have already acknowledged our obligations, and to which we earnestly refer the readers of the New Cyclopedia, in order that they may see how much more is recorded of our illustrious countryman, than can possibly be compressed in this article. Milton, says Dr. Symmons, was "a man in whom were illustriously combined all the qualities that could adorn, or elevate the nature to which he belonged; a man, who at once possessed beauty of countenance, symmetry of form, elegance of manners, benevolence of temper, magnanimity and loftiness of soul, the brightest illumination of intellect, knowledge the most various and extended, virtue that never loitered in her career nor deviated from her course;—a man who, if he had been delegated as a representative of his species to one of the superior worlds, would have suggested a grand idea of the human race, as of beings affluent with moral and intellectual treasure, who were raised and distinguished in the universe as the favourites and heirs of heaven."

Of the three daughters of Milton, Anne, the eldest, married a master-builder, and died with her first child in her lying-in. Mary, the second, died in a single state: and Deborah, the youngest, married Abraham Clarke, a weaver in Spitalfields. She had seven sons and three daughters, but of these she left, at her decease, only Caleb, who marrying in the East Indies, had two sons whose history cannot be traced; and Elizabeth, who married Thomas Foster, of the same business with her father, and had by him three sons and four daughters, who all died young and without issue. Mrs. Foster died in poverty and distress, on the ninth of May, 1754, "and with her, it is highly probable, expired the last descendant of the immortal Milton." Symmons's Life of Milton. Biog. Brit. Gen. Biog. Bayle's Dict. Newton's Life of Milton, and Milton's Works.

MILTON, in *Geography*, a parish in the lower half hundred of Toltingtrough, lathe of Aylesford, and county of Kent, England, is situated 22 miles from London, and forms the east side of the town of Gravesend, with which it was incorporated in the reign of queen Elizabeth. Milton was returned, under the population act of 1801, as containing 322 houses, occupied by 2056 inhabitants. The church, which stands near the sea-shore, about a mile from Gravesend,

end, is built of flints and rag-stones: round it formerly stood the village of Milton, of which only one house is now left. See GRAVESEND.

MILTON, or *Middleton*, as anciently called, a market town and parish in the upper half hundred of Milton, in the lathe of Scray, and county of Kent, England, is of very remote antiquity, and formed part of the demesnes of the Saxon kings. It is situated 12 miles from Maidstone, and 39 from London, on the acclivity of a hill, about half a mile from the high road, sloping down to a small creek which falls into the river Swale, about two miles to the north-west. The vicinity of this town to the Swale, which separates the isle of Sheppey from the main land, was the cause of its being frequently plundered by the Danes during their piratical incursions in the ninth century. Here their veteran chief, Hastings, endeavoured to establish himself in the time of Alfred; and the remains of his encampment or fortress are still to be seen in the marshes of Kemsley Downs, between Milton church and the mouth of the creek. It consists of a high rampart and broad ditch, inclosing a square area, the sides of which are nearly parallel with the cardinal points of the compass. It measures about an hundred feet each way, and has obtained the name of Castle-Rough, from its having been long overgrown with trees and underwood.

Milton is supposed to have originally stood in the vicinity of its church, which is considerably to the north of the present town; and near it the Saxon kings had a palace, which was burnt, together with the town, by earl Godwyn, during his quarrel with Edward the Confessor, about the year 1052. Notwithstanding this, Milton appears to have been a place of considerable importance for the time, in the days of William the Conqueror, who, in the Domesday survey, is recorded to have then held the manor. It remained vested in the crown till the time of Charles I., though frequently granted for life, or a term of years, to different persons; particularly to several queens in dower, and others of the royal blood, who procured various privileges for the inhabitants. The grant of the market, which is kept on Saturdays, was obtained by queen Isabella, in the 13th of Edward II., together with the liberty of holding an annual fair for four days. The town is governed by a portreeve, who is chosen on St. James's day, by such inhabitants of the parish as pay the church and poor's rates. The market-house and shambles stand near the middle of the town; and at a small distance northward is the court-house, an old timber building, where manor courts and other public meetings are held; beneath it is the town gaol. The church is a spacious fabric, and consists of two aisles and two chancels, with a massive embattled tower at the west end, which, together with the south chancel, is composed of squared flints, laid in even rows. The east windows are large, and pointed: that of the north chancel is divided into five lights, with numerous crockets above; the other has four trefoil-headed lights below, with three ranges of quatrefoil lights above. The south chancel, which belonged to the ancient family of Northwood, contains a piscina, and several tombs and sepulchral memorials.

The number of houses in this parish, as returned in the year 1801, under the population act, was 322; that of inhabitants 2056. The Oyster Fishery furnishes the principal source of employment to the latter, and has done so for many centuries. In the reign of king John, the right of this fishery in the manor and hundred of Milton was granted to the abbey at Faversham, to which it appertained at the dissolution. It then was held by the crown till the reign of Charles I.: since that period it has been granted, with the manor, to various persons successively; and is now held on lease by a company called Free Dredgers, who are governed by their own particular rules or bye-laws, made, according to ancient custom, at the court-baron of the manor. The oysters produced within the limits of this fishery are in high estimation, under the name of "Native Miltons." There are four wharfs belonging to this town; and considerable quantities of corn, and other produce of the adjacent country are shipped here for the London markets, commodities of every kind being freighted in return.

In the western part of this parish and its vicinity is a large tract of woodland, called Chesnut Woods, from the great plenty of those trees which grow therein: and in a presentment made of the customs of Milton, in 1575, it is mentioned, that the occupiers of three mills holden of the manor, should gather yearly for the lord of it nine bushels of "chestenottes" in Chesnot Wood, or pay eighteen-pence by the year to the queen.

In the marshes in the north-west quarter of the parish is a decoy for wild fowl, of which great numbers are taken, and principally sold in the markets of the metropolis. Hasted's History of Kent, vol. vi. Beauties of England and Wales, vol. viii. by E. W. Brayley.

MILTON, a township of America, in Chittenden county, New York, on the E. side of lake Champlain, opposite to South Hero island; divided into nearly equal parts by La Moille river, which discharges itself into the lake in Colchester. The township contains 786 inhabitants.—Also, the "Uncataquisset" or "Unquaty" of the ancient Indians, a post-town in Norfolk county, Massachusetts, adjoining to Dorchester; 7 miles S. of Boston: containing 1143 inhabitants, three paper-mills, and a chocolate-mill. It was incorporated in 1662; and affords one of the finest prospects in America.—Also, a town in the county of Saratoga, in New York, containing 2123 inhabitants.—Also, a post-town in Cayuga county, New York, on the N.E. side of Cayuga lake, 40 miles N. of Tioga river; incorporated in 1794, and containing 3553 inhabitants.—Also, a small post-town in Albemarle county, Virginia, on the S.W. side of the Rivanna, about 80 miles N.W. by W. of Richmond.—Also, a post-town of Northumberland county, Pennsylvania; 219 miles from Washington.

MILTOWN-MALBAY, a post-town of Ireland, in the county of Clare. It is built on a bank running down to the sea, facing the south-west. There are here hot and cold baths, and it is much frequented as a bathing-place. It is 128 miles W.S.W. from Dublin. Carlisle. Wakefield.

MILTSCHIN, a town of Bohemia, in the circle of Bechin; 10 miles N. of Tabor.

MILTUS, in *Botany*, so called by Loureiro, from μίλτος, *red lead*, or *vermilion*, the whole plant being as that author says of a beautifully vivid red colour.—Loureir. Cochinch. 303.—Class and order, *Dodecandria Pentagynia*. Nat. Ord. *Caryophyllei*, Linn.? *Ficoideæ*, Juss.?

Gen. Ch. *Cal.* Perianth inferior, of five, ovate, concave, rugose, coloured, spreading, permanent segments. *Cor.* none. Nectary none. *Stam.* Filaments twelve, affixed to the bottom of the calyx, and shorter than it; anthers ovate, twin, erect. *Pist.* Germen superior, roundish, furrowed; style none; stigmas five, linear, bent backwards. *Peric.* Capsules five, approaching each other, ovate, rough, single-seeded. *Seed* ovate, shining.

Eff. Ch. Calyx of five leaves, inferior. Corolla none. Capsules five, single-seeded.

Obs. Loureiro remarks that the difference between this genus and *Glinus* is not very great.

1. M. *africana*. Loureir.—A native of dry places at Mozam-

Mozambique, an African iſland.—All that we know of this plant is from the deſcription of the above quoted author, which is as follows. *Stem* ſhrubby, much divided, about four feet long, ſlender, proſtrate, ſmooth. *Leaves* oblong, entire, obtuſe, thick or fleſhy, ſmooth, the leſſer ones nearly ſeſſile, oppoſite, and crowded. *Flower-ſtalks* ſimple, many together, lateral.—The ſtems, flowers, and leaves are all of a remarkably ſtriking red or vermilion colour.

MILVAGO, in *Ichthyology*, a name given by Geſner and ſome others, to a fiſh called by authors in general *milvus*, and by ſome *lucerna*, and the *flying-fiſh*. It is a ſpecies of the trigla, and is called, by Artedi, the trigla with a ſnout bifid at the extremity, and the ſide-lines forked near the tail.

MILVERTON, in *Geography*, a market-town in the hundred of the ſame name, and county of Somerſet, England. It is ſituated in a woody fertile country, pleaſingly diverſified with hill and valley, at the diſtance of eight miles from Taunton, and five from Wellington. The buildings are chiefly arranged in three irregular ſtreets; and the church ſtands on an eminence in the centre. This town was anciently a borough, the manor whereof is now veſted in the crown, and long poſſeſſed a good trade in ſerges and druggets. The manufacture of theſe articles, however, is now almoſt entirely dropped, but an extenſive manufactory of flannels has been eſtabliſhed of late years. Though entirely deprived of its privileges as a borough, it continues to be governed by a portreeve; and ſearchers and ſealers are ſtill annually appointed. The petty ſeſſions are held here. Friday is the market day, and there are two fairs during the year, one on the 25th of July, and another on the 10th of October. The population of the town and pariſh, according to the returns of 1801, was 1667 perſons.

Milverton is remarkable in hiſtory as having given name to John de Milverton, the Carmelite friar of Briſtol, who was celebrated for his zealous oppoſition to the doctrines of Wickliff, the firſt Engliſh reformer. Collinſon's Hiſtory and Antiquities of Somerſetſhire, vol. iii. 4to.

MILUS, μιλος, a name given by the Greek writers to a plant uſed in garlands, and ſometimes to a tree. Theophraſtus evidently uſes it as the name of a tree, and Crato as that of the garland-herb,

MILVUS, in *Ichthyology*. See FLYING-*Fiſh*, CALLYONIMUS *Lyra*, and DRAGONET.

MILVUS, in *Ornithology*, the name of the kite and buzzard. See FALCO.

MILWALDE, or MIDWALDE, in *Geography*, a town of Holland, in the department of Groningen; 8 miles S.S.E. of Dam.

MIMA, a town of Japan, in the iſland of Xicoco; 23 miles N.W. of Awa.

MIMANSA, in *Philoſophy*, is the name of a theory upheld by a numerous ſect of Hindoos, among whom, however, even of this ſchool, there is conſiderable diverſity of opinion. The word Mimanſa denotes, in Sanſcrit, the operations and concluſions of reaſon. The doctrines are divided into the firſt and ſecond. The firſt, called Purva Mimanſa, or Karma Mimanſa, is ſaid to have been promulgated by Jaimini in twelve chapters; it diſcuſſes queſtions of law, and moral and religious duties. (See JAIMINI.) The ſecond diviſion is called Vedanta, and is attributed to Vyaſa, who is ſometimes ſaid to have been the maſter or preceptor of Jaimini. (See VEDANTA and VYASA; and the articles MURTY and MYSTICAL *Poetry* for ſome of the tenets of the Vedanti ſchool.) Both the Mimanſas profeſs to ſhew what acts are pure or impure, what objects are to be deſired or avoided, and by what means the ſoul may aſcend to the Firſt Principle. Compared with the Grecian ſchools, the Mimanſa approaches neareſt the Platonic, having, indeed, many conſonant ideas and doctrines.

MIME. MIMUS, a term in the ancient comedy, ſignifying a *buffoon*, or *mimic*, who acted by poſtures ſuitable to the perſon or ſubject he repreſented.

The word comes from the Greek μιμος, *imitator;* formed of μιμεομαι, *I imitate*. The ſame comedians were alſo ſometimes called *pantomimes*, becauſe of their counterfeiting all manner of poſtures and geſtures.

According to Lucian (de Saltatione), a ſingle dancer, or mime, was able to expreſs all the incidents and ſentiments of a whole tragedy or epic poem by dumb ſigns, but ſtill to muſic, as in the ancient recitation, and in modern pantomime entertainments; though Ariſtotle expreſsly ſays, that dancers want neither poetry nor muſic; as by the aſſiſtance of meaſure and cadence only, they can imitate human manners, actions, and paſſions. See BATHYLLUS and *Pylades*.

Plutarch (Sympoſ. l. vii. probl. 8.) diſtinguiſhes two kinds of pantomime: one was called υποθεσιν, the ſubject of which was decent and decorous, as well as the manner of expreſſing it, and this nearly approached to comedy. Buffoonery and indecency conſtituted the other.

Sophron of Syracuſe, who flouriſhed in the time of Xerxes, was reputed the inventor of ſerious and decorous pantomime, replete with leſſons of morality. Plato had great pleaſure in the peruſal of the pantomimes of this author. But the Greek drama was ſcarcely formed, ere theatric writers and actors endeavoured more to divert the people by farces and repreſentations of vicious ſcenes and characters, than to improve their morals. Such were the means by which interludes on the ſtage were rendered agreeable to the people of Greece.

The Romans were equally pleaſed with pantomime, and formed of it a fourth ſpecies of drama. The actors diſtinguiſhed themſelves by a licentious imitation of the manners of the times, as appears by the following verſe of Ovid.

"Scribere ſi fas eſt imitantes turpia Mimos."

The mimes uſually acted without ſocks or ſtockings, whereas the three others wore ſocks or buſkins. Their heads were cloſe ſhaved, like the fools on mountebank ſtages; their dreſs, like that of our harlequins, was compoſed of bits of cloth or linen of different colours. This dreſs was called *Panniculus centumculus*. They ſometimes alſo appeared in magnificent ſenatorial robes of purple, to divert the people by the ridicule and contraſt of a ſenator's robe, and a ſhaved head and ſocks. Thus harlequin ſometimes on our ſtage is bedight in the garb of a gentleman. To this dreſs they joined licentious language, and all kinds of ridiculous poſtures, neglecting nothing that could amuſe the populace.

This kind of diverſion was given even at funerals, and the actors were called *Archimimes*. They went before the coffin, and deſcribed by their geſtures the actions and manners of the deceaſed: his virtues and vices, all were exhibited. The propenſity which the mimes had to raillery, inclined them rather to reveal their frailties, than paint their virtues, or any thing that could redound to their honour.

The applauſe given to the pieces of Plautus and Terence, did not prevent even the better ſort from admiring theſe pantomimic farces, when enlivened by wit, and not debaſed by indecency. The Mimographic poets of the Romans, who chiefly diſtinguiſhed themſelves in theſe dramatic exhibitions, were Sneius Mattius, Decimus Liberius, Publius Syrus, under Julius Cæſar; Philiſtion, under Auguſtus; Silo, under Tiberius; Virgilius Romanus, under Trajan;

and Marcus Marcellus, under Antoninus. But the most celebrated of all these were Decimus Liberius, and Publius Syrus. The first diverted Julius Cæsar so much that he made him a Roman knight, and conferred on him the privilege of wearing gold rings. He had such a wonderful talent at seizing ridicule, as to make every one dread his abilities. To this Cicero alludes, in writing to Trebutius, when he was in Britain with Julius Cæsar, telling him, that "if he is absent much longer inactive, he must expect to be attacked by the mime Liberius." Publius Syrus, however, gained so much more applause, that he retired to Puzzoli, where he consoled himself for his disgrace and the inconstancy of the people, and the transient state of human affairs, by the following admirable verse:

"Cecidi ego: vadet qui sequitur; laus est publica."

We with difficulty can imagine some of the grave and judicious reflections of Syrus to be extracted from the pantomimes which he exhibited on the stage: we should rather take them for maxims moulded on the sock or buskin. Encycl. 1st edit.

"Sweet Polhymnia, see advance,
Mother of the graceful dance:
She who taught th' ingenious art
Silent language to impart:
Signs for sentiment she found,
Eloquence without a sound:
Hands loquacious save her lungs,
All her limbs are speaking tongues."

MIMESIS, μιμησις, in *Rhetoric*, a figure, whereby the words, gestures, speech, actions, &c. of another person are imitated. See IMITATION.

MIMETES, in *Botany*, so called by Mr. Salisbury (according to Mr. Brown); apparently from μιμητης, *a mimic*, but we know not its particular application. Brown Tr. of Linn. Soc. v. 10. 105. Ait. Hort. Kew. ed. 2. v. 1. 197. (Hypophyllocarpodendron; Boerh. Lugd-Bat. ed. 2. v. 2. 205. t. 205, 206.)—Class and order, *Tetrandria Monogynia*. Nat. Ord. *Proteæ*, Juss.

Ess. Ch. Corolla regular, in four deep segments. Stamens in the concave tips of the segments. Nectary four scales beneath the germen. Nut superior, sessile, smooth. Common receptacle flat, many-flowered. Scales deciduous.

Eleven species of this genus, all from the Cape of Good Hope, are described by Mr. Brown, four of which, introduced by Mr. Masson between the years 1774 and 1795, are cultivated at Kew. They are all *shrubs*, of a stout tortuous habit; their *leaves* either entire, or furnished with callous teeth. *Flowers* aggregate, generally axillary, sometimes embraced by a sort of hooded leaf, sometimes terminal. *Involucrum* of many imbricated, membranous, rarely coriaceous, leaves, sometimes turned all to one side. *Pistils* longer than the corolla, which becomes flaccid after its expansion. *Stigma* cylindrical, slender, for the most part acute. In *M. capitulata* however, Mr. Brown's second species, it is thickened and conical at the summit. In *M. purpurea*, his last, the *receptacle* is destitute of scales.

The following examples are sufficient.

M. *hirta*. Hairy Mimetes. Br. n. 1. (Protea hirta; Linn. Mant. 188. Lepidocarpodendron foliis sericeis brevibus, confertissimè natis; fructu gracili longo; Boerh. Lugd-Bat. v. 2. 194. t. 194. Leucadendron hirtum; Linn. Sp. Pl. 136.)—Involucrum equilateral, coloured, pointed, eight or ten-flowered. Stigma awl-shaped. Corolla feathery. Leaves acute, entire.—Grows in moist situations. Flowers in the greenhouse from June to August. A bushy *shrub*, with numerous, imbricated, silky *leaves*. *Flowers* reddish.

M. *cucullata*. Three-toothed Mimetes. Br. n. 4. (Protea cucullata; Linn. Mant. 189. Leucadendros africana, sive Scolymocephalos angustiori folio, apicibus tridentatis; Pluk. Almagest. 212. t. 304. f. 6. Hypophyllocarpodendron; Boerh. Lugd-Bat. 206. t. 206. Leucadendron cucullatum; Linn. Sp. Pl. 136.)—Involucrum unequally directed, pointed, nearly smooth. Leaves linear-oblong, three-toothed, smooth: the floral ones dilated below, with recurved margins. Stigma awl-shaped, very acute.—Native of low marshy places, a mile and a half from the Cape. The *leaves* are crowded, tipped with three blunt red teeth. *Flowers* feathery, their long prominent styles reaching far beyond the corolla.

M. *thymelæoides*. Daphne-leaved Mimetes. Br. n. 8. (Leucadendron thymelæoides; Berg. Cap. 19.)—Stem erect. Leaves oval, obtuse, downy, small. Flowers terminal, rather clustered. Style downy below the middle.—*Stem* shrubby, with round, purplish, downy, upright, compound branches. *Leaves* about half an inch long, crowded, spreading, downy, finely fringed; the lower ones becoming smooth. *Flowers* sessile, the size of a small cherry, mostly in pairs. *Leaves* of the *involucrum* elliptical, inclining to lanceolate. *Scales* of the *receptacle* all over densely woolly. *Corolla* silky. *Stigma* rather acute. Of this we find no figure, nor is any thing said of the colour of the flowers.

MIMIZAN, in *Geography*, a town of France, in the department of the Landes, and chief place of a canton, in the district of Mont-de-Marsan. The place contains 413, and the canton 2821 inhabitants, on a territory of 415 kiliometres, in 6 communes.

MIMNERMUS, in *Biography*, a Greek elegiac poet, a native of Colophon, who flourished in the sixth century before Christ, was contemporary with Solon. He was the inventor of the pentameter verse: his compositions were of the elegiac kind, according to the ancient acceptation of the word, which by no means confined it to mournful topics. His talents led him to treat of very different subjects: he was a votary of love and pleasure, and is so distinguished by a line in Propertius:

"Plus in amore valet Mimnermi versus Homero:"

Horace likewise refers to him in a similar connection, though in much stronger terms:

"Si, Mimnermus uti censet, sine amore jocisque
Nil est jocundum, vivas in amore jocisque."

"If, as wise Mimnermus said,
Life unblest with love and joy,
Ranks us with the senseless dead,
Let these gifts each hour employ."

His manners are thought to have corresponded with his philosophy. Of his poems only a few remain, which have been published with the "Novem Feminarum Græcarum Carmina," by Ursinus in 1568, and by Wolfius in 1734.

Mimnermus, according to Plutarch, has rendered himself remarkable, by playing upon the flute a nome called *Cradias*, which, Hesychius tells us, was an air for that instrument usually performed at Athens, during the march, or procession, of the victims of expiation. His elegies, of which only a few fragments are preserved, were so much admired in antiquity, that Horace preferred them to those of Callimachus. (Epist. lib. ii. ep. ii. v. 101.) He composed a poem of this kind, as we learn from Pausanias, upon the battle

battle fought between the people of Smyrna, and the Lydians, under Gyges. He likewife was author of a poem in elegiac verfe, quoted by Strabo (lib. xiv. p. 633, 634. ed. Par.), which he entitled "Nanno," and in which we may fuppofe he chiefly celebrated a young and beautiful girl of that name, who, according to Athenæus, was a player on the flute, with whom he was enamoured in his old age. Horace bears teftimony to his abilities in defcribing that feducing paffion; alluding to fome much admired lines of this Greek poet, which have been preferved by Stobæus:

"Τις δε βιος, τι δε τερπον ατερ χρυσης Ἀφροδιτης, &c.
What is life and all its pride,
If love and pleafure be denied?
Snatch, fnatch me hence, ye Fates, whene'er
The am'rous blifs I ceafe to fhare.
Oh let us crop each fragrant flow'r,
While youth and vigour give us pow'r;
For frozen age will foon deftroy
The force to give or take a joy;
And then a prey to pain and care,
Detefted by the young and fair,
The fun's bleft beams will hateful grow,
And only fhine on fcenes of woe!"

MIMOSA, in *Botany*, fo called from *mimus*, an actor or imitator. *Herba*, or *arbor*, *mimofa*, meaning a fort of imitative plant, whofe motions mimic the fenfibility of animal life. The Senfitive Plant.—Linn. Gen. 548. Schreb. 734. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 1. v. 3. 438. Juff. 346. Tourn. t. 375. Lamarck Illuftr. t. 846. Gærtn. t. 155. (Acacia; Tourn. t. 375. Inga; Plum. Gen. 13. t. 19.)—Clafs and order, *Polygamia Monoecia*. Nat. Ord. *Lomentaceæ*, Linn. *Leguminofæ*, Juff.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, very fmall, with five teeth. *Cor.* of one petal, funnel-fhaped, regular, more or lefs deeply five-cleft, fometimes wanting. *Stam.* Filaments capillary, very long, ufually very numerous, fometimes united below; anthers incumbent, fometimes partially abortive. *Pift.* Germen fuperior, oblong; ftyle thread-fhaped, fhorter than the ftamens; ftigma abrupt. *Peric.* Legume long, with numerous tranfverfe partitions. *Seeds* numerous, of various roundifh fhapes.

Obf. Many of the flowers are male, foon falling off; others are female; others furnifhed with both ftamens and piftil, each occafionally more or lefs imperfect; all which circumftances vary in different fpecies.

Mimofa of Tournefort has a jointed legume, and apparently fenfitive, or irritable, leaves.

Acacia of the fame author has a cylindrical legume; the leaves not moving when touched.

Inga of Plumier has a flefhy legume.

No part of the fructification in the genus before us is conftant.

The *calyx*, ufually five-toothed, in fome fpecies is three-cleft.

Corolla ufually of one petal, in fome is of five, in others altogether wanting.

Stamens in fome very numerous, in others ten, five, or four; in fome monadelphous; in fome abortive.

Pericarp a legume, but in fome fpecies flefhy, in others membranous; in fome winged, in others jointed; in fome compofed of four valves.

Seeds of a different fhape in different fpecies.

Eff. Ch. Calyx five-toothed. Corolla regular, five-cleft. Stamens five or more. Piftil one. Legume fuperior, with many cells. Some male flowers.

This vaft genus labours under great uncertainty of character, as appears by the above remarks of Linnæus. For fome of its near allies, fee GLEDITSIA and GYMNOCLADUS. Juffieu has hinted at the propriety of dividing it, according to the number of ftamens, and the ftructure of the legume. This Willdenow has attempted; but to accomplifh it fully, an examination of numerous fpecies in a living ftate would be neceffary; and as moft of them are tropical fhrubs or trees, rarely feen, and ftill more rarely flowering or fruiting, in the gardens of Europe, this defirable end is not at prefent attainable. The foliage is of the pinnate kind, more or lefs compound; in fome irritable, and folding up when touched or fhaken; in all, we believe, drooping and folding together in the dark. A number of paradoxical fpecies as to habit, uniform enough in fructification, have been found in the fouthern hemifphere. Thefe have only a few pinnated leaves when young, bearing fubfequently nothing but fimple, vertical, oblong or linear, dilated and defoliated footftalks, which have all the appearance of leaves, and doubtlefs perform the functions of fuch. A few fpecies bear, in their adult ftate, nothing but angular thorns, ftill lefs like foliage. Yet we know not of any difference in the fructification, between thefe and various uniformly pinnate kinds of *Mimofa*, found likewife in New Holland, which have the habit as well as characters of numerous fpecies heretofore defcribed, natives of Africa, or of the Eaft or Weft Indies.

It is difficult to form a calculation of the fpecies of *Mimofa*. The 14th edition of *Syft. Veg.* contains fifty-three only, fcarcely any of the New Holland ones being there included. Of thefe laft five are figured by Labillardiere, and feveral in Curtis and Andrews; two in Smith's Specimen of the Botany of New Holland. Much more information may be expected from Mr. Brown on this fubject.

The genus is for the prefent fubdivided, by the compofition of its leaves, into feveral fections, of which we fhall offer a few examples.—Some fpecies are furnifhed with thorns, others not.—The roots in general have a ftrong alliaceous fcent.

Section 1. Leaves fimply pinnate.

M. *Inga.* Sweet-bean Mimofa. Linn. Sp. Pl. 1498. (Inga flore albo fimbriato, fructu dulci; Plum. Ic. 14. t. 25. Arbor fylveftris, Belgis *Zoete-boontjes*; Merian. Surin. 51. t. 51.)—Thorns none. Leaves pinnate, of five pair of ovate leaflets, with a jointed bordered ftalk.—Native of South America. A *tree*, with broad, fmooth, ferrated, ribbed *leaflets*. *Flowers* corymbofe, large, green, with many united *ftamens*. *Legumes* often a foot long, tortuous and furrowed; the *feeds* lodged in fweet eatable pulp. The laft circumftance fhews an affinity to *Ceratonia*.

Section 2. Footftalk divided, bearing two or three diftinct pair of leaves.

M. *bigemina.* Pointed Twin-leaved Mimofa. Linn. Sp. Pl. 1499. (Katou-Conna; Rheede Hort. Malab. v. 6. 21. t. 12.)—Thorns none. Leaves pointed, in a double pair. —Native of Malabar. A tall *tree*, with a fœtid though infipid *root*. *Leaflets* ovate, entire, three inches long, fmooth. *Flowers* fmall, white, monadelphous. *Legumes* fpiral, compreffed, their polifhed globofe feeds fufpended by a thread.

Section 3. Leaves conjugate, confifting of two pinnate leaves, on a common footftalk.

M. *fenfitiva.* Broad-leaved Senfitive plant. Linn. Sp. Pl. 1501. (M. fpinofa prima, &c.; Breyn. Cent. t. 16.)—Prickly. Leaves conjugate; each with two pair of half-ovate leaflets; the innermoft lower one very fmall. Petals none.—Native of the Brafils; and of hedges at Lima. This very interefting plant, whofe fenfibility, on account of the large fize of its leaflets, is fo ftriking, was formerly introduced by Houfton into the gardens of England, but is

 no

no longer to be met with. We have seen it at Turin The *footstalks* have a large succulent knot at their base, which appears the chief seat of irritability, and on which the *leaflets* turn, as on a hinge, at the slightest touch. The largest *leaflets* are near an inch and half long; all semi-ovate, bristly beneath. *Flowers* in globular dense heads, on simple axillary stalks. *Legumes* flat, radiating from a centre, bristly and downy.

M. *pudica*. Common Sensitive plant, or Humble plant. Linn. Sp. Pl. 1501. (M. spinosa tertia, &c.; Breyn. Cent. t. 18.)—Prickly. Leaves somewhat fingered, pinnate. Stem hispid. Legumes jointed, fringed.—Native of South America, and of the isle of Bourbon.—This is naturally shrubby, though raised as an annual in our stoves, where it is kept for the sake of its wonderful sensibility. The *leaflets* are very numerous, oblong, obliquely elliptical, rather bristly. If one of them be cut, the shock is communicated, with gradually accelerated rapidity, along the footstalks, to the rest, who all fold softly together, after which the common and partial stalks droop and become pendulous. These have the same tumid pulpy texture at their base as the former. (See LEAVES.) The *flowers* are pale purple, in round, axillary, stalked tufts. *Legumes* near an inch long, composed of three or four orbicular fringed joints.

Section 4. Leaves at least doubly pinnate.

M. *glauca*. Glaucous Mimosa. Linn. Sp. Pl. 1504. (Acacia non spinosa, flore albo, foliorum pinnis latiusculis glabris, siliquis longis planis; Trew. Ehret. 9. t. 36.)—Thorns none. Leaves doubly pinnate, in six principal divisions, and very numerous partial ones. Legumes long, lanceolate, flat.—Native of South America. Cultivated in our stoves, from the time of king William. The delicate glaucous *foliage* is very handsome. *Flowers* white, decandrous, in globular stalked axillary heads, either solitary or in pairs. *Legumes* a span long, acute at each end.

M. *farnesiana*. Sweet-scented Yellow Mimosa. Linn. Sp. Pl. 1506. Acacia indica farnesiana; Ald. Hort. Farnes. 3. t. 2, 4.)—Spines in the place of stipulas, awl-shaped, distinct. Leaves doubly pinnate, in eight principal divisions, and numerous partial ones. Legumes tumid, curved.—Native of Hispaniola. First raised at Rome in 1611. It is scarcely now seen in our stoves. The *leaflets* are small and smooth. *Flowers* deep yellow, in stalked heads, (not sessile as Linnæus says,) valuable for their exquisite fragrance, which excels almost every thing of the kind.

M. *nilotica*. Egyptian Mimosa. Linn. Sp. Pl. 1506. Woodv. Med. Bot. t. 67.—Spines in the place of stipulas, needle-shaped, divaricated. Leaves doubly pinnate, with glands on their common stalk. Heads of flowers on downy stalks, several together.—Native of the Levant. Linnæus mistook this for the true Gum Arabic plant, whose legumes were pasted along with his specimens, and which is another species of *Mimosa*, not well known to us. At least this was the opinion of the late learned Mr. Dryander. Several species, akin to these, produce different sorts of Gum Arabic, or Gum Senegal.

M. *pubescens*. Hairy-stemmed Mimosa. Vent. Hort. Malm. t. 21. Curt. Mag. t. 1263.—Thorns none. Branches hairy. Leaves doubly pinnate, without glands. Leaflets numerous, crowded. Heads of flowers numerous, in long axillary clusters.—Native of New South Wales. A beautiful and fragrant acquisition to the conservatory, remarkable for its rich downy *foliage*, and copious golden *flowers*.

Of the New Holland species with denudated footstalks, assuming the aspect of simple leaves, and which make a fifth most distinct *section*, examples are

M. *myrtifolia*. Curt. Mag. t. 302.

M. *strilla*. Ibid. t. 1121. Andr. Repos. t. 53.

Of those which bear spines only.

M. *verticillata*. Curt. Mag. t. 110.

MIMOSA, in *Gardening*, comprehends plants of the shrubby and under shrubby kinds, of which the species cultivated are, the double-flowered annual sensitive mimosa (M. plena); the lively mimosa (M. viva); the quadrivalve-podded humble mimosa (M. quadrivalris); the sensitive plant (M. sensitiva); the humble plant (M. pudica); the long-twigged mimosa (M. virgata); the spotted-stalked mimosa (M. punctata); the slothful mimosa (M. pernambucana); the hairy-podded mimosa (M. asperata); the slow American sensitive plant (M. pigra); the glaucous mimosa (M. glauca); the horned mimosa, or cuckold tree (M. cornigera); the horrid mimosa (M. horrida); the Farnesian mimosa, or sponge tree (M. farnesiana); the Egyptian mimosa (M. nilotica); the whorled-leaved mimosa (M. verticillata); the rough tree mimosa (M. arborea); the Lebbeck, or Egyptian mimosa (M. lebbeck); the broad-podded mimosa (M. latisiliqua); the tamarind-leaved American mimosa (M. tamarindifolia); the spiral mimosa (M. circinalis); the small-leaved mimosa (M. pennata); the broad-leaved mimosa (M. latifolia); the purple mimosa, or soldier wood (M. purpurea); the netted mimosa (M. reticulata); the climbing mimosa (M. scandens); the myrtle-leaved mimosa (M. myrtifolia); and the sweet-scented mimosa (M. suaveolens.)

Method of Culture.—These plants are all capable of being increased by seed, and some of the sensitive kinds by layers and cuttings, but the first is by much the best method. The seed procured from the nurseries or seed-shops should be sown in pots of light rich mould early in the spring, covering it with fine earth, a quarter of an inch deep, and plunging the pots in the hot-bed; if in a common hot-bed under frames and glasses, managing them nearly in the manner of tender annuals, and when in a bark-bed in the stove little trouble is required. But moderate sprinklings of water should be given; and when the plants are two or three inches high, they should be planted out singly into small pots, preserving the earth to their roots, replunging them in the hot-bed, &c. giving water and occasional shade till they are well rooted, repeating the waterings frequently. The plants should afterwards be continued either in the hot-bed under glasses, or plunged in the bark-bed of the stove, to facilitate their growth, preserve them in vigour, and increase the sensibility of the sensitive kinds; admitting fresh air pretty freely.

It is proper that the perennial sorts, both shrubby and herbaceous, should be kept in the stove all winter, and principally the year round. And they must be frequently removed into larger pots to prevent the roots from getting through the pots, which they are apt to do, and by that means are often destroyed.

The Acacia kinds are the most tender, requiring the stove almost constantly, except a little in the heat of summer, when they must be placed in a warm situation. They should always have a bark hot-bed, and be put in very small pots filled with sandy mould, the heat of the stove being kept up to above temperate; as the leaves of some of them are shed, they have the appearance of being dried when that is not the case.

Where there is not the convenience of a stove, those who are curious to have the plants, may have them in summer, by the aid of a common dung, or tan-bark hot-bed, under frames and glasses, though not in winter; by raising some of the annual, or any of the other kinds, by seed in spring, in a hot-bed under a frame, &c. keeping up the heat of the bed until the middle of June, and continuing the plants always

always under the frame, raising one end of the lights a little, occasionally, in warm days, to admit fresh air; and as they rise in height, raise the frame at bottom, to allow them full room to grow. About Midsummer, or soon after, some of the low spreading kinds may likewise be turned out with balls, or plunged in their pots into a warm sunny border, and covered with large hand-glasses, which may be lifted off occasionally just to view the plants. By these methods, the plants may be preserved through the summer in their sensitive quality, though not in equal perfection to those in stoves; nor can they be preserved alive in winter out of the stove.

The shrubby kinds that afford spreading branches may be laid any time in summer, in pots plunged in the bark-bed, where they then take root, and are ready to pot off singly in the autumnal season.

The sensitive and humble sorts often branch out profusely, so as to furnish plenty of young shoots for cuttings, which should be planted in pots in the summer season, plunging them in the bark-bed, whereby they often readily take root, and form good plants.

These modes should, however, only be practised when seed cannot be procured.

The general culture of all the species is afterwards to keep them always in pots placed in the stove, being plunged occasionally in the bark-bed, especially the spreading sensitive kinds, frequent waterings being given in summer and winter, but considerably the most in the summer season; shifting them into larger pots as they increase in growth. And although most of the sorts will live in the open air in the heat of summer, it is the best practice to expose them but sparingly.

The fourth and fifth sorts are held in high estimation on account of the singular sensibility lodged in their leaves; which, in consequence of being touched or shaken, either by the hand, a stick, or the least wind blowing upon them, the wings of the leaves suddenly close, and the footstalks fall down. The period of time which the leaves, &c. require to recover themselves, after falling from any irritation, are according to the vigour of the plant, the hour of the day, the sereneness of the atmosphere, and the temperature of the heat of the stove, &c. being often from ten or fifteen minutes to an hour or more.

The plants also, every evening, naturally contract themselves, and expand again in the morning. They are all ornamental and curious in their nature.

MIMULUS, in *Botany*, a name borrowed from Pliny, whose plant however could not be the same with Linnæus's American genus. The word is derived from *Mimus*, a masked actor among the Romans, and alludes to the form of the corolla.—Linn. Gen. 323. Schreb. 423. Willd. Sp. Pl. v. 3. 360. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 1. v. 2. 361. Juss. 122. Brown Prodr. Nov. Holl. v. 1. 439. Lamarck Illustr. t. 523. Gærtn. t. 53. (Cynorrhynchium; Mitch. 3.)—Class and order, *Didynamia Angiospermia*. Nat. Ord. *Personatæ*, Linn. *Scrophulariæ*, Juss. and Brown.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, oblong, prismatic, five-sided, five-folded, five-toothed, nearly equal, permanent. *Cor.* of one petal, ringent; tube the length of the calyx; limb two-lipped; the upper erect, cloven, rounded, reflexed at the sides; the lower broader, with three rounded segments, the middle one smallest; palate convex, cloven, protruded from the base of the lower lip. *Stam.* Filaments four, thread-shaped, within the throat, two of them shorter; anthers cloven, kidney-shaped. *Pist.* Germen superior, conical; style thread-shaped, the length of the stamens; stigma ovate, cloven, compressed. *Peric.* Capsule oval, of two cells, opening transversely at the top; partition membranous, contrary to the valves. *Seeds* numerous, small. *Recept.* oblong, affixed to the partition on each side.

Eff. Ch. Calyx five-toothed, prismatic. Corolla ringent; the upper lip folded back at its sides. Capsule with two cells and many seeds.

1. M. *ringens.* Oblong-leaved Monkey-flower. Linn. Sp. Pl. 884. Curt. Mag. t. 283.—Stem erect. Leaves oblong, linear, sessile.—A native of Virginia and Canada, growing in wet places, and flowering in the summer.—*Root* perennial. *Stem* annual, about two feet high, square, jointed, occasionally branched at the base. *Leaves* two at each joint of the stem, opposite, serrated, acutely pointed. *Flowers* solitary, on long, opposite stalks which spring from the joints of the upper part of the stem; they are of a delicate violet colour and without smell. *Seeds* pale straw-coloured, and tipped at each end, according to Gærtner, with a small, prominent, reddish point.—This plant was referred to several different genera by old authors. Linnæus first called it *Mimulus*, assigning the following explanation of the term in his *Philosophia Botanica*, "MIMULUS, *mimus personatus*."

2. M. *glutinosus.* Orange Monkey-flower. Willd. n. 2. (M. aurantiacus; Curt. Mag. t. 354.)—Stem erect, shrubby, round. Leaves sessile, ovato-lanceolate, rather obtuse.—Gathered by Mr. Archibald Menzies in California. It flowers in our greenhouses, to which it is extremely ornamental, during the greatest part of the summer.—*Stem* nearly three feet high, much branched, jointed, viscid. *Leaves* opposite, sessile, serrated, much blunter than in the last species, revolute, smooth above, veiny. *Flowers* very showy, twice as large as those of M. *ringens*, of a beautiful orange colour, on solitary stalks, two at each joint of the stem. The whole plant is glutinous.

3. M. *alatus.* Oval-leaved Monkey-flower. Willd. n. 3. Vahl. Symb. p. 2. 72.—Stem erect, square, winged. Leaves oval, on stalks. A native of North America. It flowers at Kew in July and August.—We know of no figure of this plant, which very much resembles the first species in appearance.—*Stem* simple, smooth, slightly branched at the top, winged with a membrane at each angle. *Leaves* oval, veined, unequally serrated. *Flowers* on axillary, solitary, opposite, square stalks, swelling upwards. *Corolla* but little exceeding the calyx in length.

4. M. *luteus.* Yellow Monkey-flower. Linn. Sp. Pl. 884. Curt. Mag. t. 1501. (Gratiola foliis subrotundi nervosis, floribus luteis; Feuill. Peruv. v. 2. 745. t. 54.)—Stem creeping. Leaves roundish or ovate, on short stalks embracing the stem.—Found originally at Chili by Feuilleé; and lately in California, and at Nootka, by Mr. Archibald Menzies. Dr. Langsdorff also, one of the Russian embassy to China, found it at one of the Fox Islands.—*Stems* creeping in the lower part, angular, thick at the base, the flowering branches ascending. *Leaves* opposite, at the joints of the stem. *Flowers* on solitary stalks, two at each joint, of a bright yellow colour, their throat spotted with red. The whole plant is massy and magnificent, being thickly set with foliage and flowers.

5. M. *gracilis.* Slender Monkey-flower. Brown Prodr. Nov. Holl. v. 1. 439.—Very smooth, erect. Leaves oblong, somewhat linear, obtuse, nearly entire. Flower-stalks elongated.—Found by Mr. R. Brown near Port Jackson, as well as in the tropical part of New Holland.

6. M. *repens.* Creeping Monkey-flower. Brown Prodr. Nov. Holl. v. 1. 439.—Smooth, creeping. Branches ascending. Leaves oval, obtuse. Flower-stalks shorter than the

the calyx.—Native of New South Wales and Van Diemen's Land. *Brown.*

Mimulus, in *Gardening*, comprehends plants of the herbaceous flowery ornamental kind, of which the species cultivated are, the oblong-leaved monkey-flower (M. ringens); the wing stalked mimulus (M. alatus); and the orange monkey-flower (M. aurantiacus).

Method of Culture.—This is a plant which is very hardy in respect to cold, but should have a loamy soft soil, rather moist than dry, and not too much exposed to the sun.

In the first sort the plants may be increased by parting the roots, not too small, and planting them in autumn, or the early spring, but the former is the better season. It may also be raised by seeds, which should be sown in autumn, soon after they become perfectly ripe, on a border exposed to the morning sun. And the second sort may likewise be increased in the same manner.

With respect to the third kind, it is best propagated by planting cuttings of the young shoots or branches in the early spring in pots of fresh mould, plunging them in a mild hot-bed, being afterwards managed as the other sorts.

The first and the second sort may be introduced in the borders and clumps, and the third among other potted plants of the less tender kinds.

MIMUSOPS, in *Botany*, so called by Linnæus, who seems to have taken the idea of the name from Hermann's *Museum Zeylanicum*, p. 23. This tree is there called *Munamal*, *Muna* being said to signify the human face in the Cingalese language, because the flowers have somewhat of the resemblance of a human face, of which however we seek in vain for any trace in the plates of authors. As this author says the highly fragrant flowers are worn by young women to adorn the neck and head, may not the above appellation allude to their being used as an ornament for the face?—Linn. Gen. 190. Schreb. 252. Willd. Sp. Pl. v. 2. 325. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 349. Brown Prodr. Nov. Holl. v. 1. 530. Juss. 152. Lamarck Illustr. t. 300. Gærtn. t. 42. (Imbricaria; Juss. 152. Binectaria; Forsk.)—Class and order, *Octandria Monogynia.* Nat. Ord. *Holoraceæ*, Linn. *Sapotæ*, Juss. and Brown.

Gen. Ch. *Cal.* Perianth inferior, of eight deep segments in two rows, ovate, acute, coriaceous, permanent. *Cor.* of one petal, wheel-shaped, its segments in two rows, numerous, oblong, entire or divided, the length of the calyx. *Stam.* Filaments eight, awl-shaped, hairy, very short; anthers oblong, erect, as long as the calyx. *Pist.* Germen superior, roundish, rough; style cylindrical, smooth, the length of the corolla; stigma simple, very blunt. *Peric.* Berry of one cell, oval, pointed. *Seeds* one or two, oval, hard.

Obs. Mr. Brown describes an equal number of abortive filaments, alternate with the stamens, and the calyx as in some instances six-cleft. The germen has originally six or eight cells. Dr. Roxburgh also found the abortive filaments.

Ess. Ch. Calyx of eight segments in two rows. Corolla of one petal, in numerous segments, in a double row. Berry with one or two seeds.

1. M. *Elengi.* Linn. Sp. Pl. 497. Fl. Zeyl. 57. Roxb. Coromandel. v. 1. t. 14. (Elengi; Rheed. Hort. Mal. v. 1. 33. t. 20.)—Leaves alternate, remote, ovate, pointed.—A native of sandy places in the East Indies, and much cultivated for its highly fragrant blossoms, which expand chiefly in the hot season. These flowers are sacred to the Hindoo gods. The *root* of this tree is thick and fixed deeply in the earth. *Trunk* branched, many feet in circumference, covered with a brown and smoothish *bark.* *Leaves* alternate, on short stalks, somewhat drooping, waved, very firm, of a deep shining green, three or four inches long and about half as broad. *Flowers* stalked, two or three at the base of the leaf-stalks, slightly drooping, white or yellowish, very fragrant. *Seed* compressed, shining, chesnut coloured. The wood of this plant is said by Rheede to be remarkaby durable in water, but on the contrary very subject to become rotten if exposed to the air.

2. M. *parvifolia.* Brown Prodr. Nov. Holl. v. 1. 531.—A native of the tropical part of New Holland.—Leaves oval, pointed, smooth on both sides. Flower-stalks one to three, downy, longer than the downy leaf-stalks.—All that we know of this species is from its discoverer Mr. Brown, who says that it is very nearly allied to *M. Elengi*, but that the flower-stalks of the latter are more numerous, and shorter than the leaf-stalks, which are smoothish.

3. M. *Kauki.* Linn. Sp. Pl. 497. Fl. Zeyl. 57. Brown Prodr. Nov. Holl. v. 1. 531. Willd. n. 3. (Metrosideros macassarensis; Rumph. Amboin. v. 3. t. 8.)—Leaves on shortish stalks, crowded together at the ends of the branches, ovate, obtuse, silvery beneath.—A native of the East Indies and Arabia, as well as of the tropical parts of New Holland.—The *branches* of this tree are thicker than those of *M. Elengi*, having small scars scattered all over them. *Leaves* crowded together at the ends of the branches. *Flowers* very similar in structure, but larger than those of the first species.—The *berries* are eaten in their crude state by the natives of Macassar, and are said to have a pleasant flavour. The foliage is extremely ornamental, and the wood useful for the handles of tools and such purposes.—Mr. Brown hazards a doubt whether the *Manil-kara*, Rheed. Hort. Mal. v. 4. t. 25, can possibly be cited as a synonym of *M. Kauki* on account of its six-cleft flowers, though they agree precisely as to foliage.

4. M. *hexandra.* Willd. n. 2. Roxb. Coromandel. v. 1. t. 15.—Leaves alternate, obovate, emarginate. Flowers hexandrous.—Native of the East Indies, in the mountainous, uncultivated parts of the Circars. It flowers towards the beginning of the wet season.—The *trunk* of this large tree is erect, and much branched, with an ash-coloured *bark.* *Leaves* alternate, on stalks, wedge-shaped, deeply emarginate, very hard, of a deep shining green, three to five inches long, and about a third as broad. *Flowers* several together, axillary, stalked, variegated with white, lilac and yellow. *Berry* the size and shape of an olive.

5. M. *Imbricaria.* Willd. n. 5. (Imbricaria; Juss. et Lamarck Illustr. t. 300.)—Leaves crowded together at the ends of the branches, ovate, obtuse, retuse. Berry with many seeds.—A native of the Isle of Bourbon.—We are inclined to believe that this is very near *M. Kauki*, or perhaps a variety of that species, although we have adopted it on the authority of Willdenow.

MINA, μνᾶ. The Attic mina was either nummary or ponderal; in the first acceptation it was the sixtieth part of a talent, and contained a hundred drachmæ, or denarii, amounting in our coin (if we allow nine-pence for the value of the drachma), to three pounds fifteen shillings. The mina of Athens contained, at first, seventy-three drachmæ; but Solon gave it a hundred. Mina, considered as a weight, was also divided into a hundred drachmæ. It was regarded as a pound weight of the country to which it belonged; and the Attic pound is considered as the same with the Roman, and very nearly one pound troy. See Drachm.

Mina was also a medicinal weight, consisting of twelve Roman ounces; but as in coinage eight drachms were allowed to the ounce, the mina, or pound, contained ninety-six, *i. e.* the

the pound in weight consisted in fact of ninety-six drachmæ, while the pound in tale had a hundred. Dr. Arbuthnot asserts that the common Attic pound contained sixteen ounces, and was equal to our pound avoirdupoise; but this assertion seems to be contradicted by ancient testimony. See COIN and WEIGHT.

MINA, or *Mine*, in *Commerce*, a corn measure of Genoa, equal to 8 quarte, or 96 gombette: 100 English quarters = 233 mina, and a mondino of salt = 8 mine. See MEASURE.

MINA, in *Geography*, a town of Algiers; 50 miles S.E. of Oran.—Also, a river of Algiers, which runs into the Sheliff, 12 miles E. of Mustygannim.

MINA, or *Minau*, a sea-port town of Persia, in the province of Kerman, at the entrance of the gulf of Persia, at the mouth of the river Ibrahim, the air of which is insalubrious. It is surrounded with walls, and defended by towers, and has medicinal springs and baths; 42 miles W. of Ormus. N. lat. 27° 8′. E. long. 56° 40′.

MINADA, a town of Japan, in the island of Niphon; 20 miles N. of Xenday.

MINADAH, a river of Bengal, which runs into the Ganges at its mouth, N. lat. 22° 45′. E. long. 91° 3′.

MINAES GERAES, a jurisdiction of South America, in Brazil, situated between the 15th and 22d degrees of S. lat., and the 25th and 33d degrees of W. long. The number of inhabitants is computed to be about 35,180 whites, 26,075 Indians, and 108,400 slaves. The fifth part of the gold found in this jurisdiction, and formerly paid to the king of Portugal, is estimated yearly to be about five millions of livres.

MINAGGNHINIM, a pulsatile instrument of music among the Hebrews, which was a square table of wood, fitted with a handle; over this table was stretched an iron chain, or hempen cord, passing through balls of wood or brass, which struck against the table when the instrument was shook, and occasioned a clear sound, which might be heard at a great distance.

MINARES, in *Geography*, a river of Spain, which waters the province of Aragon.

MINAS, *Basin of*, or *Les Mines* bay, sometimes called "Le Grand Praye," a gulf on the S.E. side of the bay of Fundy, into which its waters pass by a narrow strait; about 30 leagues from the entrance of Annapolis, and ten from the bottom of Bedford bay; 12 leagues in length and three in breadth.

MINAS, or *De las Minas* hill, the middlemost of the three hills, serving as inland marks for Bonaventura bay and river, on the coast of Peru, in South America; S. of Panama bay. N. lat. 3° 20′. W. long. 75° 18′.

MINAS *des Rixas*, a town of Brazil, in the government of Goya; 85 miles N. of Villaboa.

MINASCOU BAY, a bay in the river St. Mary, between lake Superior and lake Huron; containing several islands. N. lat. 46°. W. long. 84°.

MINATO, *Count* NICOLA, of Bergamo, in *Biography*, a dramatic poet of great fertility. The reputation which he had acquired in writing for the theatres of Venice, occasioned his being engaged at Vienna as imperial poet laureate. He furnished the emperor's lyric theatre with a great number of serious operas, and still more small occasional dramas and poems for music. On every birth-day and occasion of joy and festivity, an analogous piece or two, besides the fixed operas for winter and autumn. These operas passed into Italy, where they were new set and performed with success. This poet possessed a perfect knowledge of history, his fable was generally well planned, and his characters well sustained. He had genius and invention, and gave good opportunities for decoration and machinery. He flourished from about 1650 to 1683.

MINATTA, *Isle la*, in *Geography*, lies on the N. coast of lake Superior, in Upper Canada, near to, and E. of, the grand Portage, extending to Thunder bay.

MINAYA, a small town of Spain, in the province of La Mancha: it was formerly considerable, but is now almost reduced to the size of a village. The entrance to the parish church, which is of a moderate size, and has three chancels, is through a portico supported by two pillars of the Corinthian order, of white marble; 2½ leagues from La Roda.

MINAZZO, CAPE, a cape of Spain, on the W. coast of Galicia. N. lat. 42° 51′. W. long. 9° 20′.

MINCA, a name given by the ancients to a very coarse and bad kind of myrrh.

MINCH, in *Geography*, a channel of the North sea, between the Hebrides and the main land of Scotland.

MINCHA, in the *Jewish Customs*, offerings of meal, cakes, or biscuits, made in the temple of the Lord. The Seventy have sometimes preserved this word in their translation; but instead of *mincha* they read *manaa*, which doubtless was the received pronunciation in their time. We find *manaa* in the same sense in Baruch, i. 10. Levit. ii. 3, &c. See the Greek of Jerem. xvii. 26. Dan. ii. 46. 2 Kings, viii. 5. 9. xvii. 7. xx. 12. 2 Chron. vii. 7. Nehem. xiii. 5, 9, &c. Calmet. Dict. Bibl.

MINCHIN-HAMPTON, in *Geography*, a market-town in the hundred of Longtree, and county of Gloucester, England, is situated on the declivity of a gentle eminence, and consists of four irregular streets, intersecting each other at right angles. The chief trade of this town is a manufacture of cloths, which is carried on to a considerable extent, the many brooks and rivulets in the vicinity being extremely favourable for the purpose. The church, which is built in the form of a cross, was founded by the nuns of Caen, in the reign of Henry III. Numerous monuments and sepulchral inscriptions diversify the interior of this fabric; and in the church-yard appears a brass plate, in honour of Mr. James Bradley, the celebrated astronomer, who was a native of Gloucestershire, and died in 1762. Here are three market-houses, two of which were erected by P. Sheppard, esq. in the year 1700, with the view of establishing a wool-market, but the design failed of success. Here is likewise a respectable free-school. Leland says "there were nunnes" in this town; and Camden and Speed hence affirm it contained a nunnery. Bishop Tanner, however, considered this statement as erroneous, and says, "this place was called Minchin-Hampton, only because the manor was given to the nuns, or minchins of the Holy Trinity, at Caen, in Normandy, by William the Conqueror." The abbess of that monastery purchased for it the privilege of a weekly market, which continues to be held on Tuesday. According to the parliamentary returns of 1801, this town contained a population of 3419 persons, of which number 1549 were males, and 1870 females. To the west of this town lies an extensive common, called Amberley, remarkable for being the scite of a very singular encampment. The great vallum of this work is irregular, and has smaller trenches branching from it. It extends nearly three miles in length, to a spot called Woeful-Dane-Bottom, probably in memory of some signal defeat sustained here by that people, whom Mr. Fosbrooke conjectures to have occupied this camp as a summer residence, during their abode at Cirencester in the year 879. At Rodmarton, a small village near the foss-way, which passes through this district, a tessellated pavement and other Roman remains were discovered about the

the middle of the feventeenth century. Horfley, a difufed market-town, two miles from Minchin-Hampton, contains fome fragments of a priory, formerly dependent on the monaftery of St. Martin's, at Trours, in Normandy. In a field adjoining to Gatcombe park, the feat of Philip Sheppard, efq., is a large oval tumulus, now planted with firs, which had erect ftones at each end of it. On its fummit is placed a huge fragment of rock, evidently a fepulchral monument, which has been long diftinguifhed by the appellation of Tingle-ftone. At fome diftance from this tumulus appear two large ftones, fet upright in the ground; one has its top broken off, but the other is perfect, and rifes ten feet above the furface. Tradition affigns one or both of thefe memorials to Long, a Danifh chieftain, whence comes the name Long's ftone, or pillar. Bigland's Hiftory of Gloucefterfhire, vol. ii. folio. Beauties of England and Wales, vol. v.

MINCHIVAVIDA, a fmall ifland in the South Pacific ocean, near the coaft of Chili. S. lat. 44° 40'.

MINCIO, a river of Italy, which rifes in lake Garda, forms the lake which furrounds the city of Mantua, and afterwards runs into the Po near Sachetta.—Alfo, a department or divifion of the new kingdom of Italy, confifting of what was before the revolution the duchy of Mantua, containing 123,649 inhabitants, who elect nine deputies. The capital is Mantua.

MIND, Mens, denotes a thinking or underftanding being. See Spirit.

Philofophers generally allow three kinds of minds, *viz.* *God*, *angels*, and the human *foul*. For a thinking being muft either be finite or infinite: if infinite, it is *God*; and if finite, it is either joined with a human body, or not; if the latter, it is an *angel*; if the former, a *foul*.

The *human mind* is properly defined a thinking rational fubftance; by *thinking* it is diftinguifhed from body; and by *reafoning* from God and angels, who are fuppofed to fee and know things intuitively, without the help of deduction and difcourfe.

Mind, *Affection of the.* See Affection.

MINDANAO, or Magindanao, in *Geography*, one of the Philippine iflands, and interior only to Luçon in extent: it is of a triangular form, and in circumference about 900 miles, but fo interfected with promontories and bays, that a perfon might crofs it in a day and a half. It was difcovered by the Spaniards who accompanied Magellan. It lies S.E. of Manila, at the diftance of 600 miles. Although mountainous, the vales confift of a rich black mould, watered with the fineft rivulets; it furnifhes ample fupplies of rice, and alfo palm-trees, the pith of which affords fago, and this, when reduced to meal, is ufed for making bread and bifcuit throughout all the ifland. It has a variety of fruits in common with the other iflands of this archipelago; but the cinnamon is peculiar to itfelf, and the trees that furnifh it grow on the mountains without culture, and without being regarded as the property of any individual. By digging deep in the ground, and fearching the rivers, the inhabitants find good gold. They alfo collect plenty of fulphur from the burning mountains. The fcenery of Mindanao is beautiful, and it is fertile in a variety of productions. The chief Spanifh fettlement is at Sambuang, in the S.W. The "Lano" is a large inland lake, about 60 miles in circumference: horfes and buffaloes have multiplied here to a furprifing degree. In the fouth, there is a volcano of conftant eruption, which ferves as a fea-mark. In the ftrait between this ifland and that of Xolo, very large pearls are found. N. lat. 5° 40' to 9° 55'. E. long. 122° to 126° 27'.

MINDAY, a town of Pegu; 8 miles S. of Prome.

MINDELHEIM, a town of Bavaria, and capital of a lordfhip, about 8 miles fquare; 22 miles S.W. of Augfburg. N. lat. 48° 2'. E. long. 10° 27'.

MINDEN, a principality of Germany, in the kingdom of Weftphalia, about 96 miles in circumference, confifting of good corn land, fo that agriculture is carried on with great diligence and with fuch fuccefs, that from hence neighbouring countries are fupplied with flax and corn, and particularly with wheat and barley. This principality has alfo wood, turf, coal, and a productive falt-work, and plenty of fifh. The Roman Catholics only enjoy in the town of Minden, and the Calvinifts every quarter of a year, at the citadel of Peterfhagen, their public worfhip; all other churches in the country belong to the Lutherans. This principality is now annexed to the kingdom of Weftphalia.

Minden, a city of Weftphalia, and capital of the forementioned principality, and formerly one of the Hanfe towns, is fituated on the Wefer. It is about two miles in compafs, and furrounded with walls and ramparts. Its fituation for commerce is advantageous, and fome of the inhabitants carry on a confiderable brewery; others are employed in agriculture and breeding of cattle. The cathedral is a confiderable building, and the chapter confifts of 18 perfons, partly Roman Catholic and partly Lutheran. This town was an important place, even in the reign of Charlemagne; and it has fince been contended for, and occafionally poffeffed by the Imperialifts, Swedes, and French; 30 miles E. of Ofnabruck. N. lat. 52° 18'. E. long. 8° 56'.

Minden, a poft-town of America, in Montgomery county, New York; 472 miles from Wafhington.

MINDEPILLY, a town of Hindooftan, in Myfore; 8 miles W. of Veniatighery.

MINDERER, Raymond, in *Biography*, a phyfician of Augfburg, who was diftinguifhed in the early part of the feventeenth century as a partizan of the chemical fect. He was alfo eminent as a military phyfician, in which capacity he ferved feveral campaigns, with univerfal efteem throughout all ranks in the army; whence he alfo rofe to high reputation and practice in the courts of Vienna and Munich, and was confulted by the principal nobility. He publifhed the refult of his experience relative to the difeafes of armies, in the German language; and this work was tranflated into Latin, with the title of "Medicina Militaris, feu, Liber Caftrenfis, euporifta et facilè parabilia Medicamenta continens," Vienna, 1620, 8vo. This work was feveral times reprinted, and was alfo tranflated into Englifh in 1674. He was likewife author of the following works. "De Peftilentiâ Liber unus," ibid. 1608. "Aloëdarium Marocoftinum," ibid. 1616, and afterwards republifhed. "De Calcantho, feu Vitriolo, ejufque qualitate, virtute, et viribus," 1617. "Threnodia Medica, feu, Planctus Medicinæ lugentis," 1619. His chemical reputation is evinced by the connection of his name in the fhops, even at this day, with the neutral falt, the acetate of ammonia, which is called Mindererus' fpirit. Eloy. Dict. Hift.

MINDERERI Spiritus. See Vinegar.

MINDIGAUT, in *Geography*, a town of Hindooftan, in Dooab; 5 miles S.E. of Canoge.

MINDIUM, in *Botany*, Juff. 164. Medium Diofcoridis, Mindium Rhazis; Rauw. It. 284. See Medium and Michauxia.

MINDO, in *Geography*, a town of South America, in the audience of Quito; 20 miles N.W. of Quito.

MINDORO, one of the Philippine iflands, about 27 miles S. from the ifland of Luçon, triangular in figure, and about 150 miles in circumference. It is high and mountainous,

mountainous, abounding in cocoa and other fruit-trees, with some rice. A part of the sea adjoining this island is called the "sea of Mindoro." N. lat. 12° 21′ to 13° 30′. E. long. 120° 24′ to 121° 24′.

MINDOWLY, a town of Hindoostan, in the circar of Singrowla; 10 miles N. of Soipour.

MINDYGUR, a town of Hindoostan, in Oude; 5 miles S. Canage.

MINE, a town of Abyssinia; 170 miles S.W. of Gondar. N. lat. 0° 4′. E. long. 35° 30′.

MINE. This word is applied generally to all works carried on under ground, but seems principally to belong to such as have for their object the discovery and production of the metallic ores.

The construction of the works in various mines differs according to circumstances, such as the form of the hills in which they are situated, or the position of the ores, whether found in veins or beds. Some mines are formed by a level or drift entering the foot of a mountain, and extending to the deposits of metal within it, which may be taken away and carried out through this opening; and in this case *shafts* are only required for the purposes of ventilation.

This seems to be the simplest state of mining, and is, as well as such mines as have been formed by following ore from the surface to such depths as water would permit, to be ranked among the earlier efforts of this kind.

The more extended operations of mining are to be found where regular metallic veins, situated in primitive rocks, are worked to great depths below the level of the sea, where perpendicular *shafts*, drained of the constantly accumulating water by engines, form the means of communication from the surface to *levels* driven upon the *lode* or vein, at various and successive depths, so as to open all parts of it for the discovery of its contents.

A mine thus constructed, of any considerable extent, is one of the most extraordinary instances of human enterprize, patience, and ingenuity; especially if it be considered that its formation depends upon the application of two of the most wonderful discoveries on record, the expansive forces of gunpowder and steam.

Mines in Cornwall and Devon are generally worked by a company of proprietors, called adventurers, who agree with the owner of the land, or lord of the soil, as he is usually denominated, to work the mine for a certain term of years, paying him, by way of rent, a proportion of the ores raised, or an equivalent in money. The grant thus made to the adventurers is called a *set*, and the lord's rent, if paid in ore, is called the *dish* (probably from the ancient practice of measuring it by a vessel of that sort), and when settled for in money, has the term *dues* applied to it.

The adventurers divide their undertaking into shares of different magnitude, but usually forming in the whole some even and easily divisible number. The smallest share usually held by one adventurer is one sixty-fourth part, though in some large mines this share is divided, and a person may then have only a one hundred and twenty-eighth part of the whole, while others may hold eighths, others sixteenths or thirty-seconds, and some larger proportions, but the whole added together make up sixty-four shares. Any part of the concern held by one person is generally called a *dole*, and distinguished as to its relation to the whole by adjoining to this word the denomination of its value, as an eighth dole, a sixteenth dole, &c.

Mines in Cornwall and Devon are usually named as soon as they are undertaken, and this practice seems to have been of considerable antiquity, as the word *wheal*, or *huel*, usually even now prefixed to these appellations, is derived from the ancient Cornish language, and signifies a work or mine. The other parts of the names of mines often relate to the situation, or have been given in compliment to some person connected with them, or adopted according to the fancy of the adventurers. Thus Wheal Rose is probably derived from the Cornish word *ros*, a valley, and means therefore the mine in the valley; Wheal Godolphin has the name of a family; and among the arbitrary appellations which are the most numerous, may be instanced Wheal Unity, Wheal Virgin, Wheal Jewel, &c.

The *bounds*, or limits of the set of a mine, are usually marked out upon the surface, and include the space of ground in which any company of adventurers have contracted for the right working. Bounds for working tin are recognized by the stannary laws of Devon and Cornwall, as a property in themselves distinct from the possession of the soil, and were probably originally granted to encourage the search for this metal by the laws of the duchy, that the revenue of the chief lord might not suffer by the unwillingness of the possessor of the soil to have its surface disturbed. Tin bounds that have been legally renewed, or possession retained, are even now in their original state in this respect; but copper mines, and also many tin mines, are now generally held of the possessor of the fee.

Mines are generally conducted in Cornwall and Devon by a manager appointed by the adventurers, who hold meetings at the counting-house to revise and pass the accounts, and to debate and determine on all subjects relative to the prosecution of the works submitted to them.

Under the principal agent others are appointed, who are practical miners, and who superintend the various operations and settle the terms of the contracts with the workmen, which are made by a kind of public auction. These agents are called *captains*, and the number employed in a mine is in proportion to its extent and importance. Some attend principally to the works below, and are therefore called *underground captains*; others take charge of the operations on the surface, and are therefore distinguished by the appellation of *grass captains*. It would be injustice to this useful and respectable body of men to pass them over without noticing the intelligence, activity, and skill by which the agents of the mines in the districts alluded to are distinguished.

The establishment of a mine further includes occasionally an engineer, a head carpenter and smith, who have each their workmen under their care; a *pitman*, who directs the fixing and repair of the pump-work; a *timberman* or *binder*, who superintends the construction of the woodwork under ground, for securing the shafts, ladders, levels, and so on: and besides these operative men, there are usually clerks to keep the accounts, and persons to receive and deliver to the workmen the materials used in their operations.

The miners working under ground are divided into two classes, according to the mode by which they are paid. Those of the first class are called *tributers*, who work on the productive parts of the mine, and receive a proportion of the ore which they procure and make merchantable, for their labour. This mode of payment, by its occasionally leading to unusual profit, stimulates to great exertion in the discovery of fresh deposits of ore, and is therefore conducive to the interests of the employer as well as the workman. To the reward thus held out to skill and intelligence, may probably be attributed the prevalence of these qualities, which may be observed more particularly in this class of Cornish miners. The other workmen employed under ground are denominated *tutwork-men*, who agree for sinking shafts, driving levels, and so on, at a certain price *per* fathom. These prices are exceedingly various, as the rock to be penetrated differs in degrees

grees of hardness, or the nature of the work exposes the men to more or less danger or inconvenience from water or bad air.

The people employed on the surface in dressing the ores, generally perform their labour by task-work, the amounts being charged to the account of the tributers, whose ore is undergoing this process.

The copper ores, when ready for sale, are sampled by agents of the smelting companies, who visit the mines for that purpose, and are sold on a fixed day by a public sale, called a *ticketing*, and afterwards weighed and carried to a port and shipped to Wales, where the copper smelting houses in general are. Tin ores are smelted in Cornwall, and are sold by the miner to the owners of the smelting houses by private contract, valuing them by an assay made by the buyer. In this respect the value of tin ores is determined by a mode much more uncertain and irregular than that employed for copper, the assay of which is conducted with extreme care, and wonderful accuracy.

The extent of the returns and costs of the mines in Cornwall and Devon, both collectively and separately, may be seen by referring to the history of mining in this district, where the tables of the state of these concerns exhibit a very interesting picture of the great increase of these extensive undertakings. See MINING, *History of*.

The king by his prerogative hath all mines of gold and silver to make money; and therefore those mines, which are properly royal, and to which the king is entitled when found, are only those of silver and gold. (2 Inst. 577.) By the old common law, if gold or silver be found in mines of base metal, according to the opinion of some, the whole was a royal mine, and belonged to the king; though others say that this was only the case, when the quantity of gold or silver was of greater value than the quantity of base metal. (Plowd. 336.) But by statute no mines of copper, tin, iron, or lead, shall be adjudged royal mines, though gold or silver be extracted. (1 W. and M. c. 30.) And persons having mines of copper, tin, lead, &c. shall enjoy the same, although claimed to be royal mines; but the king, or persons claiming royal mines under his authority, may have the ore (except tin-ore in Devon and Cornwall) paying to the owners of the mines, within thirty days after it shall be raised, and before removed, 16*l. per* ton for copper-ore washed, and made merchantable; for lead-ore 9*l. per* ton; tin or iron, 40*s.* &c. (Stat. 5 W. & M. c. 6.) If any person maliciously set on fire any mine, or pit of coal, he shall be guilty of felony, without benefit of clergy, by stat. 10 Geo. II. c. 32. If any person shall wilfully or maliciously set fire to, burn, demolish, pull down, or otherwise destroy or damage any fire-engine, or other engine erected for draining water from coal mines, or for drawing coals out of the same; or for draining water from any mine of lead, tin, copper, or other mineral, or any bridge, waggon-way, or trunk erected for conveying coals from any coal mine, or staith for depositing the same; or any bridge, or waggon-way erected for conveying lead, tin, copper, or any other mineral, from such mine, or cause the same to be done, he shall be guilty of felony, and transported for seven years. (9 Geo. III. c. 29.) Provided that no person be prosecuted under this act beyond 18 months after the offence committed. By 39 & 40 Geo. III. c. 77, destroying or damaging mines or roads leading to or from the same, &c. incurs the guilt of misdemeanor, and any one person so offending may, on conviction, be imprisoned for any time not exceeding six months. Colliers and miners working in a manner contrary to their agreement, or not fulfilling their contracts, shall, on conviction, forfeit not exceeding 40*s.* and on non-payment be imprisoned for a time not exceeding six months, or until the penalty and costs shall be paid. Stealing ore out of mines is no larceny, except only those of black-lead, the stealing ore out of which is felony, punishable with imprisonment and whipping, or transportation not exceeding seven years, and escaping from such imprisonment, or returning from transportation is felony, without benefit of clergy, by 25 Geo. II. c. 10.

MINE-*adventurers, Company of*, had its first rise about the year 1690, when certain mines of lead and copper were found in South Wales, which were divided by the proprietors into twenty-four shares; and in 1693 sub-divided into four thousand and eight shares, for the term of twenty-two years and a half; to which term five years more were added in 1698, and the affairs of the company regulated by a new constitution. In 1704, queen Anne granted a charter of incorporation to this company; in consequence of which several new shares were added, so that the whole number amounted to six thousand and twelve. However, the interests of this corporation were so ill managed, that the proprietors and creditors petitioned parliament in 1710, and a committee of the house of commons was appointed to enquire into its state. The result of the enquiry was a censure on the principal managers; and though, in 1711, a law was passed for the better regulation of the company, and the relief of the creditors and proprietors, nothing could preserve it from sinking.

MINE, in the *Art of War*, denotes a subterraneous canal or passage dug under the wall or rampart of a fortification intended to be blown up by gunpowder.

The passage of a mine leading to the powder is called the *gallery*. These passages or galleries made within the fortification, before the place is attacked, and from which several branches are carried to different places, are generally four feet wide, and five feet high, and the earth is supported from falling in by arches and walls, as they are to serve for a considerable time; but when mines are to be used in a short time, the galleries are only about three feet wide and five high, and the earth is supported with wooden frames or props. When the gallery is carried on to the place where the powder is to be lodged, called the *chamber*, the miners make this generally of a cubical form, large enough to hold the wooden box, which contains the powder necessary for the charge; this box is lined with straw and sand-bags, to prevent the powder from contracting any dampness. The chamber is sunk somewhat lower than the gallery, unless the besieged can raise the water in the ditch, and incommode the gallery; in which case the chamber is made higher than the gallery, that the water may not be let in and spoil the mine. The line, drawn from the centre of the space containing the powder, perpendicular to the nearest surface, is called the line of *least resistance;* the pit or hole, made by a mine when sprung, is called the *excavation*. The fire is conveyed to the mines by a pipe or hose, made of coarse cloth, whose diameter is about an inch and a half, called *saucisson*, extending from the chamber to the entrance of the gallery, to the end of which is fixed a match, that the miner who sets fire to it may have time to retire before it reaches the chamber. In order to prevent the powder from becoming damp, the saucisson is laid in a small trough, called *auget*, with straw in it, and round the saucisson, with a wooden cover nailed upon it. There are various kinds of mines, which acquire different names; as *royal* mines, *serpentine* mines, *forked* mines, as their passages are straight, oblique, winding, &c. The mines made by the besiegers in the attack of a place are simply called *mines*, and those made by the besieged *counter-mines*. They are both made in the same manner, and for the like purposes, *viz.* to blow up their enemies and their works; only the principal galleries and mines of the besieged are usually made before

before the town is besieged. The besieged generally make a great many small mines under the glacis, of about six, seven, or eight feet deep under ground, which are called *fougasses* or *fougades*. They make likewise another sort, called *coffers* or *caissons*, which are a kind of wooden boxes three or four feet long, and a foot or eighteen inches wide, which they bury four, five, or six feet under the glacis, and about four yards distant from each other.

Mines, *History of*. It is observed by writers on this subject, that mines were in use long before the invention of gunpowder; for the ancients made galleries or subterraneous passages under the walls of places, and supported them with strong props; filling the interval with all kinds of combustibles, which being set on fire burnt their props, and, the walls being no longer supported, fell, whereby a breach was made. The besieged also made use of similar passages from the town under the besiegers' machines, with which they battered the walls, in order to destroy them. But the art of mining has received great improvements since the invention of gunpowder. The first mines which we read of, since the discovery of gunpowder, were used, in 1487, by the Genoese, in the attack of Serezanella, a town belonging to Florence: however, as these failed, they were neglected for a considerable time. The first successful application of the blowing of mines in sieges was in the kingdom of Naples, in the year 1503; when Pietro de Navarre by this means possessed himself of a fort garrisoned by the French. But the first celebrated use of these mines in opposing the progress of the besiegers was in the years 1666, 1667, 1668, at the siege of Candia; though they had been often practised in the defence of places before, in a less memorable manner; for by the assistance of this invention principally, the city of Candia kept the whole power of the Ottoman empire at bay for three years successively. Since that time the advantage of counter-mines hath been better understood. The last eminent instance of their great utility was in the defence of Turin, in 1706: for so effectually were the besiegers traversed thereby, that, after near four months of open trenches, they were not in possession of more than the counter-scarp, and even then, eleven pieces of their cannon were blown up by the defendants but three or four days before the place was relieved.

The first professed writer on mines was the celebrated M. Vauban; he was succeeded by M. de Valliere, one of the greatest masters in the art of mining; who, uniting theory with experiment, discovered, by measuring several excavations, that the pit or hole made in the earth, when the mine was sprung, was not an inverted cone (*Plate* VI. *Fortification*, *fig.* 10.) nor a frustum of a cone (*fig.* 11.) as Vauban and others had supposed, but nearly a paraboloid (*fig.* 12.); and his tables were computed according to that figure. It has been generally admitted by miners, that the diameter of the pit or hole made by the mine was always twice the line of the least resistance, and that this diameter should never exceed this proportion. But M. Belidor undertook to remove this prejudice; and however generally it may still prevail, he seems to have proved by many experiments, which have since been repeated by others, that the diameter of the hole made by a mine may be increased to any length in regard to the depth of the mine.

Mines, *Theory of*. The estimation of the proper quantity of powder with which a mine is to be loaded in any kind of soil, or at any depth under ground, in order to produce any proposed effect, is the most difficult part of the whole art of mining. This depends not only on the quantity of earth to be blown up, but likewise on the tenacity of the different soils in which the mines are made. The quantity of earth to be raised depends on the figure of the excavation; for if this is known, the solid content may be determined by geometry; and by weighing exactly a cubic foot of that soil, we can easily discover what weight is to be raised; and by knowing what quantity of powder is required to raise a certain weight, the tenacity of the parts may also be had, by making a mine so as to produce a good effect; and subtracting the quantity of powder, necessary to raise the weight of the solid from the charge of the mine, the remainder would be the quantity necessary to overcome the tenacity. It is, however, disputed, as we have already observed, what the figure of the excavation is: it was at first imagined to be an inverted cone, as A C B (*fig.* 10.) whose vertex is in the centre of the chamber, and the radius of its base A D equal to its axis C D; but this being found to allow too small a charge, it was next supposed to be a frustum of a cone, as A E F B (*fig.* 11.) whose lesser base E F is equal to the line C D of least resistance, and the greater A B equal to twice that line. On this last supposition, said to be confirmed by the experiments of M. Maigrigny, under M. Vauban, near Tournay, miners have computed their tables of the quantities of powder necessary for charging mines at different depths.

However, Mr. Belidor disputed the conclusions of Maigrigny; whose experiments were examined by direction of the chief commander of the artillery of La Fere, in the construction of more than a hundred and fifty mines between the years 1725 and 1730. In the course of this enquiry, seven mines were made, whose line of least resistance was ten feet, and loaded with the following quantities of powder, *viz.* the first with 120lb.; the second with 160lb.; the third with 200lb.; the fourth with 240lb.; the fifth with 280lb.; the sixth with 320lb.; and the seventh with 360lb. These mines being sprung one after another, and their excavations examined, the diameters of their bases were found to be as follow: that of the first $22\frac{1}{3}$ feet; the second, 26 feet; the third, 29 feet; the fourth, $31\frac{1}{4}$ feet; the fifth, $33\frac{1}{2}$ feet; the sixth, 36 feet; and the seventh, 38 feet. These experiments invalidated the principles of Maigrigny; nevertheless miners have still doubted, whether the diameter of the excavation can be made greater than double the line of least resistance, or whether the excavation itself will not become like a well or pit when overcharged. As to the true figure of the excavation, this was discovered by M. de Valliere, and ascertained by others after him to be very nearly a paraboloid, as A E B (*fig.* 12.) having the centre of the powder or charge in the focus C, C D the line of least resistance, A B the diameter, and C A the radius. Mr. Muller, however, observes, that though the figure of the excavation is a paraboloid, the quantity of the earth to be blown up should be estimated by the part A L M B, cut off by a plane L M, passing through the focus or centre C of the chamber, parallel to the horizon A B; the other part L E M being occasioned by the force of the powder pressing downwards; because, he says, the explosion of gunpowder, acting on all sides alike, must condense the solid under the chamber from L to M, by its pressure downwards, so long as it presses the earth above L M upwards; and it cannot be said, that any particle of earth under the horizontal line L M can be drove upwards. In order to find the content of this solid, let $EK = EC = \frac{1}{4}$ of P, or the parameter; and it appears from the well known properties of the parabola, that $AD^2 = ED \times P$; $LM = P$; and $CA = KD$. And in tht right-angled triangle C D A, $CD^2 + DA^2 = CA^2 = KD^2$; and, therefore, $\sqrt{CD^2 + DA^2} = KD$; whence, if C D and D A are given, the line K D, and

and conſequently C K, or its equal C L, will be known; and, therefore, if the line of leaſt reſiſtance C D, and the radius D A of the baſe are given, the parameter may be found. Moreover, the ſolid content of the paraboloid is equal to half the cylinder of the ſame baſe and altitude; if r expreſſes half the circumference, whoſe radius is unity: *i. e.* if $r = 1.57$; then, becauſe $1 : 2r$, or the radius to the circumference as the ſquares of the radii C L, D A, are to the areas of their circles; we have $r\,ED \times AD^2$ for the ſolid content of A E B, and $r\,EC \times CL^2$ for the ſolid L E M; therefore, their difference $r\,ED \times AD^2 - r\,EC \times CL^2$, will expreſs the ſolid required. But if P expreſſes the parameter L M, then will $P \times ED = AD^2$, and $P \times CE = CL^2$, and theſe values ſubſtituted in the expreſſion of the ſolid, give $rP \times ED^2 - rP \times EC^2$: or, becauſe $ED = EC + CD$, and $KD = CD + 2EC$, we ſhall have this expreſſion reduced to $rP \times CD \times KD$. But as r is a conſtant number, it may be neglected in comparing the ſolids; and then $P \times CD \times KD$ will be the expreſſion of the ſolid. And when two excavations are compared together, which have the ſame line of leaſt reſiſtance C D, the ſolid will be expreſſed by the rectangle $P \times KD$. Hence if this ſolid, or the quantity of earth to be raiſed, and the line C D of the leaſt reſiſtance be given, the parameter P may be found; and having the parameter and the line C D, the equation $P \times ED = AD^2$, will give the radius A D of the baſe. For if $CD = c$, and the given ſolid $ALMB = a$, then becauſe $CE = \frac{1}{4}P$, the expreſſion $P \times CD \times KD$ will give

$$Pc \times \overline{\tfrac{1}{2}P + c} = a, \text{ or } PPc + 2Pcc = 2a, \text{ and } PP + 2Pc = \frac{2a}{c}, \text{ to which adding } cc, \text{ we ſhall have } PP + 2cP + cc = \frac{2a}{c} + cc; \text{ and } P + c = \sqrt{\frac{2a}{c} + cc}.$$

In comparing mines together, which have the ſame line of leaſt reſiſtance, the rectangle $P \times KD$ gives $PP + 2cP = 2A$, to which adding cc, we ſhall have $PP + 2cP + cc = 2a + cc$, whoſe ſquare root is $P + c = \sqrt{2a + cc}$. By means of theſe equations, all the different problems relating to mines are eaſily ſolved, on the ſuppoſition, that the forces of powder are proportional to their quantities, and, therefore, the charges alſo proportional to the quantities of earth to be raiſed in the ſame ſort of ſoil, *i. e.* in ſoil of the ſame denſity and tenacity. Some writers, however, aſſert, that the elaſtic force of powder is greater in proportion in larger quantities than in ſmall ones, which Mr. Muller denies; and Mr. Belidor gives another reaſon for diminiſhing the charges of mines, as the earth to be raiſed increaſes; which is, that not only the weight of the earth to be raiſed is to be conſidered, but likewiſe the preſſure of the atmoſphere over the ſurface of the excavation, which preſſure is as the baſes of the excavation, and theſe as the ſquares of the diameters; whereas the weights of ſimilar ſolids are as the cubes of theſe diameters; and, therefore, this preſſure being leſs, in proportion, in larger bodies than in ſmaller, the charges ought rather to be leſſened in large mines than in the ſmall. But this reaſoning ſeems to be contradicted by experiments.

In order to know the quantity of powder neceſſary for blowing up a mine in a particular ſoil, ſeveral mines are to be made in it, having their lines of leaſt reſiſtance equal, but loaded with different quantities of powder, till one is found to have the deſired effect. When this is found, the diameter of its baſe muſt be meaſured with the greateſt accuracy, and likewiſe the line of leaſt reſiſtance; and when theſe lines are determined, the parameter P of the parabola is found by the equation $KD = \sqrt{AD^2 + CD^2}$; and, having the parameter given, the quantity of earth or ſolid is found by the ſolid $P \times CD \times KD$, or by the rectangle $P \times KD$, as the lines of leaſt reſiſtance are different or the ſame. This ſolid, and the charge of the mine, will ſerve to find the effect of any other mine made in the ſame ſoil when the charge is given; or to determine the charge, ſo that the diameter of the baſe ſhall be of any given length, by means of the equation $P \times ED = AD^2$. The ſame being performed in all the different ſoils, which generally occur in making mines, will ſerve to make mines of any depth, or placed in any ſoil.

The miners divide the different ſoils into five ſpecies.

1. 2. 3. 4. 5. 6. } into {
1. looſe earth or ſand.
2. common middling light ſoil.
3. loam or ſtrong ſoil.
4. potters' clay, or ſtiff ſoil.
5. clay mixed with ſtones.
6. all kind of maſonry.

It has been found, that a cubic foot of the firſt weighs 95lb; of the ſecond, 124lb.; of the third, 126lb.; of the fourth, 135lb.; and 160lb. of the fifth. But as to maſonry, it cannot be determined to any degree of exactneſs, as depending on the different kinds of ſtones or bricks of which they are made.

It is pretended, that there are nine pounds of powder required to raiſe a cubic toiſe of the firſt kind; 11 of the ſecond; 13 of the third; 15 of the fourth; 18 of the fifth; and 20 or 25 to raiſe a cubic toiſe of maſonry above ground; and 35 or 40 for raiſing the ſame quantity under ground.

Theſe are the French weights and meaſures, which being reduced into Engliſh, give 8lb. of powder for the firſt kind of ſoil; 9.8 for the ſecond; 11.6 for the third; 13.4 for the fourth; 16 for the fifth; 18 or 22.3 for the maſonry above ground; and 31 or 35 for raiſing the ſame quantity under ground.

In the ſecond volume of M. Vauban's Attack and Defence of Places, he ſays, that the following rules never fail.

A cubic toiſe of common earth requires 14 pounds of powder to be raiſed.

Stiff ſand or loam, which may be dug without being ſupported, requires 17 pounds *per* toiſe.

Mixed earth requires 18 pounds *per* toiſe.

Potters' clay or ſtiff ſoil, 19 pounds *per* toiſe.

Fat or ſtiff earth mixed with pebble ſtone, 22lb.

Wet ſand, which cannot be dug without being ſupported, 15lb.

Theſe rules of M. Vauban make, therefore, the charges greater than thoſe of later miners.

But this is a matter which muſt be decided by experiments; and when theſe are made with ſufficient exactneſs, it will be eaſy to find the proper charge of a mine, ſo as the diameter of its baſe be of any given length; or when that length is given, to determine the charge required. *E. gr.* Let it be required to find the diameter of a mine made in the ſecond ſort of ſoil; which being loaded with 100lb. of powder, ſay, if 11 pounds raiſe a cubic toiſe, or 216 cubic feet of earth, how much will raiſe 100lb.; the fourth term, which is 1964, will be $= a$; and $2a = 3928$; and ſuppoſing the line of leaſt reſiſtance C D to be 10 feet, then will $c = 10$; hence the equation $c + P = \sqrt{\frac{2a}{a} + cc}$,

will

will give $c + P = \sqrt{402.8} = 20$; or $P = 10$, and $EC = \frac{1}{4}P = 2.5 : ED = 12.5$; whence the equation $P \times ED = \overline{AD}^2$, gives $10 \times 12.5 = 12.5 = \overline{AD}$, or $AD = 11.2$ nearly.

But to ſhew how far this theory agrees with the experiments mentioned before, we may ſuppoſe the firſt to be true, and from thence proceed to find what the diameters of the baſes of the others will be. All the lines of leaſt reſiſtances of theſe mines were ten feet each, the diameter of the baſe of the firſt mine was found to be $22\frac{2}{3}$ feet; ſo that AD is $= 11.33$, or 11.4 $CD = 10$; theſe values being ſubſtituted in the equation $KD = \sqrt{\overline{CD}^2 + \overline{AD}^2}$, will give $KD = \sqrt{229.96} = 15.16$; and $2KC = P = 10.32$; hence theſe values being ſubſtituted in the rectangle $P \times KD$, becauſe the line of leaſt reſiſtance is here always the ſame, gives $10.32 \times 15.16 = 156.5$, for the ſolid, which muſt be remembered, becauſe it is the ſtandard number whereby the other ſolids are determined.

Now if 120lb. gives 156.5, how much gives the charge 160lb. of the ſecond for its ſolid, the fourth term gives $208\frac{2}{3} = a$, and $2a = 417\frac{1}{3}$; this value, as well as that of $c = 10$, being ſubſtituted in $P + c = \sqrt{2a + cc}$, gives $P + c = \sqrt{517.4} = 22.7$; hence $P = 12.7$, $EC = \frac{1}{4}P = 3.2$, and $ED = 13.2$. Now theſe values being ſubſtituted in $P \times ED = \overline{AD}^2$, give $\overline{AD}^2 = 167.64$, and $AD = 13$ nearly; and as AB has been found by meaſurement to be about 26, it ſhews that this computation anſwers very nearly the experiment.

If as the charge 120 of the firſt is to the charge 200 of the third, ſo is the ſolid 156.5 of the firſt to the ſolid of the third; we ſhall have $a = 260.84$, or $2a = 521.68$; and as $c = 10$, the equation $P + c = \sqrt{2a + cc}$ gives $P + c = \sqrt{621.68} = 24.93$ nearly; hence $P = 14.93$, $\frac{1}{4}P = EC = 3.73$, and $ED = 13.73$; theſe values being ſubſtituted in $P \times ED = \overline{AD}^2$, give $AD = 14.32$, and $AB = 28.64$; which anſwers nearly the experiment; it was found that $AB = 29$ nearly.

If we proceed thus with regard to the 4th, 5th, 6th, and 7th experiments, we ſhall find the diameters of the baſe to be as follows; that of the 4th, 31.2; that of the 5th, 33.2; the 6th, 35.3; and that of the 7th, 37.4; which anſwers pretty near the experiments.

In this method of conſtructing mines, any opening may be made, whatever be the line of reſiſtance; and by making this line ſmall, and loading the mine with more powder, the inconvenience of a large excavation, which affords lodgment to the beſiegers, is avoided: beſides, the ſhafts and galleries are ſooner made, and ſeveral mines may be placed under one another, by which the ſame ſpot of ground may be blown up ſeveral times.

If it were required to make a mine in the ſame ſort of ſoil as that in which the ſeven experiments mentioned before were made, ſo that the line of the leaſt reſiſtance ſhall be equal to the radius of the baſe, and each of ten feet, and to find the quantity of powder neceſſary for its charge. Becauſe $AD = CD = 10$, the equation $KD = \sqrt{\overline{AD}^2 + \overline{CD}^2}$, will give $KD = \sqrt{200} = 14.14$; hence $P = 8.28$; theſe values being ſubſtituted in $P \times KD$, will give 117, nearly, for the ſolid; then if we ſay, as the ſolid 156.5, of the firſt experiment, is to the ſolid 117, ſo is the charge 120 to the charge required, it will be 90lb. nearly. But if it was required to find the quantity of powder neceſſary to raiſe a cubic fathom, or 216 cubic feet of this ſoil; then becauſe $CD = 10$ has been neglected in the ſolid 156.5, of the firſt experiment, as likewiſe the ratio r, therefore the quantity muſt be multiplied by $r \times 10$; or becauſe $r = 1.57$ by 15.7, which will give 2457; then if we ſay, as 2457 requires 120lb. of powder, how much will 216 require; and the fourth term, which is 10.5lb., will be the number ſought. From whence it appears, that the ſoil, in which theſe experiments were made, was a light ſort of ſoil, ſomewhat lighter than that which is taken by the miners for the ſecond ſort.

M. De Valliere ſuppoſes, in his table, inſerted below, that a mine, whoſe line of leaſt reſiſtance and radius of the baſe are each ten feet, requires $93\frac{3}{4}$lb. for its charge. Now, if it be required to find what kind of ſoil theſe mines are made in, by ſubſtituting the number for CD, AD, in the equation $KD = \sqrt{\overline{AD}^2 + \overline{CD}^2}$, we ſhall have $KD = \sqrt{200} = 14.4$, and $P = 8.28$; now theſe values being ſubſtituted in $rP \times CD \times KD$, we ſhall have $15.7 \times 8.28 \times 14.14 = 1838$; then if we ſay, as 1838 is to $93\frac{3}{4}$, ſo is 216 to 11. This fourth term will expreſs the number of pounds of powder required to raiſe a cubic fathom of the ſame ſort of ſoil, which therefore is the ſecond ſort.

The preceding computations have been made of French weights and meaſures, to ſhew how nearly the foregoing theory agrees with the experiments made at La Fere. It remains now to apply it to our own weights and meaſures; becauſe eight pounds of powder will raiſe a cubic fathom of earth of the firſt ſort; if we ſay a cubic fathom, or 216 cubic feet, is to eight pounds, as 1838 cubic feet is to 68.074 pounds, this fourth term will be the charge of a mine, whoſe line of reſiſtance is 10 feet as well as the radius of the baſe: in the ſame manner are found the charges of the ſame mine in the reſt of the ſoils. But the ſhorteſt way of computing tables is to ſubtract the logarithm of 216 from that of 1838, which gives 9298917; now if to this logarithm we add thoſe of 8, 9.8, 11.6, 13.4, 16; the weight of the powder required to raiſe a cubic fathom of the different ſoils, found before; we ſhall have 1° 83298, 2° 92112, 3° 99435, 4° 05699, 5° 14301 for the logarithms of the charges of a mine whoſe line of leaſt reſiſtance is 10 feet, and the diameter of the baſe 20.

Valliere's TABLE for the Charges of Mines.

Length of the line of leaſt reſiſtance.	Charge of Powder.	Length of the line of leaſt reſiſtance.	Charge of Powder.	Length of the line of leaſt reſiſtance.	Charge of Powder.	Length of the line of leaſt reſiſtance.	Charge of Powder.
Feet.	lb. oz.	Feet.	lb. oz.	Feet.	lb. oz.	Feet.	lb. oz.
1	0 2	11	124 12	21	868 3	31	2792 4
2	0 12	12	162 0	22	998 4	32	3072 0
3	2 8	13	205 15	23	1140 10	33	3369 1
4	6 0	14	257 4	24	1296 0	34	3680 12
5	11 11	15	316 4	25	1559 9	35	4019 8
6	20 4	16	384 0	26	1647 12	36	4374 0
7	32 2	17	460 9	27	1815 4	37	4748 11
8	48 0	18	516 12	28	2058 0	38	5144 4
9	68 5	19	643 0	29	2286 7	39	5561 2
10	93 12	20	750 0	30	2530 4	40	6000 0

By

By this conftruction the radii of the bafes being always equal to the lines of leaft refiftances, the folids are fimilar, and therefore are to one another as the cubes of their axes; that is, as the cubes of the lines of leaft refiftances. So that taking any one of the charges to be true, the others will be found by faying, as the cube of the axis whofe charge is given is to its charge, fo is the cube of the axis of any other mine to its charge.

For example, let the charge $93\frac{3}{4}$ of the mine, whofe line of leaft refiftance is 10 feet, be given; and it be required to find the charge of any other mine whofe line of leaft refiftance is given, fuppofe 15: then fay, as the cube 1000 of 10 is to the cube 3375 of 15, fo is the charge $93\frac{3}{4}$ to the charge required, which is 316.4, or 316 pounds 6 ounces, which is 2 ounces more than in the table. In the fame manner is found the charge of a mine whofe line of leaft refiftance is 20; or becaufe 20 is double of 10, the cube of 20 will be octuple the cube of 10; and therefore $8 \times 93\frac{3}{4}$, or 750 pounds, will be the charge of that mine.

A Table of the Charges of Mines according to Muller's Theory.

Diam.	Charge.	Diam.	Charge.	Diam.	Charge.
Feet.	Pounds.	Feet.	Pounds.	Feet.	Pounds.
22	150	42	639	62	1518
24	181	44	711	64	1621
26	217	46	773	66	1741
28	255	48	857	68	1842
30	297	50	946	70	1980
32	344	52	1020	72	2098
34	394	54	1115	74	2243
36	452	56	1205	76	2372
38	502	58	1299	78	2501
40	560	60	1406	80	2648

In this table the line of leaft refiftance is fuppofed to be always 10 feet, and the charges producing the openings at the fides of them from 22 feet to 80. It is fuppofed that the charge $93\frac{3}{4}$ of a mine, whofe line of leaft refiftance and radius of the bafe are each 10 feet, is given, and from thence all the reft are computed by means of thefe equations, $KD = \sqrt{AD^2 + CD^2}$, and $P \times KD = a$; and by comparing the diameters of the bafes found, by means of thefe equations, to be rather lefs than thofe found by experiments, it is prefumed that the diameters marked in this table will not be found lefs, but rather greater in practice.

In order to find the fize of the boxes, generally made cubical, in which the powder is lodged: as a cubic foot of common powder weighs about 55 pounds, if we fay as 55 is to unity, fo is any other quantity to its cube; *i. e.* if the given quantity of powder be divided by 55, the quotient will be the cube required, and its cube root will be the length of the fide of the box. The box muft always be made a fourth bigger than it fhould be, on account of the ftraw and fand-bags put in it, for keeping the powder free from wet; fo that if the quantity of powder be 360 pounds, the fourth part of it, or 90, muft be added, and the fum 450 divided by 55, whofe quotient is 8.1818, and the fquare root of this, or 2.86 feet, or 34 inches, will be the fize required. If the chamber happens to be placed on a rock, or any other hard fubftance, the force or action of the powder downwards, meeting with great refiftance, will be employed in raifing the earth upwards; and confequently the effect of the mine will be much greater than that produced by the fame quantity of powder, placed on a fofter fubftance. On which account, if a platform of ftrong planks were made under the chambers, there would be a lefs quantity of powder required for the charge of the mine. When the mine is properly loaded, the gallery is ftopped up with ftones, earth, and dung, well rammed, five or fix feet farther from the chamber than the length of the line of leaft refiftance. And for preventing the mine from burfting through the gallery, and to make it have its effect upwards, the gallery is made with one or two turnings, at right angles to each other, and ftrongly fecured with buttreffes and planks, and the intervals rammed with ftones and earth.

Many writers have eftimated the operation of mines on the falfe fuppofition, that their entonnoir, or excavation, is the fruftum of a cone; and therefore, in order to eftimate the weight of the matter to be blown up, they have only to compute the folidity of fuch a fruftum in cubic fathoms, and to multiply the number of fathoms by the number of pounds of powder neceffary for raifing the matter it contains; and if this cone contains matters of different weights, to take a mean betweeen them all; always having a regard to their degree of cohefion. As to the difpofition of mines, there is one general rule, which is, that the fide towards which one would determine the effect, be the weakeft; but this varies according to occafions and circumftances.

Mines, *Different Sorts of.* A mine which has only one chamber is called a fingle mine, as A, *fig.* 13. If it has two chambers, it is called double, as *fig.* 14, and if it has three, triple, as *fig.* 15, &c. the names being taken from the number of chambers. If a fingle mine is made under the rampart, to make breach, the entrance O, *fig.* 13, muft not be oppofite to the place where the chamber is defigned to be, but on one fide or other; and the gallery with two turnings, that it may be ftopped with greater fecurity, and that the diftance of the entrance O to the chamber A may be greater than the length of the line of leaft refiftance: otherwife the mine would have its effect that way. It muft alfo be obferved, that the chamber is placed in the middle of a counterfcarp, by which means it will make a greater breach than if it were placed in the earth behind the wall. When a double mine is made under the rampart for making breach, the entrance O, *fig.* 14, is made, as nearly as can be gueffed, in the middle, between two counter-forts; the gallery being carried quite through the wall in a direct line, turns afterwards to the right and left, in the form of a T; from whence it is alfo called a T mine; and the chambers are alfo placed in the next counter-forts, but exactly at equal diftances from the direct gallery: this double mine will make a much larger breach than the fingle one, and it is for that reafon preferred to any other.

But when a triple mine is to be made under the rampart, the opening O, *fig.* 15, is to be made directly oppofite to the counter-fort, if poffible, and carried directly through the wall, and turned to the right and left in the fame manner as the former; and the chambers A, B, at both ends, are placed in the two adjacent counter-forts. As to the gallery of the third, C, it is carried round the middle counter-fort, and the chamber placed under its extremity; this laft is generally

generally charged with fifty pounds of powder more than either of the others; but great care must be taken to carry the auger of this last chamber in zig-zags, so as to be equal in length to that of the chamber B, otherwise the fire would not reach them all three at the same time, and thereby the chamber C not take fire, which sometimes happens, and then the effect does not answer the expectation.

There are seldom or ever more made than a triple under the ramparts in sieges; but when a work is to be demolished, they make then as many as will demolish a whole face at once; which is done by giving the fire to all at the same time; that is, all the saucissons are brought into one, and so contrived, as that their parts from the chambers to the common junction may be exactly equal. Muller's System of Artillery, &c. vol. vi. part iii. p. 206, &c.

Mine, *Chamber of a.* See Chamber and Mine.

Mine, *Counter.* See Counter-*mine* and Mine.

Mine, *Gallery of a.* See Gallery and Mine.

Mine, *Knight of the*, is a military honour, anciently conferred on persons who had distinguished themselves in engagements in mines.

Mine-*Ships*, are ships filled with gunpowder, inclosed in strong vaults of brick or stone, to be fired in the midst of an enemy's fleet. See Fire-*ship*.

Mine is also a French measure. See Measure.

Mine-*Dial* is a box and needle, with a brass ring divided into 360 degrees, with several dials graduated thereon; generally thus made for the use of miners.

MINEHEAD, in *Geography*, a township of America, in Essex county, Vermont, on Connecticut river; it is watered by Nulhegan river, and has only 27 inhabitants.

Minehead, a cape of Ireland, in the county of Waterford, between Ardmore-head and Helwick-head, from the latter of which it is about four miles distant.

Minehead, a sea-port town and borough, situated on the southern shore of the Bristol channel, in the hundred of Carthampton and county of Somerset, England. The town was first incorporated by queen Elizabeth, who endowed it with many valuable privileges. In the reigns of Charles II. and queen Anne, so great was the trade from this port to Ireland, that upwards of forty vessels were constantly engaged in it. Several were likewise employed in the West India, Virginia, and Straits trade; and not less than 4000 barrels of herrings were annually shipped here for the Mediterranean. The chief articles of import, besides colonial produce, were wool, linen, and cattle, and the exports consisted mostly of coals and grain. All this trade is now entirely lost; the herrings have deserted the coast, and there are at present only five or six vessels belonging to the port. In the time of its prosperity the government of this borough was vested in a portreeve, but since its decline it has been committed to two constables, who are chosen annually at the court leet of the lord of the manor. The arms of the town are a ship under sail and a wool-pack, emblematical of its pristine trade.

Minehead is divided into three parts; the Upper Town, consisting of several irregular streets, meanly built, and standing on the eastern slope of a vast hill, called Greenalaigh or Minehead point; the Lower Town, situated half a mile from the beach to the south-east; and the Quay Town, placed under the brow of a lofty eminence close to the shore. The church, which is a large handsome structure, stands in the Upper Town, and is distinguished by a very elegant alabaster statue of queen Anne, on a pedestal four feet high. It was the gift of sir Jacob Banks, as appears from an inscription upon it, bearing the date 1719. At the entrance of the quay, in Quay Town, stands the Custom-house, which still continues furnished with a regular establishment of officers. A market continues to be held here every Wednesday; and there is a small manufacture of woollen cloths, which constitutes the chief support of the inhabitants. Fronting the market place is an alms-house, built and endowed by Robert Quirk, in 1630. Two members are sent from this borough to parliament, who are elected by the parishioners of Dunster and Minehead, being housekeepers and not receiving alms. The constables are the returning officers.

The country around Minehead is pleasing and beautiful, presenting to the view a series of lofty hills interspersed with rich and luxuriant vallies. The climate is so mild that vegetation is a month earlier here than in most parts of England. This circumstance has of late years induced many persons to resort hither during the bathing season, to the great benefit of the town. A peculiar species of limpet, found on the rocks here at low water, afford a very curious liquor used in marking linen, which, when first applied, exhibits a variety of changes in its colour, and ultimately, after washing, assumes a bright crimson hue, which no subsequent efforts will alter or eradicate. About six miles to the south of the town is the lofty mountain of Dunkerry, which rises 1770 feet above the level of the sea, and is 12 miles in circumference at the base. From the collections of stones bearing the marks of fire, which appear on different parts of it, it is conjectured to have been used as a beacon to alarm the country in the event of invasion. Collinson's History and Antiquities of Somersetshire, vol. ii. 4to. 1791.

MINELLI, Andrea, in *Biography*, a Venetian opera poet, and author of many dramas that were much applauded; such as "Orfeo," 1702; "Finezze d'Amore, et la forza vinta dall' Onore," 1703; "La Rodoguna," at Milan the same year; and "Il trofeo dell' innocenza," at Venice, 1704.

MINELLIUS, John, was born at Rotterdam about the year 1625, and passed his life as a teacher of the learned languages. He died in 1683. He published notes upon Terence, Sallust, Virgil, Horace, Florus, Valerius Maximus, and Ovid's Tristia, which have not only been very useful to students, but have been freely transcribed by more modern editors and commentators.

MINEO, in *Geography*, a town of Sicily, in the valley of Noto, near a lake of the same name; 24 miles S. of Catania.

MINERA, in *Medicine*, the seat, or rather matter of a disease.

The term is applied by some authors to those parts of the body wherein there are collections and coacervations of humours made; which, hardening, form obstructions, and produce diseases.

In this sense we say, the *minera morbi*, &c.

MINERALS, or Fossils, are those inorganical natural bodies of which the solid mass of the earth is composed. Their more remarkable properties and characters will be enumerated under the article Oryctognosy.

Mineral, *Æthiops.* See Æthiops, and Mercury.

Mineral, *Turbith.* See Turbith, and Mercury.

Mineral *Oil.* See Oil.

Minerale *Bezoardicum.* See Bezoardicum.

Mineral, *Crystal.* See Crystal *Mineral.*

Mineral *Kermes.* See Kermes *Mineral.*

Mineral *Waters*, are those which, at their springing forth from under-ground, are found impregnated with some mineral matter; as salt, sulphur, vitriol, &c. See Water.

Such are hot baths, spaws, purging, &c. springs.

Mineral *Waters, Earth of.* See Earth.

Mineral

Mineral *Juices*. See Juices.

Mineral *Courts*, *Curiæ minerales*, in *Law*, courts for regulating the concerns of lead mines; as *stannary courts* are for tin.

MINERALOGY, the science which makes us acquainted with all the various relations under which minerals present themselves to us. This comprehensive branch of knowledge is by the illustrious Werner divided into five distinct doctrines, viz. 1. *Oryctognosy*, or that part of mineralogy which, with the assistance of well ascertained characters and fixed denominations, teaches us to determine fossil substances, and to arrange them according to their natural affinities. 2. *Geognosy*, which has for its object the structure, relative position, and formation of those substances of which the crust of the earth is composed. 3. *Mineralogical Geography*, which exhibits, in geographical order, the species of rocks that occur in different countries, together with the various species of minerals contained in them, and the circumstances under which they occur. 4. *Mineralogical Chemistry*, which makes us acquainted with the various chemical properties of minerals, and with the quality and quantity of their component parts. 5. *Economical Mineralogy*, in which mineral substances are considered merely with a view to the use to which they are applicable, which also determines their arrangement.

It is only within the last quarter of the elapsed century that the knowledge of minerals has made rapid strides towards perfection; not long before that period it could scarcely be said to have assumed the appearance of a science; and the ancients appear to have been totally unacquainted with any thing in the shape of scientific mineralogy.

The ὀρυκτα and μεταλλευτα of Aristotle can scarcely be considered as bearing testimony to this philosopher's knowledge of minerals, and are indeed only mentioned by him because he fancied the origin of the former might be derived from earth, and that of the latter from water. The few mineral substances treated on by Theophrastus, Pliny, Dioscorides, and Galen, intermixed with productions of art, are merely such as were employed for the common purposes of economy, and the study of these authors is far more important to the philologist and antiquary than to the mineralogist. On reading the sixth book of Dioscorides, we become indeed acquainted with part of the medical knowledge of the ancients, but it teaches us very little that might be deemed any way interesting in a mineralogical point of view. Pliny, where he treats on gems and metals, expatiates on the luxury prevalent among the Romans, and when speaking of marble, basalt, &c. enters upon the history of their productions of art, without at all adverting to the degree of knowledge they possessed of unorganized nature. Indeed, *scientific* knowledge of this kind was not among the acquirements of the ancients; and whatever may have the appearance of it in the writings of the authors above-mentioned, is so destitute of order and precision, that it is surprising how Wallerius, who well knew what is requisite for a mineralogical system, could mention Theophrastus, Pliny, Dioscorides, and Galen, as the first systematical writers in mineralogy. The knowledge of some mineral substances must, of course, be coeval with the earliest ages of the world; but to trace mineralogy, as a science, to Egypt, or to ancient Greece and Rome, is almost as absurd as to dignify Tubal Cain with the title of the first of chemists.

When the general lethargy of the sciences commenced, little regard was paid even to the scanty knowledge handed down in the works of the ancients; and it was not till the introduction of the chemistry, or rather alchemy, of the Arabians into Europe, that a small share of attention was again bestowed on the study of unorganized bodies. Avicenna laid the foundation of the distribution of minerals, into stones, metals, sulphureous fossils, and salts; a division which was generally adopted by the chemists of those times, but not by the other naturalists; the former, to judge from a passage in Agricola (De Nat. Fossilium, l. i. p. xvii), not being held in great esteem by the scholiasts. "Avicenna," says Agricola, "non *scienter*, sed *more chimistarum*, sulphureo duas species subjecit: sulphur et arsenicum." Hence it is that Albertus Magnus, this superstitious transcriber of the ancients, followed quite a different distribution; for among other changes which he adopted, was that of throwing the salia and sulphurea into one class, under the name of *Media*.

Such were the first attempts at introducing some order among the unorganized bodies. The chemists on one side proposed the component parts, which, however, far from being demonstrated, were only hypothetically assumed by them: the scholiasts, on the other hand, were equally intent upon investigating and recommending the characters derived from the external form of minerals, their supposed medicinal properties and miraculous virtues. This twofold view of the subject characterizes the writings of almost all succeeding mineralogical authors, down to a period not far remote from the present; we find them either implicitly adopting the ideas of the chemists, or announcing themselves as mere empirical collectors of curiosities. Agricola, the first systematic mineralogical writer, may, indeed, be considered as an exception to this rule. He directed his thoughts to the uniting the views of these two classes of writers, although he certainly inclined more to those of the second.

Agricola was the first who paid attention to external characters, which were determined by him with tolerable precision, and employed for the distinction of the mineral substances then known. All fossils (corpora subterranea) are divided by him into simple, or such as consist of homogeneous particles; and into compounded, or such as are formed of heterogeneous parts, taken in a mineralogical acceptation of the terms. The minerals belonging to the former of these divisions are found in four different forms, which are, 1. Terra. 2. Succus concretus. 3. Lapis. 4. Metallum. *Terra* he defines as "corpus fossile quod potest manu subigi, cum fuerit aspersum humore, aut ex quo, cum fuerit madefactum, fit lutum." These earths he divides partly according to some external characters, partly after their localities, in cases where their names are derived from the countries or places in which they are found. "*Succus concretus* est corpus fossile siccum et subdurum, quod aquis aspersum aut non mollitur, sed liquescit, aut, si mollitur, multum vel pinguitudine differt a terra, vel materia ex qua constat." The fossils of this class Agricola divided into macra and pinguia; the former consist of a juice partly mixed with earth (sal nitrum), partly with metal (chrysocolla, ærugo, ferrugo, cæruleum), partly mixed both with earth and metal (atramentum sutorium, alumen, &c.): to the latter he refers sulphur, bitumen, sandarach, and auripigmentum. The ambiguity of this definition, and the impropriety of placing in one and the same class substances so very distinct from each other, require no comment. The stones are the third class of Agricola's system. "Lapis est corpus fossile siccum et durum, quod vel aqua longinquo tempore vix mollit, ignis vehemens redigit in pulverem; vel non mollit aqua, sed maximo ignis liquescit calore." The stones are subdivided into lapis, gemma, marmor, and saxum. His definition of metals, being his fourth class, is, "corpus fossile natura vel liquidum vel durum quidem, sed quod ignis liquescit calore." He enumerates ten metals. The last class of Agricola's system comprehends mixed and compound fossils. 1. Mixtures of stones and juices (succi). 2. Of earth and metal. 3. Of stone and metal. 4. Of juice, stone, and metal. To the second and third division he refers the various ores. What has been said may convey an idea of Agricola's systematic knowledge in mineralogy. Considered as a first essay, his system is indeed very valuable, and more logical precision in its execution can scarcely be expected from its author; but, on the other hand, it cannot be denied that he was often strangely led astray by his deficiency in chemical knowledge, nor did he even suspect that the preservation of unity is at all required in the construction of a system.

Most of the systematic mineralogical writers who succeeded Agricola were chemists, or rather alchemists; but even these adopted his system, although it was more or less altered by some of them. Thus, Cardanus retained the "succi concreti," but he followed the chemists in separating the salts from the bitumens.

Kentmann, who published in 1569 his book "De omni rerum fossilium genere," was a nomenclator who adopted Agricola's system almost without making any alteration. The earths and the succi concreti are, however, subdivided in a different manner, and a treatise on petrifactions is added, entitled "Alcyonia, conchæ et alia, quæ ex salso liquore maris et ex ejus spuma, cum tenuissimis sordibus permista concrescunt."

The celebrated botanist, Cæsalpinus, was the first who properly separated the salts from the inflammable fossils. The divisions of his system are, 1. Mineralia humore solubilia, to which he refers the earths and salts. 2. Oleo solubilia, which contains the sulphureous substances with orpiment. 3. Illiquabilia, comprehending the rocks, and all other stones, as also corals, animal calculi, &c. 4. Liquabilia, or metals.

Aldrovandus, that voluminous writer, compiled his system from Agricola, Cardanus, and Cæsalpinus. With him the petrifactions begin to be considered as objects of curiosity.

Besides the many authors of that period, who busied themselves by arranging the minerals of the ancients according to Agricola's system, which they now and then altered conformably to the supposed discoveries of the day, there were some who, although not systematic writers themselves, had considerable influence on the systems of succeeding periods. Among these was the famous Jesuit, Athanasius Kircher, who (in his Mundus subterraneus, Amsterd. 1678) surpassed all his precursors in the amassing of wonderful curiosities and *lusus naturæ;* although Jonston had not been remiss in affixing much importance to the strange forms representing celestial and sublunary bodies, presented to the world in his "Notitia regni mineralis," which appeared at Leipzig in 1661.

Of greater importance were the advantages which the science of mineralogy derived from the investigations of Beccher. This mineralogist (in his "Physica subterranea," first published in 1667,) considered water and earth as the remote, and vitreous, inflammable, and mineral earths (sal, sulphur, mercurius), as the proximate constituent parts of all minerals, which he accordingly arranged under three classes; the first comprehending such stones in which the vitreous earth constitutes the principal ingredient; the second and third class containing the substances in which the two remaining earths predominate. Though the principles which thus formed the base of his system were derived from gratuitous assumption, yet they served to prove the possibility of a chemical arrangement of the genera, and of applying the differences observable in the constituent parts of the earths and stones as fit characters for distinguishing them.

The stones Beccher divides into those that either calcine or vitrify in the fire; those that preserve their solidity, or become friable when ignited; and those that, when ignited and immersed in water, either remain solid or crumble to pieces. In his work, we for the first time find antimony, zinc, and bismuth, (though, indeed, also pyrites,) introduced as imperfect or semi-metals. The perfect metals, of which he has six in number (for mercury he considers as a *decompositum*), are classed after the following characters: two of them (gold and silver) melt in a red heat; two (copper and iron) are red-hot before they melt; and two (tin and lead) melt before they can be heated to redness.

The next in succession are the *decomposita*, or such minerals as are composed of several earths and stones, earths and metals, &c., or of several species belonging to the same class, such as mixtures of metals; and they are divided into terrea, lapidea, metallica, and aquea.

Bromelius (who published a book intitled "Catalogus rerum curiosarum," Gothenburg, 1698,) began to refer to the same class sulphur and the bituminous substances, which he called sulphurea and pinguia: he retained Beccher's division of metallic substances into perfect and imperfect metals.

Nor should the Swedish mineralogist Hiärne be left unnoticed here, who introduced several changes into the then prevailing system of mineralogy: thus, for instance, he was the first who separated the common from arsenical pyrites, which before him had constantly been united by authors. Like Bromelius he places sulphur and the bituminous substances in the same class; an arrangement which has been retained by all succeeding systematic writers in mineralogy: and though the term "succus concretus" continued to be employed by some of them, it was always used as a synonym of salt.

Towards the close of the 17th century Woodward published his catalogue of minerals. His knowledge of mineralogy was superior to that of any other English author of his time.

Of the mineralogists of the beginning of the 18th century, the most celebrated were Beyer, Bütner, and Scheuchzer. These authors, who were less superstitious and more to be depended upon than Aldrovandus and Kircher, principally presented the world with their observations on petrifactions. The two latter, however, were not quite free from prejudice; they introduced an excess of biblical teleology into the mineralogical science, and most of their observations were made with a view to the universal deluge. But it is not to be denied that all three contributed largely towards directing the attention of mineralogists to the structure of mountain rocks. All the mineralogical writers that had preceded them were chemists, practical miners, or at best mere oryctognosians: but about this period naturalists began to examine rocks with other than merely metallurgical views; mineralogy was found susceptible of being treated in a scientific manner, and it began to go hand in hand with the other branches of physical knowledge. Even Scheuchzer and Beyer, and some other authors of those times, by not confining themselves to the mere collecting of petrifactions, but also considering them as vestiges of important revolutions, had opened a new field of investigation to the thinking naturalist.

Magnus von Bromell, a Swede and pupil of Hiärne and Boerhaave, published a system of mineralogy, (Inledning til kundscab om Mineralier, &c. Stockh. 1730,) in which he not only availed himself of all the improvements made by his masters, but also proposed a new chemical division of stony substances into such as are refractory (apyri), or calcinable, or or vitrefcible, in the fire; to which were added the figured ftones (figurati.)

After Von Bromell, Linnæus appeared, and it is chiefly from this period that the origin of fyftematic mineralogy may be dated, when our fcience, together with the other branches of natural hiftory, acquired a degree of popularity which it had never before enjoyed. It has been queftioned whether Linnæus himfelf contributed to the advancement of the fcience; and fome writers have even denied him any knowledge in this department of natural hiftory. But the fact is that in his earlier years Linnæus devoted a confiderable fhare of time to the ftudy of mineralogy, and whatever his merits in framing his mineralogical fyftem may be, certain it is that it befpeaks the fame acutenefs and the fame original mode of thinking, which we fo much admire in the other works of this illuftrious naturalift. His mineralogical arrangement cannot, indeed, be compared with the mafterly fyftems of zoology and botany, and it even appears that he added it chiefly for the fake of completing his grand work of a general fyftem of nature. It has been juftly urged againft the applicability of his fyftem, that it is founded on an erroneous principle, *viz.* on the fuppofition that the cryftalline form of mineral fubftances is due to different falts, and that they are to be claffed accordingly; but even this erroneous notion ferved to direct the attention of the ftudent to the important characters derived from the diverfity of cryftallization, of which fubfequent mineralogifts availed themfelves with fignal fuccefs, for the diftinction and claffification of mineral fubftances. (See CRYSTALLIZATION.) If, moreover, we confider the advantages which neceffarily accrued to mineralogy by thofe general principles that were introduced into natural hiftory by Linnæus, the precifion of his terminology, his philofophical views of claffification, &c., all of which were equally applicable to our fcience, it can no longer be a matter of doubt that the labours of the great Swedifh naturalift have, at leaft indirectly, been of effential fervice to the advancement of this important branch of natural knowledge.

The chemical part of mineralogy began, about this period, to be cultivated with great fuccefs. The difcoveries of Henkel and Pott, who (if we except Hiärne, and perhaps Beccher) may be looked upon as the firft mineralogical chemifts, had clearly demonftrated the important advantages which mineralogy may derive from chemiftry. The external characters were almoft entirely rejected by Henkel as vague and unfatisfactory. In his "Idea Generalis de Lapidum Origine," the inflammable mineral fubftances (to which, however, he refers alfo vegetable gum and phofphorus) conftitute a feparate clafs; the clafs of falts contains acids, alkalies, and neutral falts, and the alkaline are kept diftinct from the earthy, and the latter from the metallic neutral falts; the earths he divides in the fame manner as Beccher, and he fubdivides them after the degree of heat required for their fufion; the clafs of ftones comprifes the calcareæ, filiceæ, calcareo-filiceæ or limofæ; a claffification which he propofes with great modefty, although it may indeed be confidered as a great ftep in mineralogical chemiftry. Henkel's "Kies-Hiftorie" (Hiftory of Pyrites), confidering the period in which it was written, difplays an uncommon degree of accuracy, and contains, as well as others of his works, valuable contributions towards the natural hiftory of various metallic fubftances, and their ores.

More accurate chemical knowledge marks the works of the celebrated Pott, who, on account of the valuable difcoveries illuftrative of mineralogy, may juftly be called the Klaproth of the period in which he flourifhed. No mineralogift before him had fo clearly demonftrated that it is the degree of hardnefs alone which diftinguifhes earths from ftones, and that this property, infinitely variable in various fubftances, cannot furnifh a principal diftinctive character for their claffification. Profound chemical knowledge and unintermitted application enabled him to fubject the fimple earths to a clofer examination, to determine their character with greater precifion, and alfo to augment their number. His claffification of the earths, which, with fome alterations, juftly became a ftandard for his fucceffors, is the following:—1. *Alcaline earth*, which may be burnt into quick-lime, and is foluble with effervefcence in the acids. 2. *Siliceous earth*, little alterable by calcination, and infoluble in acids: this he confidered as the principal caufe of hardnefs of the ftones in which it predominates. In his "Lithogeognofie," Pott called this latter "vitrefcible" earth; but finding afterwards that the property which gave rife to it is common to all the earths, he difcontinued the name. 3. *Argillaceous earth*, which, on account of its vifcidity and ductility, is fufceptible of being turned on the lathe, becomes hard in the fire, and is infoluble in the acids. 4. *Gypfeous earth*, which by burning is converted into gypfum, which refifts the acids, and is difficultly vitrifiable. The fpecies of earthy foffils were diftributed among thefe claffes, according as one or the other of the above earths formed the predominant conftituent part in them. Had this great chemift lived to extend to the metals the fame ftrict examination to which he fubjected the earths and ftones, mineralogy would undoubtedly, in his time, have arrived at that perfection which afterwards refulted from the laborious experiments of fucceeding chemical mineralogifts.

Nearly about the fame time Wallerius publifhed his fyftem of mineralogy (Mineral-rike indelt och befkrifvit, Stockholm 1747), in which, as the difcoveries of Pott were not then known to him, he adopts the claffification of the older mineralogifts, feparating earths from ftones, the former of which he divided into pulverulent earths (terræ macræ), argillaceous earths (terræ pingues), mixed earths (terræ minerales f. compofitæ), and fand (arenæ); the latter (with Bromell the younger) into lime-ftones (calcarei), vitrifiable ftones (vitrefcentes), refractory ftones (apyri), and rocks (faxa). The fubftances of the third clafs of his fyftem are called mineræ, comprehending faline ores (falia), inflammable fubftances (fulfura), and metals. The fourth clafs contains the concretions (concreta), which are fubdivided into ftalactical fubftances (pori), petrifactions (petrificata), figured ftones (figurata), and calculi.

This work of Wallerius was a welcome prefent to the mineralogical world. The genera before its appearance were extremely vague, and the external characters pointed out in the defcriptions were infufficient for the determination of a given foffil fubftance; it was indeed required to be previoufly acquainted with minerals in order to underftand the fyftematic works, and the knowledge of foffils was propagated more by tradition than by fcientific inftruction. One of the chief objects of oryctognofy, the determining a given foffil from defcription alone, even without any previous practical knowledge of mineral fubftances, was in a great meafure attained by this new work of Wallerius; the utility of which was greatly enhanced by the addition of a correct and critical fynonymy of preceding mineralogifts. But however great the advantages which accrued to the fcience by the labours of this excellent mineralogift, his fyftem was ftill, in many parts, effentially defective: thus, for inftance, the characters of the firft, fecond, and fourth claffes were derived from the external form, thofe of the third, on the other hand, from the mode of occurrence of the fubftances which it contains; the orders are chemically determined in the three firft

claffes,

classes, while those of the fourth class are derived from the form, and even the origin of the minerals referred to it. Nothing can be more vague than the definition he gives of concretions, which to him are "mineral substances composed of a fossil and common matter, formed in the usual manner, but hardened, and, as it were, cemented, either by fire or water, and therefore different from other minerals in their origin, figure, and the localities in which they occur."

Woltersdorf, a pupil of Pott, proposed to frame a system, embracing the whole mineral kingdom, in the manner of his master's system of lapideous substances; but his chemical knowledge appears to have been inadequate to the task which he undertook: his system, therefore, not being sufficiently supported by experiments, shared the fate of all attempts at natural arrangement not founded on actual observation, and proved abortive.

Pott's discoveries had paved the way to a more judicious and proper mode of framing classes and orders in mineralogy. In the same manner as botanists, in former times, separated trees from plants, mineralogists, equally misled by an apparently important external character, had kept the stones distinct from the earths; it was principally Pott who shewed the impropriety of this separation, and also that both earths and stones are divisible into several genera, according to the greater or less proportion they contain of the several chemically simple earths. The idea now presented itself, that perhaps in future the genera might be successfully determined after the number of earths which enter the composition of each, and that this principle of classification might be made subservient to the preservation of unity of the system. The salts were already arranged, also in the mineralogical systems, according to their more obvious chemical differences. To the class of metallic substances all such minerals were referred as chiefly contained metals, and the mineralized ores were no longer separated from the native metals. On the other hand, the writers on petrifactions, Bourguet, d'Argenville, &c. still followed closely the footsteps of Scheuchzer. Lusus naturæ, fossil productions imitative of organic structure, still occupied a conspicuous place in their arrangements, from which no systematic writer had yet dared to exclude them. To do this was reserved for Cronstedt.

With Cronstedt begins the second principal era of the science of mineralogy, if the first is to be dated from Agricola. In his work (Forsög til Mineralogie, &c. Stockh. 1758,) he sets out with giving some highly interesting and important observations on the gradual effects of fire and water on minerals, and on the slow but unintermitted changes they experience by physical and chemical agents in the bowels of the earth.

The minerals are divided by Cronstedt into earths, bitumens, salts, and metals. The earths are subdivided according to the difference in their mixture, as far as it was then known, into the following nine orders:—1. Calcareous stones; to which order also gypsum is referred. 2. Siliceous substances. 3. Granitic substances (garnet, basalt, shorl.) 4. Argillaceous substances. 5. Micaceous substances (mica, talc.) 6. Fluoric substances (fluor spar.) 7. Asbestine substances. 8. Zeolite, to which he refers also the lapis lazuli. 9. Manganesian substances (manganese, wolfram.) The salts are classed according to the acids or alkalies. The class of inflammables, which till then had been but little elucidated, has hardly undergone any alterations. He has, however, added the plumbago or graphite to it. The class of metals comprehends as many genera as simple metals were known in the author's time. For the first time we find here the then newly discovered platina, and also nickel, one of Cronstedt's own discoveries.

One of the principal and most striking advantages of this system, is the strict unity observed in the principle of classification, which is throughout chemical; and the principles on which these classes and orders are established are, still pretty generally acknowledged as genuine by the systematic mineralogists of the present day. The garnets were not separated by Cronstedt, from supposing them to contain a peculiar earth; on the contrary, he himself considers them as a mere variety of iron-shot quartz, and the separation was suggested by some peculiarities of external and physical characters presented by the garnets and shorls, the component parts of which were not as yet known to him. This unacquaintance with the constituent parts, and their peculiar chemical properties, likewise induced him to separate mica, talc, asbest, fluor, zeolite, and azur stone, manganese and wolfram from the other earths: though he actually suspected that the two former of these substances contained argillaceous earth, and that manganese and wolfram were known metals. Soon after, a new acid was discovered in fluor spar, a new earth in talc and asbest, and new metals in manganese and wolfram. In some instances he has deviated from the unity of his classification, particularly in the class of inflammable substances, to which, probably, on account of its use, iron pyrites is referred, though it does not display those properties which are mentioned as characteristic of that class. As, on one hand, Cronstedt's system is enriched with many new species, so, on the the other hand, this mineralogist properly rejected a great number of substances, which occupied a conspicuous place in the writings of his predecessors; for instance, the lusus naturæ, figured stones, &c. He also shewed that petrifactions cannot claim a separate place in the system merely because they have retained part of their original form; as also that compound mountain rocks are not admissible into a system which comprehends mineralogically simple substances. Both these natural productions are treated on in an appendix.

No work on mineralogy ever created greater sensation than that of Cronstedt. A short time after its appearance, it was translated into almost all European languages, the system was studied in all civilized countries, and with some occasional, often unnecessary deviations, was adopted by all writers on mineralogy. Yet with all this, Cronstedt's system is not without its great defects: thus, for instance, it is a matter of great difficulty to become acquainted with a mineral substance by consulting the description he gives of it. Cronstedt improved the classification of minerals, but the task of giving the greatest possible perfection to description, so indispensably necessary for the diagnosis of fossils, was reserved for succeeding mineralogists. He even neglected those external characters which were known and adopted in his time; but these, it must be confessed, were, for the greatest part, unsettled and vague.

At the same time with Cronstedt's Mineralogy, or immediately after, Lehmann and Vogel published their Systems, which, however, did not contribute much to the advancement of the science.

Marggraf demonstrated the peculiar nature of magnesian earth, which became the foundation for a new order of earthy substances. His writings contain, moreover, many discoveries highly important to chemistry, but which it is not necessary to detail in this place.

Wallerius was the first by whom the principles on which systematic writers had hitherto arranged mineral substances, were subjected to a strict examination. He rejected all characters derived from the value, use, and geognostic situation, and established it as a rule, that the orders and genera should be founded on chemical characters alone, while the species

species should principally be determined by their external characters. These principles he employed in the new edition of his "Mineralogical System," published at Stockholm in 1772. The nomenclature of no mineralogical writer before him had been equally correct and precise. His external characters, combined with the chemical ones then known, enabled the student, at least in some measure, to discriminate minerals by means of these improved descriptions. The genera, too, were distinguished by him with greater precision, and augmented with many new ones. In these respects Wallerius holds a most distinguished place among mineralogical writers, and his work still deserves to be consulted by the student in oryctognosy. It cannot, however, be denied that his terminology is still much too vague, and his external characters far from being sufficiently complete; for, as Werner very justly remarks, description is one of the principal objects of oryctognosy, and it is better to see a mineral badly arranged and well described, than well arranged and badly described. But even in his arrangement Wallerius has fallen into errors, which later discoveries might have taught him to avoid. In separating earths from stones he is not even faithful to his own principles of classification; and the reasons he assigns for so doing are, indeed, very unsatisfactory. His retaining the faulty division into vitrescible and fixed stones, his referring to one and the same class the salts, the sulphureous and bituminous substances, together with the metals, were among the more important defects in his classification.

It was about this time that Engström, by pointing out a more convenient method of trying some of the chemical properties of minerals by subjecting them to the flame urged by the blowpipe, greatly contributed toward facilitating the diagnosis of minerals, especially that of metallic substances.

Werner now published his classical work on the external characters of minerals, (Von den äussern Kennzeichen der Fossilien, Leipzig 1774,) upon the appearance of which the vague terminology which had, till then, rendered description almost useless, gave way to a settled and determinate language, and the foundation was laid of a system which has deservedly procured its framer the title of the father of systematic mineralogy. In the work just mentioned, all characters are described with uncommon precision, which may appear pedantic to those who are ignorant of the salutary effects which this very circumstance has on the discrimination of minerals. In 1780, Werner published a German translation of Cronstedt's Mineralogy, accompanied with notes, in which he makes us acquainted with his ideas respecting a system of oryctognosy. This was followed, in 1791, by a descriptive Catalogue of the Mineral Collection of M. Pabst von Ohein, in which we have the first authentic sketch of his system. These two works, and some highly interesting memoirs in "The Bergmännishe Journal," and some other periodical publications, is all that has been published by this great and modest mineralogist. All the expositions of his system which we possess are by his pupils; they are of various merit, and some of them are but ill calculated to convey an adequate idea of its excellencies. The late Mr. Kirwan, in his "System of Mineralogy," (a work of peculiar merit, on account of the many original observations which it contains) was the first who made the Wernerian system known in England; and after him professor Jameson, a distinguished pupil of the Freiberg school, has published an elaborate work in three volumes, the two first of which contain the system of oryctognosy according to the method of Werner, the third giving a complete exposition of his system of geognosy.

The fundamental principle laid down by Werner, in the systematical arrangement of fossils, is their natural affinity, which he allows to be founded on the chemical mixture of their component parts. These may be distinguished into essential and accidental component parts; the former of which alone are considered in the classification of mineral substances. The essential component parts are subdivided into predominant and characteristic ones; and generally the characteristic happen to be, at the same time, the predominant constituents. By Humboldt the former are called the enveloping constituent parts. All mineral substances are distributed by Werner into four classes, which are founded on what is called the fundamental constituent parts, *viz.* the earthy, saline, inflammable, and metallic; each class being called after that fundamental constituent part which predominates in and characterizes it. Thus we have the earths, the salts, the inflammables, and the metals. These classes are subdivided into genera, which are derived from the variety in the component parts of the minerals comprehended in each class; there being as many distinct genera as there are predominating, or, at least, characteristic constituent parts discovered in their mixture. Werner has himself disregarded this rule in several instances, and we suppose has now even entirely discontinued the division into genera; at least, several of his pupils have, in their systematic works, introduced *families* as the only division between class and species; each family being a group of species that manifest close affinity to each other, such as the "Feldspar family," the "Zeolite family," &c. By this means the system is so far freed from the shackles of chemistry, and the contradictions are avoided, which so frequently strike the student of the Wernerian system. In the same manner perhaps, also, the species might in some measure be made independent of chemistry. The character of the species, according to the original idea of the founder of this system, was to be derived from the chemical mixture, and from the differences in the quantity and quality of the constituent parts. But in most cases, where no analyses existed of minerals, or no satisfactory ones, external characters were substituted the more readily, as it is an axiom with Werner that a difference in external characters is indicative of a corresponding difference in the component parts, whether it be in their quantity and quality, or in the particular state of their chemical combination. If, therefore, a mineral differs from another related substance in three or more external characters, it is now considered as a distinct species. This circumstance accounts for the considerable number of species in the Wernerian system, compared with those of Haüy's, whose characters employed for specification are confined within a far more narrow compass. We shall shew in another place, that the laws for framing species in mineralogy, whatever the characters may be on which they are founded, must always be arbitrary: but fortunately for the science, the different opinions entertained by different schools respecting the nature of the species, is a mere matter of speculation, exerting little or no influence either on the diagnosis or the arrangement of mineral substances: for, provided the natural connection between two mineral substances remain undisturbed, it is certainly of no great importance whether one of them be degraded into a mere variety of its neighbour, or raised to the rank of a distinct species. Werner enumerates three different kinds of affinity of minerals, *viz.* the chemical, depending on the similarity of their constituent parts; the oryctognostical, consisting in the approximating resem-

resemblances of their external characters; and the geognostic affinity, denoting similarity in occurrence, relative age, &c. The species is subdivided by Werner into *subspecies* and *variety:* by the former are meant fossils belonging to the same species with another, but differing from it in two or three particular external characters; the latter is produced by the difference in any single external character, such as colour, fracture, &c.

The following is a tabular view of the Wernerian oryctognostic system, according to the improvements it has experienced up to 1803; to which are subjoined the additions lately made by its founder.

Class I. EARTHY FOSSILS. A. *Diamond Genus:* 1. Diamond. B. *Zircon Genus:* 2. Zircon. 3. Hyacinth. 4. Cinnamon-stone. C. *Flint Genus: Chrysolite Family:* 5. Chrysoberyl. 6. Chrysolite. 7. Olivine. 8. Coccolite. 9. Augite. 10. Pistacite. 11. Vesuvian.—*Garnet Family:* 12. Leucite. 13. Melanite. 14. Garnet; noble, common. 15. Staurolite. 16. Pyrope.—*Ruby Family:* 17. Spinelle. 18. Sapphire. 19. Emery. 20. Corundum. 21. Diamond spar. 22. Ceylanite. 23. Topaz.—*Shorl Family:* 24. Euclase. 25. Emerald. 26. Beryl; noble, shorlous. 27. Shorl; common. Tourmaline. 28. Axinite.—*Quartz Family:* 29. Quartz amethyst; (common, thick fibrous). Rock crystal. Milk quartz. Common quartz. Prase. 30. Iron flint. 31. Hornstone; splintery, conchoidal, wood-stone. 32. Flint slate; common, Lydian-stone. 33. Flint. 34. Calcedony; common, carnelian. 35. Hyalite. 36. Opal; noble, common, semi-opal, wood-opal. 37. Menilite 38. Jasper; Egyptian (red, brown), striped, porcelain, common (conchoidal, earthy). 39. Heliotrope. 40. Chrysoprase. 41. Plasma. 42. Cat's-eye.—*Pitch-stone Family:* 43. Obsidian. 44. Pitch-stone. 45. Pearl-stone. 46. Pumice.—*Zeolite Family:* 47. Prehnite; fibrous, foliated. 48. Zeolite; mealy, fibrous, foliated, radiated. 49. Cubicite. 50. Cross-stone. 51. Lomonite. 52. Schmelzstein (Dipyre, H.) 53. Natrolite. 54. Lazulite. 55. Azure-stone.—*Feldspar Family:* 56. Andalusit. 57. Feldspar; adularia, Labrador, common, (fresh, disintegrated), compact, hollow spar. 58. Scapolite. 59. Arctizite. 60. Spodumene. 61. Ichthyophthalmite.—D. *Clay genus: Clay Family:* 62. Pure clay. 63. Porcelain earth. 64. Common clay; loam, pipe-clay, potters' clay, (earthy,) variegated, and slate-clay. 65. Clay-stone. 66. Adhesive slate. 67. Polishing slate. 68. Tripoli. 69. Float-stone. 70. Alum-stone.—*Clay-slate Family:* 71. Alum-slate; common, glossy. 72. Bituminous shale. 73. Drawing-slate. 74. Whet-slate. 75. Clay-slate:—*Mica Family:* 76. Lepidolite. 77. Mica. 78. Pinite. 79. Pot-stone. 80. Chlorite; chloritic earth, chlorite slate, common and foliated chlorite.—*Trap Family:* 81. Hornblende; common, Labrador, basaltic, hornblende slate. 82. Basalt. 83. Wacke. 84. Clink-stone. 85. Iron-clay. 86. Lava.—*Lithomarge Family:* 87. Green earth. 88. Lithomarge; friable, indurated. 89. Rock-soap. 90. Umbra. 91. Yellow earth.—E. *Talc Genus: Soap-stone Family:* 92. Native magnesia. 93. Bole. 94. Meerschaum. 95. Fullers'-earth. 96. Steatite. 97. Bildstein.—*Talc Family:* 98. Nephrite; common, axe-stone. 99. Serpentine; common, noble, (conchoidal, splintery). 100. Schillerstein. 101. Talc; earthy, common, indurated. 102. Asbest; rock-cork, amianth, common asbest, rock-wood.—*Actinote Family:* 103. Kyanite. 104. Strahlstein; asbestous, common, glassy. 105. Tremolite; asbestous, common, glassy. 106. Salite.—F. *Lime-stone Genus: Carbonats:* 107. Rock-milk. 108. Chalc. 109. Lime-stone; compact, (common, roe-stone), foliated, (granular, calc. spar), fibrous, (common, calc. sinter,) pea-stone. 110. Lime-tuff. 111. Foam earth. 112. Slate-spar. 113. Brown spar; foliated, fibrous. 114. Schaalstein. 115. Dolomite. 116. Rhomb spar. 117. Stink-stone. 118. Marl; marl-earth, indurated m. 119. Bituminous marl-slate. 120. Arragon.—*Phosphats:* 121. Appatite. 122. Asparagus-stone. 123. Phosphorite.—*Fluats:* 124. Fluor; compact, F. spar.—*Sulphats:* Gypsum; earthy, compact, foliated, fibrous. 126. Selenite. 127. Anhydrite. 128. Cube spar.—F. *Baryte Genus:* 129. Witherite. 130. Heavy spar; earthy, compact, granular, curved lamellar, straight lamellar, columnar spar, prismatic spar, Bolognese spar.—G. *Strontian Genus:* 131. Strontian. 132. Celestine; fibrous, foliated.—H. *Halite Genus:* 133. Boracite. 134. Cryolite.

Class II. FOSSIL SALTS.—*Carbonats:* 135. Natural soda.—*Nitrats:* Natural nitre.—*Muriats:* Natural rock-salt; rock-salt, (foliated, fibrous,) lake-salt. 138. Natural sal-ammoniac.—*Sulphats:* 139. Natural vitriol. 140. Hair-salt. 141. Rock-butter. 142. Natural Epsom-salt. 143. Natural Glauber-salt.

Class III. INFLAMMABLE FOSSILS.—*Sulphur Genus:* 144. Natural sulphur; common, volcanic.—*Bituminous Genus:* 145. Mineral oil. 146. Mineral pitch; elastic, earthy, flaggy. 147. Brown coal; bituminous wood, earth coal, alum earth, common brown coal, moor coal. 148. Black coal; pitch coal, columnar, slaty, foliated, coarse, cannel coal.—*Graphite Genus:* 149. Glance coal; conchoidal, slaty, scaly, compact. 151. Mineral charcoal.—*Resin Genus:* Amber; white, yellow. 153. Honey-stone.

Class IV. METALLIC FOSSILS.—*Platina Genus:* 154. Native platina.—*Gold Genus:* 155. Native gold; gold-yellow, brass-yellow, greyish-yellow.—*Mercury Genus:* 156. Native mercury. 157. Native amalgam; semi-fluid, solid. 158. Mercurial horn-ore. 159. Mercurial liver-ore; compact, slaty. 160. Cinnabar; dark, light-red.—*Silver Genus:* 161. Native silver; common, auriferous. 162. Antimonial silver. 163. Arsenical silver. 164. Corneous silver-ore. 165. Silver black. 166. Silver glance. 167. Brittle silver glance. 168. Red silver-ore; dark, light. 169. White silver-ore. 170. Black silver-ore.—*Copper Genus:* 171. Native copper. 172. Copper glance; compact, foliated. 173. Variegated copper-ore. 174. Copper pyrites. 175. White copper-ore. 176. Grey copper-ore. 177. Copper black. 178. Red copper-ore; compact, foliated, capillary. 179. Tile ore; earthy, indurated. 180. Copper azure; earthy, indurated. 181. Malachite; compact, fibrous. 182. Copper green. 183. Iron-shot copper green; earthy, slaggy. 184. Copper emerald. 185. Copper mica. 186. Lenticular ore. 187. Olive ore. 188. Copper muriat.—*Iron Genus:* 189. Native iron. 190. Iron pyrites; common, radiated, hepatic, capillary. 191. Magnetic pyrites. 192. Magnetic iron-stone; common, arenaceous. 193. Iron glance; common, (compact, foliated,) micaceous. 194. Red iron-stone; red iron-froth, ochrey and compact red iron-stone, red hematite. 195. Brown iron-stone; brown iron-froth, ochrey and compact iron-stone, brown hematite. 198. Clay iron-stone; reddle, columnar, lenticular, jaspery, common, reniform, and pisiform clay-stone. 199. Bog iron-ore; morass-ore, swamp-ore, meadow-ore. 200. Blue iron-earth. 201. Pitchy iron-ore. 202. Gadolinite. 203. Green iron-earth. 204. Cube-ore.—*Lead Genus:* 205. Galena; common, compact. 206. Blue lead-ore. 207. Brown lead-ore. 208. Black lead-ore. 209. White lead-ore. 210. Green lead-ore. 211. Red lead-ore. 212. Yellow lead-ore. 213. Lead-vitriol. 214. Lead-earth; coherent, friable.

friable.—*Tin Genus:* 215. Tin pyrites. 216. Tin-ſtone. 217. Wood-tin.—*Biſmuth Genus:* 218. Native biſmuth. 219. Biſmuth glance. 220. Biſmuth ochre.—*Zinc Genus:* 221. Blende; yellow, brown, black. 222. Calamine.—*Antimony Genus:* 223. Native antimony. 224. Grey antimony; compact, foliated, radiated, plumoſe. 225. Black antimony. 226. Red antimony. 227. White antimony. 228. Antimony ochre.—*Cobalt Genus:* 229. White cobalt ore. 230. Grey cobalt ore. 231. Cobalt glance. 232. Black cobalt ochre; earthy, indurated. 233. Brown cobalt ochre. 234. Yellow cobalt ochre. 235. Red cobalt ochre; cobalt cruſt, cobalt bloom.—*Nickel Genus:* 236. Copper nickel. 237. Nickel ochre.—*Mangancſe Genus:* 238. Grey mangancſe ore; radiated, foliated, compact, earthy. 239. Black mangancſe. 240. Red mangancſe.—*Molybdena Genus:* 241. Molybdena.—*Arſenic Genus:* 242. Native arſenic. 243. Arſenical pyrites; common, argentiferous. 244. Orpiment; yellow, red. 245. Arſenic bloom.—*Scheele Genus:* 246. Tungſten. 247. Wolfram.—*Menachine Genus:* 248. Menachan. 249. Octahedrite. 250. Rutile. 251. Nigrine. 252. Iſerine.—*Uran Genus:* 253 Pitch ore. 254. Uran mica. 255 Uran ochre.—*Sylvan Genus:* 256. Native ſylva. 257. Graphic ore. 258. Yellow ſylvan ore. 259. Black ſylvan ore.—*Chrome Genus:* 260. Acicular ore. 261. Chrome ochre.

Werner has ſince added ſeveral new ſpecies to this liſt, and from the place aſſigned to one or two of them in the arrangement, it follows that this latter muſt alſo have undergone ſome ſlight alterations. Thus zoiſite is placed between piſtacite and axinite, which in the above tabular view are placed at ſome diſtance from each other. Augite is divided into common, foliated, conchoidal, and granular; and, as next ſpecies to it, the coccolite is added. The Siberian green garnet forms a diſtinct ſpecies next to garnet, under the name of groſſular. To the ſame natural family, Werner has now alſo added the cinnamon ſtone, (which, after Lampadius' incorrect analyſis, had before been placed in the zircon genus,) and the allochroit of d'Andrada. Between plaſma and cat's eye, the fettſtein or elæolite of Klaproth is placed. The ſpecies pumice is divided into three ſubſpecies, common, glaſſy, and porphyritic p. The dichroïte of Cordier is added, as iolite, to the pitch-ſtone family. The blue feldſpar of Stiria now forms a ſpecies diſtinct from, but next to feldſpar, under the name of blau-ſpath. A variety of compact feldſpar (jade of Sauſſure) is called variolite. Porcelain earth now ſtands next to feldſpar, from which it originates. Alſo the meionite and ſommit are united with this family. Potters' clay is now ſub-divided into earthy (formerly called pipe-clay) and ſlaty. To the three ſubſpecies of ſtrahlſtein or actinote is added a fourth, the granular. Silver-black is divided into friable and indurated. What was called capillary iron pyrites, has, by Klaproth's analyſis, proved to be native nickel. The menachine genus has received two additional ſpecies in the brown and the yellow menachan, inſerted after iſerine.

Having given this general idea of Werner's ſyſtem, we cannot proceed to that of Haüy, without making honourable mention of the celebrated Romé de l'Iſle, whoſe indefatigable reſearches ſo eminently contributed to the progreſs of the ſcience of mineralogy in general, and whoſe "Cryſtallographie" (of which the firſt edition appeared in 1773) is deſervedly characterized as the reſult of labours immenſe in their extent, almoſt entirely novel in their object, and of the higheſt importance on account of their utility. His claſſification of minerals has nothing peculiar; but for the accuracy, completeneſs, and elegance of his deſcriptions, and particularly his ſcientific method of determining the cryſtalline forms, he ſtood unrivalled among the mineralogiſts of his time. For an account of the labours of this father of cryſtallography, the reader is referred to the article Crystals.

Several memoirs of Haüy, illuſtrative of his theory of the ſtructure of cryſtals, were followed, in 1801, by that celebrated profeſſor's great work, entitled "Traité de Minéralogie." In this important and truly claſſical production, the new theory (of which a detailed view is given under the article Crystallography) is alſo made ſubſervient to the claſſification of mineral ſubſtances. Haüy has defined the mineralogical ſpecies "an aſſemblage of bodies, the integrant molecules of which are ſimilar to each other, and have the ſame compoſition." According to his mode of viewing the ſubject, minerals have both a geometrical and a chemical limit; the former conſiſts in the invariable form of the molecule, the other in the compoſition of the ſame molecule. Haüy prefers making uſe of the geometrical limit for determining the ſpecies, not only becauſe minerals being in general more or leſs mixed with heterogeneous matter, it often happens that the chemical limit is but imperfectly repreſented by the reſults of the analyſis, whereas mechanical diviſion invariably furniſhes the ſame form of the molecule; but principally becauſe the geometrical limit is far more obvious and palpable, ſince to obtain it nothing is in many caſes required but the mechanical diviſion of the cryſtal. In caſes where the integrant molecule belongs excluſively to a determined combination of component principles, it alone is ſufficient to diſtinguiſh the ſpecies; but there are forms of molecules which are common to ſeveral diſtinct ſpecies; and theſe forms, as far as they are known, happen to poſſeſs the peculiar character of ſymmetry and regularity, conſtituting, as it were, limits with reſpect to other forms. As in this latter caſe the character derived from the integrant molecule is not ſufficient, Haüy adds to it another, chemical or phyſical, character for the diſcrimination of the ſpecies: thus, for inſtance, the property of diſſolving in water, ſuper-added to the cubic form determines muriate of ſoda, or common ſalt; but if the ſame form is united to the property of becoming electric by heat, we have borate of magneſia, or boracite. The type of the ſpecies, according to Haüy, being once determined, it is comparatively eaſy to arrange the varieties of cryſtallization belonging to the ſame ſubſtance, by aſcertaining, with the aſſiſtance of the theory of decrements, whether all their forms, even thoſe which no longer retain a trace of the primitive form, are in exact correſpondence with the latter. With regard to the varieties, ſuch as thoſe compoſed of fibrous, granular, or compact maſſes, of which the type, though it ſtill exiſts in them, can no longer be determined, their diſcrimination depends on the phyſical and chemical properties of the ſubſtance, ſuch as hardneſs, ſpecific gravity, electricity, &c. What regards the genera and upper diviſions, the diſtribution is made after the component parts or chemical properties common to all the ſubſtances contained in the ſame diviſion. The method adopted by Haüy, in his deſcription of the mineral ſpecies, is the following. At the head of the deſcription of each mineral is placed the eſſential character, founded on the moſt conſtant properties which diſtinguiſh its individuals; after which follow the phyſical, the geometrical (comprehending the cleavages and primitive form of the ſubſtance), and the chemical character; to which is added the diſtinctive character, in which the differences are pointed out which diſtinguiſh the ſubſtance in queſtion from others which might be eaſily miſtaken for it. Theſe general characters are followed by the enumeration of the varieties of form (divided into determinable and undeterminable), the varieties depending on light, ſuch as colour, tranſparency, &c.

The

The following outline of Haüy's diſtribution is principally taken from his "Tableau comparatif des Réſultats de la Cryſtallographie, et de l'Analyſe chimique," Paris, 1809. The names included in parentheſes are thoſe of the Wernerian ſchool.

Claſs I. *Acidiferous Subſtances.* *Order* I. Diſengaged acidiferous ſubſtances. 1. Sulphuric acid. 2. Boracic acid. *Order* II. Earthy acidiferous ſubſtances. A With ſimple baſe:—*Firſt Genus:* Chaux (lime), ſp. 1. 3. Chaux carbonatée, (compriſing all the Wernerian ſpecies of carbonates of lime, with the exception of the following ſpecies). 4. Arragonite. 5. Chaux phoſphatée (apatite). 6. Ch. fluatée (fluor). 7. Ch. ſulfatée (gypſum and ſelenite). 8. Ch. anhydro-ſulfatée (anhydrite). 9. Ch. nitratée. 10. Ch. arſeniatée (arſenic bloom; pharmacolite, Klapr.)—*Second Genus:* Baryte. 11. Baryte ſulfatée (barytes or heavy ſpar). 12. Baryte carbonatée (witherite).—*Third Genus:* Strontian. 13. S. ſulfatée (celeſtine). 14. S. carbonatée (ſtrontian). —*Fourth Genus:* Magneſie. 15. M. ſulfatée (natural Epſom or bitter ſalt). 16. M. boratée (boracite). 17. M. carbonatée (native magneſia or talc earth).—*Fifth Genus:* Lime and ſilica. 18. Chaux boratée ſiliceuſe (datholite).—*Sixth Genus:* Silica and alumine. 19. Silice fluatée alumineuſe (topaz and pycnite, or ſhorl beryl).

Order III. Acidiferous alkaline ſubſtances.—*Firſt Genus:* Potaſſe. 20. P. nitratée (natural nitre).—*Second Genus:* Soude. 21. S. ſulfatée (natural Glauber ſalt). 22. S. muriatée (rock-ſalt). 23. S. boratée (tinkal, K.) 24. S. carbonatée (natural ſoda or natron).—*Third Genus:* Ammoniaque. 25. A. ſulfatée (maſcagnin, K.). 26. A. muriatée (natural ſal ammoniac).

Order IV. Acidiferous alkaline-earthy ſubſtances. 27. Alumine ſulfatée alcaline (alum)—*Appendix.* 28. Alumine fluatée alcaline (kryolite). 29. Glauberite.

Claſs II. Earthy ſubſtances. (No ſubdiviſion into orders) 30. Quarz (the whole of Werner's quarz family compriſing fourteen of his ſpecies). 31. Zircon (zircon and hyacinth). 32. Corindon (corundum, ſapphire, diamond-ſpar, emery). 33. Cymophane (chryſoberyl). 34. Spinelle (ſpinel, ceylanit). 35. Emeraude (emerald, beryl). 36. Euclaſe. 37. Grenat (garnet, melanite). 38. Amphigène (leucite). 39. Idocraſe (Veſuvian). 40. Meïonite. 41. Feld-ſpath (feldſpar). 42. Apophyllite (fiſh-eye ſtone, or ichthyophthalmite). 43. Triphane (ſpodumen). 44. Axinite. 45. Tourmaline (ſhorl). 46. Amphibole (all the ſub-ſpecies of hornblende, except Labrador hornbl., actinote, augite and tremolite partly). 47. Pyroxène (augite, ſahlite). 48. Yenite. 49. Staurotide (ſtaurolite). 50. Epidote (piſtazite, zoiſit). 51. Hyperſthène (Labrador hornblende). 52. Wernerite (arktizit). 53. Paranthine (ſcapolite). 54. Diallage (var. of actinote, ſchillerſtein). 55. Gadolinite. 56. Lazulite (azur-ſtone). 57. Meſotype (fibrous and mealy zeolite, nadeſtein). 58. Stilbite (radiated and foliated zeolite). 59. Laumonite (lomonit). 60. Prehnite. 61. Chabaſie (ſchabaſit). 62. Analcime (kubizit). 63. Nepheline (nephelin; ſommit, K.) 64. Harmotome (croſs-ſtone). 65. Peridot (chryſolite, olivine). 66. Mica (glimmer or mica). 67. Pinite. 68. Diſthène (cyanite). 69. Dipyre (ſchmelz-ſtein; dipyr, K.) 70. Aſbeſte. 71. Talc. 72. Marle (hollow ſpar; chiaſtolite, K.)

To this claſs are appended the following ſubſtances, the characters of which are not ſufficiently well underſtood to aſſign them their reſpective places in the ſyſtem.

Allochroite (ſplintery garnet, K.) Alumine pure (pure clay). Amianthoïde. Antophyllit, Schum. and Wern. Aplome. Bergmannit, Schum. Diaſpore. Feldſpath apyre, H. (andaluſit). Feld-ſpath bleu (var. of compact feldſpar). Fibrolite, Bourn. Gabbronite, Schum. Jade (common nephrite, axe-ſtone). Jolithe, W. and K. Kaneel or cinnamon ſtone, W. Lazulit, W. Latialite (Haüyne). Lepidolite, W. Melilite, Fleuriau. Natrolite, W. Pſeudo-ſommit, Fleur de B. Spath en tables (ſchaalſtein). Spinellane. Spinelle zincifère? (automalite). Spinthère, H. Talc? granuleux (earthy talc), and T. glaphique (bildſtein; agalmatolite, Kl.)

Claſs III. Combuſtible not metallic ſubſtances.—*Ord.* I. Simple. 73. Soufre (ſulphur). 74. Diamant (diamond). 75. Anthracite (kohlenblende, glanz-kohle).—*Ord.* II. Compounds. 76. Graphite. 77. Bitume (mineral oil; mineral pitch). 78. Houille (black coal). 79. Jayet (pitch coal). 80. Succin (amber). 81. Mellite (honey-ſtone).

Claſs IV. Metallic ſubſtances.—*Ord.* I. Not immediately oxidable, except by a very high degree of heat, and immediately reducible.—*Firſt Genus:* Platina. 82. P. natif ferrifère (native platina).—*Second Genus:* Or. 83. O. natif. (native gold).—*Third Genus:* Argent. 84. A. natif (native ſilver). 85. A. antimonial (antimonial ſilver); as appendix to it, A. antimonial ferro-arſénifère (arſenical ſilver). 86. A. ſulfuré (vitreous ſilver-ore). 87. A. antimonié ſulfuré (red-ſilver-ore); and as appendix to it, A. antimonié ſulfuré noir (brittle vitreous ſilver). 88. A. carbonaté. 89. A. muriaté (horn-ore or horn-ſilver).—*Ord.* II. Immediately oxidable and reducible: Mercure. 90. M. natif (native mercury). 91. M. argental (native amalgam). 92. M. ſulfuré (cinnabar); and as appendix, Mercure ſulfuré bituminifère (mercurial liver-ore). 93. Mercure muriaté (mercurial horn-ore).—*Ord.* III. Oxidable, but not immediately reducible: *a*, ſenſibly ductile.—*Firſt Genus:* Plomb. 94. P. natif volcanique. 95. P. ſulfuré (galena); by way of appendix, P. ſulf. antimonifère, and P. ſulf. antimonifère et argentifère (weiſſgultig-erz). 96. P. oxydé rouge. 97. P. arſeniaté (flokken-erz, K.) 98. P. chromaté (red lead-ore). 99. P. carbonaté (white lead-ore); and, as appendix, P. carb. noir (black lead-ore, lead earth), and P. carb. cuprifère. 100. P. phoſphaté (brown and green lead-ore). 101. P. molybdaté (yellow lead-ore). 102. P. ſulfaté (natural lead vitriol).—*Second Genus:* Nickel. 103. N. natif (capillary iron pyrites). 104. N. arſenical (copper nickel). 105. N. oxydé (nickel ochre).—*Third Genus:* Cuivre. 106. C. natif (native copper) 107. C. pyriteux (copper pyrites); and, as appendix, C. pyr. hépatique (variegated copper ore). 108. C. gris (grey copper ore). 109. C. ſulfuré (vitreous copper ore). 110. C. oxydulé (red copper ore and tile ore). 111. C. muriaté (ſaltz-kupfer). 112. C. carbonaté bleu (copper azur). 113. C. carb. vert (malachite; copper green). 114. C. arſeniaté (lenticular copper ore; olive ore); as appendix, C. arſen. ferrifère (cupreous arſeniate of iron, Bourn.) 115. C. dioptaſe (copper emerald). 116. C. phoſphaté. 117. C. ſulfaté (copper vitriol, K.)—*Fourth Genus:* Fer. 118. Fer natif (native iron). 119. F. oxydulé (magnetic iron-ſtone); and, by way of appendix, F. oxydulé granuliforme (iron-ſand). 120. F. oligiſte (ſpecular iron, iron mica, red iron froth, red hematite; compact red iron-ſtone, columnar clay iron-ſtone). 121. F. arſenical (common arſenical pyrites); and, as appendix, F. arſenical argentifère (weiſs-ertz, W. noble arſenical pyrites, K.) 122 F. ſulfuré (common pyrites); and, as appendix, F. ſulfuré épigène (leberkies, but not of Werner), and F. ſulfuré ferrifère (magnetical pyrites). 123. F. oxydé (brown hematite; reniform and lenticular clay iron-ſtone; green iron-earth); and, as appendix, F. oxydé réſinite (eiſenpech-erz, or pitchy iron-ore); alſo part of F. oxydé carbonaté (ſparry iron-ſtone). 124. F. phoſphaté (blue iron earth). 125. F. chromaté (eiſen-chrom, K.) 126. F. arſeniaté (cube ore). 127. F. ſulfaté

ſulfaté (native vitriol).—*Fifth Genus:* Etain. 128. E. oxydé (tin-ſtone); and, as appendix, E. oxydé concrétionné (Corniſh tin ore, or wood-tin). 129. E. ſulfuré (tin pyrites).—*Sixth Genus:* Zinc. 130. Z. oxydé (calamine). 131. Z. carbonaté. 132. Z. ſulfuré (blende). 133. Z. ſulfaté (zinc vitriol, K.)—*b*, not ductile.—*Seventh Genus:* Biſmuth. 134. B. natif (native biſmuth). 135. B. ſulfuré (biſmuth glance); and, as appendix, B. ſulf. plumbo-cuprifere (needle ore). 135 B. oxydé (biſmuth ochre).—*Eighth Genus:* Cobalt. 137. C arſenical (white and grey cobalt-ore). 138. C. gris (cobalt glance). 139. C. oxydé noir (black cobalt ochre). 140. C. arſeniaté (red cobalt ochre).—*Ninth Genus:* Arſenic 141. A. natif (native arſenic). 142. A. oxydé (arſenic bloom). 143. A. ſulfuré (yellow and red orpiment).—*Tenth Genus:* Manganèſe. 144. M. oxydé (grey and black manganeſe ore); and, as appendix, M. oxydé carbonaté (red manganeſe ore). 145. M. ſulfuré (manganeſe glance, K.) 146. M. phoſphaté ferrifère (phoſphor. mangan, K.)—*Eleventh Genus:* Antimony. 147. A. natif. (native antimony). 148. A. ſulfuré (grey antimony ore). 149. A. oxydé (white antimony ore; antimony ochre). 150. A. oxydé ſulfuré (red antimony ore).—*Twelfth Genus:* Uran. 151. U. oxydulé (pitch ore). 152. U. oxydé (uran mica; uran ochre).—*Thirteenth Genus:* Molybdena. 153. M. ſulfuré (molybdena).—*Fourteenth Genus:* Titane. 154. T. oxydé (rutil; menakan). 155. T. anataſe (octaedrit). 156. T. ſiliceo-calcaire (ſphen).—*Fifteenth Genus:* Scheelin. 157. S. ferruginé (wolfram). 158. S. calcaire (tungſten).—*Sixteenth Genus:* Tellure. 159. T. natif; auro-ferrifèré (native ſylvan), argentifère (graphic ore); auro-plombifère (nagyag ore).—*Seventeenth Genus:* Tantale. 160. T. oxydé ferro-manganéſifère (tantalit, K.) and yttrifère (yttro-tantalite, K.)—*Eighteenth Genus:* Cerium. 161. C. oxydé ſiliciſère (cererit, K.)

Two appendices contain, the one, all the compound rocks; the other, the volcanic productions. As neither of theſe claſſes of minerals form a prominent or diſtinctive feature in the ſyſtem, it is only neceſſary in this place to mention the ſubdiviſion of thoſe aſſemblages. The rocks are divided into aggregates of primary, ſecondary, and tertiary formation, and into thoſe compoſed of fragments or detritus cemented together ſubſequent to the formation of the ſubſtances to which they belonged. The volcanic productions are divided into ſix claſſes: 1. Lavas, (ſubdivided into lithoid, glaſſy, and ſcorified). 2. Thermantides, or ſubſtances preſenting only ſlight traces of volcanization. 3. Products of ſublimation, ſuch as ſulphur, &c. 4. Altered lavas. 5. Volcanic tuffas. 6. Subſtances formed in the interior of lavas, ſuch as meſotype, &c. Conf. Anon. über das Studium der Mineralogie. Haüy's Tabl. comparatif. Lucas' Tabl. des Eſpéces minerales.

MINERVA, La, in *Geography*, a town of Naples, in the province of Otranto; 20 miles E.S.E. of Matera.

Minerva, in *Mythology*, derived according to ſome *à minis*, from the threats of her ſtern countenance, otherwiſe called *Pallas*, is the goddeſs of wiſdom and the arts; and the only one of the offspring of Jupiter to whom pertain the prerogatives of the ſupreme rank of divinity. Minerva is repreſented, both by the painters and poets of antiquity, as a beauty of the ſeverer kind: the diſtinguiſhing character of her face is dignity and a certain ſternneſs, which has more of maſculine than feminine in it: and, therefore, more apt to ſtrike one with awe and terror, than to charm one, at firſt ſight. Her dreſs and attributes are adapted to the characters of her face; ſhe moſt uſually appeared with a helmet on her head, and a plume that nodded formidably in the air; in her right hand ſhe ſhook her ſpear, and in her other graſped her ſhield, with the head of the dying Meduſa upon it; the ſame figure appears alſo on her breaſt-plate called Egis, which was the ſkin of a goat, or, as others ſay, of a monſter ſo called, which vomited fire and committed dreadful havoc in Phrygia, Phœnicia, Egypt and Libya, and which was killed by Minerva, and hence ſhe wore its ſkin upon her buckler; and ſometimes the goddeſs herſelf is repreſented as having living ſerpents about her breaſts, and about her ſhoulders; ſhe is alſo accompanied with a cock, which is a fighting bird, and correſponding to her character as the inventreſs and preſident of war, and an owl, which ſees in the dark, and, therefore, is the image of wiſdom. It is probable that the Romans conſidered Jupiter, Juno, and Minerva, as one and the ſame divinity, under three different names: among which names, that of Jupiter might ſignify ſupreme goodneſs; that of Minerva, ſupreme wiſdom; and that of Juno, ſupreme power: thus the learned Dr. Cudworth obſerves, Intell. Syſt. b. 1. c. 4. p. 450, that the three Capitoline gods, Jupiter, Juno, and Minerva, may be underſtood to have been nothing elſe but ſeveral names and notions of one ſupreme deity, according to its ſeveral attributes and manifeſtations. Cicero mentions five goddeſſes of the name of Minerva, and Clemens Alexandrinus admits alſo the ſame number. Several cities were diſtinguiſhed by the worſhip which they paid to Minerva; among others Rhodes and Athens, but Sais in this reſpect rivalled all the cities in the world, for here this goddeſs had a magnificent temple, which Herodotus has particularly deſcribed. The ſame author alſo ſpeaks of temples conſecrated to this goddeſs in ſeveral cities of Greece; but the iſland Dio, or Naxos, though conſecrated to Bacchus, was more remarkable for the worſhip of Minerva, which appears by her repreſentation on three medals of that city. At Athens ſhe had a magnificent temple, called "Parthenos," the virgin, which Phidias adorned with a ſtatue of gold and ivory, reckoned his maſter-piece. The worſhip of Minerva was rendered ſtill more ſolemn by a feſtival, called "Atheneia," celebrated to her honour, and the pomp of which invited ſpectators from all Greece. This feſtival afterwards took the name of "Panathenaia," in which was a proceſſion, when the people carried about the "peplus" of Minerva, which was a white robe without ſleeves, wrought with gold, on which were repreſented the combats and great achievements of Minerva, Jupiter, and the Hermes.

Minerva is alſo ranked among the muſical deities, to whom the invention of the flute is aſcribed. See Flute.

MINERVALIA, among the Romans, called alſo *Quinquatria*, were feaſts celebrated in honour of Minerva. One of theſe feaſts commenced on the 3d of January, and another on March 19th, and laſted five days. The firſt day was ſpent in prayers to the goddeſs; the reſt in offering ſacrifice, ſeeing gladiators fight, acting tragedies upon mount Albanus, and reciting pieces of wit, wherein the conqueror had a prize given him. Scholars had then a vacation, and made a preſent to their maſters, which was called *Minerval*.

MINEUR, Fr., Minor, Lat., a muſical term applied to ſuch concords and intervals, as are rendered as flat or ſmall as poſſible, without being falſe and out of tune. Mineur is ſaid alſo of a key or mode in which the third above the key note is minor or flat. See Mode, Major, and Interval.

MINGALLA, in *Geography*, one of the ſmall weſtern iſlands of Scotland, the largeſt of thoſe called "Biſhop's iſlands," about three miles long and one broad. N. lat. 56° 48′. W. long. 7° 35′.

MINGAN Islands, a cluſter of iſlands near the ſouth coast of Labrador, in the gulf of St. Laurence, so called from the name of the principal of them. N. lat. 50° 15'. W. long. 64°.

MINGHIOL, signifying "Thousand Springs," a mountain in the northern part of Armenia, abounding with springs; from which the Euphrates originates.

MINGO, an Indian town on the W. bank of the Ohio river, 40 miles south-westerly of Pittsburg. In the creek, where it is situated, there are springs, that yield the "petrol," a bituminous liquid.

MINGOES, an Indian nation, inhabiting the vicinity of the southern branch of the Scioto river. The number of warriors is 40.

MINGOLZHEIM, a town of the duchy of Baden; 14 miles S.E. of Spire.

MINGOTTI, Regina, in *Biography*, a female opera singer and actress of great abilities and celebrity, was born in Carinthia, a German province, in the dominions of Austria, and though a native of a transalpine country, she became one of the most eminent vocal performers on the Italian opera stage during the last century. After seeing and hearing her frequently in England, where she arrived in the year 1754, we met with her, in 1772, at Munich, in Bavaria, and in conversation obtained from her the following sketch of her active professional life.

Her parents were Germans; her father, an officer in the Austrian service, being called to Naples upon duty, his wife travelled with him thither during her pregnancy, and was there brought to bed of this daughter; who, however, was carried to Gratz, in Silesia, before she was a year old; and her father dying while she was young, her uncle placed her in a convent of Ursulines, where she was educated, and where she received her first lessons of music.

She told us, that during her childhood, she remembers being so pleased with the music performed in the chapel of her convent, particularly with the Litany sung there one festival, that she went to the abbess, with tears in her eyes, and trembling, both with fear of anger, and of a refusal, to intreat her to teach her to sing, as *she* did in the chapel. The abbess put her off, with saying, that she was very busy that day, but would think of it. The next day she sent one of the elder nuns to ask her who bid her make that request, when the little Regina, as she was then called, replied, that nobody had bid her, but that it was merely her own love for music which inspired the thought. After this the abbess sent for her, and told her, that she had very little time to spare; but if she would promise to be diligent, she would teach her herself; adding, that she could only afford her half an hour a day; but with that, she should soon find what her genius and industry were likely to produce, and she should go on with, or discontinue her instructions accordingly.

Regina was in rapture with this compliance of the abbess, who began to instruct her the next day, *à table sec*, as she expressed it, without a harpsichord, or any other instrument. She applied to the harpsichord several years after, and still accompanied on it very well. But it was perhaps owing to her manner of learning to sing *without* an instrument, that she acquired the firmness in performance, for which she has always been remarkable.

In this manner she was taught the elements of music and *solfeggi*, with the principles of harmony, and was obliged to sing the treble, while the abbess sung the base. She shewed us a very small book, in which all her first lessons were written: the explanations were in the German language.

She remained in this convent till she had attained her 14th year, at which time, upon the death of her uncle, she went home to her mother. During the life of her uncle, she had been intended for the veil. When she quitted the convent, she appeared, in the eyes of her mother and sisters, to be one of the most useless and helpless of beings; they looked upon her as a fine lady, brought up in a boarding school, without knowing any thing of houshold concerns; and her mother neither knew what to do with her, or her fine voice, which both she and her sisters despised, not foreseeing that it would one day be productive of so much honour and profit to the possessor.

Not many years after she quitted the convent, signor Mingotti, an old Venetian, and manager of the opera at Dresden, was proposed as a husband for her. She detested him, but was at length worried into a compliance, which was the sooner extorted from her, perhaps, as she, like other young women, imagined that by losing, she should gain her liberty.

People talked very much of her fine voice and manner of singing. Porpora was at this time in the late king of Poland's service, at Dresden: he had heard her sing, and spoke of her at court as a young person of great expectations; which occasioned a proposal to her husband for her entering into the service of the elector: he had before marriage promised never to suffer her to sing on the stage; however, he came home one day, and asked her, if she should like to engage in the service of the court. She thought this was done in derision, and gave him a short and peevish answer; but he continuing to teize her on the subject, at length convinced her that he was in earnest, and had a commission to treat with her. She liked the thoughts of singing, and turning her voice to some account, and therefore gladly entered into articles for a small stipend, not above 3 or 400 crowns a-year.

When her voice had been heard at court, it was supposed to raise a jealousy in Faustina, who was then in that service, but upon the point of retiring; and consequently, in Hasse, her husband, particularly when he heard that Porpora, his old and constant rival, was to have 100 crowns a month for teaching her. He said it was Porpora's last stake; the only twig he had to catch at; *un clou pour s'accrocher*. However, her talents made such a noise at Dresden, that the fame of them reached Naples, to which place she was invited to sing at the great theatre. In her way thither from Dresden she passed through Vienna, where she visited unexpectedly Metastasio, in whose "Attilio Regolo" she had distinguished herself; of which visit he gives the following account to the princess di Belmonte.

"Signora Regina Mingotti, one of the principal ornaments of the vocal band at Dresden, being engaged at Naples in the same rank, has not escaped the epidemic desire of bringing with her a letter from me to your excellence. This request, however, would have been fruitless, had she not most wickedly and maliciously hit upon the following expedient, for vanquishing my well-known repugnance to give way to such applications. When she left the court of Dresden, what does she do but post away to Vienna; and without giving me the least previous notice of my danger, early one fine morning presents herself in my room, and in a military habit, preceded only by her fame, and accompanied by all the graces of youth, vivacity, talents, and what is still worse, entitled to the chief credit of the success of my "Attilio" in Dresden. Now tell me madam, with your usual candour, if ever you heard of so cunning a musical trick, it was like putting a knife to the throat of a poor Christian. I know not what Socrates, Cato, or Aristotle would have done in such a case; but this I know, that

that I could not help writing the letter, and even devoutly thanking heaven, that ſhe had the moderation to limit her pretenſions to a letter only."

This letter has no date, but it muſt have been written in 1751, when "Attilio" was firſt repreſented at Naples.

At this time ſhe knew but little Italian; however, ſhe now went ſeriouſly to work in ſtudying it.

The firſt character ſhe appeared in was Ariſtæa in the opera of the "Olimpiade," ſet by Galuppi. Montecelli performed the part of Megacles. On this occaſion her talents, as an actreſs, gained her as much applauſe as her ſinging: ſhe was bold and enterpriſing; and, ſeeing the character in a different light from what others had done before her, would, in ſpite of the advice of old actors, who durſt not deviate from cuſtom, play it in a way quite different from any one of her predeceſſors. It was in this original and courageous manner, that our Garrick firſt ſurpriſed and charmed an Engliſh audience, and, in defiance of contracted rules, which had been eſtabliſhed by ignorance, prejudice, and want of genius, ſtruck out a ſtyle of ſpeaking and acting, which the whole nation has ever ſince continued to approve, with acclamation, rather than applauſe.

After this ſucceſs at Naples, Signora Mingotti received letters from all parts of Europe, to offer her terms for engaging at different operas; but ſhe was not then at liberty to accept of any of them, being obliged to return to the court of Dreſden, in which ſervice ſhe was ſtill a penſioner; however, her ſalary was conſiderably augmented, and ſhe frequently expreſſed her gratitude to that court, and ſaid ſhe owed to it all her fame and fortune. Here ſhe repeated, with great applauſe, her part in the "Olimpiade;" every one agreed, that in point of voice, execution, and acting, her powers were very great; but many thought that ſhe was wholly unfit for any thing pathetic or tender.

Haſſe was now employed to ſet "Demofoonte;" and ſhe imagined that he kindly gave her an adagio, accompanied by the violins, Pizzicati, merely to expoſe and ſhew her defects. But ſuſpecting the ſnare, ſhe ſtudied hard to eſcape it; and in the ſong, "Se tutti i Mali Miei," which ſhe afterwards ſung in England with great applauſe, ſhe ſucceeded ſo well, as to ſilence even Fauſtina herſelf. Sir Ch. H. Williams was Engliſh miniſter here at this time, and being intimate with Haſſe and his wife, had joined their party, publicly declaring that Mingotti was utterly unable to ſing a ſlow and pathetic ſong; but when he had heard her, he made a public recantation, aſking her pardon for doubting of her abilities, and ever after remained her firm friend and adherent.

She went next to Spain, where ſhe ſung with Gizziello, in the operas under the direction of Farinelli; who, ſhe ſaid, was ſo rigid a diſciplinarian, that he would not allow her to ſing any where but in the opera at court, or even to practiſe in a room next the ſtreet. She was requeſted to ſing at private concerts by many of the firſt nobility and grandees of Spain, but could not obtain permiſſion from the director; who carried his prohibition ſo far, as to deny a pregnant lady, of great rank, the ſatisfaction of hearing her, though ſhe was unable to go to the theatre, and declared that ſhe longed for a ſong from Mingotti. The Spaniards have a religious reſpect for theſe involuntary and unruly affections in females thus circumſtanced, however they may be treated as problematic by M. Buffon and others. The huſband, therefore, of the lady, complained to the king of the cruelty of the opera director, who, he ſaid, would kill both his wife and child, if his majeſty did not interfere. The king lent a favourable ear to the complaint, and ordered Mingotti to receive the lady at her houſe, in which his majeſty was implicitly obeyed, the lady's deſire was ſatisfied, and the child prevented, perhaps, from being marked in ſome part of its body with a muſic paper, or from having an Italian ſong written with indelible characters on its face.

Mingotti remained two years in Spain, whence ſhe came to England, for the firſt time, in 1754. How much her performance was then admired many perſons now living can well remember, and tradition has told the reſt. She afterwards ſung in every great city of Italy: but always regarded Dreſden as her home during the life of Auguſtus, the late king of Poland. She was now ſettled at Munich, more it was thought from economy than attachment. She had no penſion from the court of Bavaria, as was reported; but with care and prudence, ſhe had juſt ſufficient from her ſavings to bring her ſafely through the year. She ſeemed to live very comfortably, to be well received at court, and to be eſteemed by all ſuch as were able to appreciate her underſtanding, and enjoy her converſation.

It gave us great pleaſure to hear her ſpeak concerning dramatic muſic, which ſhe did with more intelligence than any maeſtro di cappella with whom we ever converſed. Her knowledge and experience in ſinging, and powers of expreſſion in different ſtyles, were ſtill aſtoniſhing, and muſt have delighted all ſuch as could receive pleaſure from ſong unaccompanied with the blandiſhments of youth and beauty. She ſpoke three different languages, German, French, and Italian, ſo well, that it was difficult to ſay which was her own. Engliſh ſhe likewiſe ſpoke, and Spaniſh, well enough to converſe in them, and underſtood Latin; but in the three languages firſt mentioned ſhe was truly eloquent.

Her ſtyle of ſinging was always grand, dramatic, and ſuch as diſcovered her to be a perfect miſtreſs of her art; ſhe was a moſt judicious and complete actreſs, extending her intelligence to the poetry, decorations, and every part of the drama. Yet her greateſt admirers allowed that her voice and manner would have been more irreſiſtible, if nature had allowed her a little more female grace and ſoftneſs. Her performance of male parts, however, obviated every objection that her greateſt enemies could make to her perfection, either as a ſinger or actreſs.

The firſt time Mingotti came to England, ſhe remained here three years; during part of which time ſhe and Giardini were joint managers; by which their celebrity was more increaſed by their talents, than their fortune by the profits of the theatre.

MINGRAY, in *Geography*, a town of Spain, in Catalonia, near the mouth of the Tet; 15 miles E. of Gerona.

MINGRELIA, a country of Aſia, the ancient *Colchis*, (which ſee), is bounded on the N. by Circaſſia, on the E. and S.E. by Imeritia, on the S. by Guriel, and on the W. by the Black ſea and Abaſcia. This country is woody, intermixed with a ſmall proportion of arable land, which is ſo ſoft as ſcarcely to bear the plough. The climate as well as the ſoil is relaxed by moiſture; and it is ſaid that in many places the ground ſounds hollow, from which circumſtance originates an opinion, that the Euxine and Caſpian are connected by a ſubterraneous communication. Mingrelia is watered by the Phaſis, and a great number of other rivers. The chief food of the inhabitants is "gom," a grain reſembling millet; wheaten bread is uſed only by the prince and nobility. This country was originally rich in gold, and hence, it has been ſaid, the Argonauts fetched the golden fleece; but the mines of precious metals are now unwrought. Ancient Colchis, of which Mingrelia is a part, contained a great number of cities and towns, moſt of which have long ſince ſunk into oblivion. The preſent capital of this part of Turkey in Aſia, called Cotatis or

Cutais,

Cutais, comprehends hardly 200 houſes, though it is the reſidence of the prince. The air is rendered inſalubrious by frequent rains, and the inhabitants ſeldom protract their lives beyond 60 years. The vines of the country produce excellent wine, and the paſtures, which are excellent, feed many horſes. The men, as well as women, are generally well formed and handſome; but they are reckoned, in general, to be thieviſh, perfidious, cruel, drunken, and licentious in their amours. Infants, that have no means of ſupport, are often put to death, as well as ſick perſons, of whoſe recovery there is no reaſonable expectation. The people are generally employed in the chaſe, and they think themſelves peculiarly happy, if they poſſeſs a horſe, a good dog, and a well-trained falcon. The peaſants are ſlaves to the nobility; who have the power of life and death over their vaſſals in Mingrelia, as well as Imeritia, Guriel, and Georgia. Their religion is that of the Greek church. The principality is hereditary, and the prince or chief of Mingrelia and Guriel aſſumes the title of "Dadian," or the chief of juſtice; and the tribute exacted by the Turks is a quantity of linen cloth, manufactured in the country. The principal commerce is in ſlaves.

MINHO, Lat. MINIUS, which is ſaid to derive its name from "Minium," or vermilion, found in its neighbourhood, is a river of Spain, that riſes on the E. of the Sierra Mondonado, in the province of Galicia, receives the waters of the Cuytella and the Ouaria, paſſes to Lugo, receives the Chouro, and at San Martino de Coba the Sil, and then purſuing the boundary of Galicia, ſeparates it from Portugal, whence it proceeds and falls into the ocean near the port of Guardia; its courſe is about 52 leagues, firſt from N. to S., then to the S.W.

MINIACI, or CASALINO, a town of Sicily, in the valley of Demona; 10 miles S.W. of Randazzo.

MINIATO, ST., a town of Etruria, on the Arno, the ſee of a biſhop, containing four churches beſides the cathedral and nine convents; 20 miles W. of Florence. N. lat. 43° 44′. E. long. 10° 49′.

MINIATURE, in *Painting*, a word borrowed of the French, and derived, as ſome ſay, from the Latin *minimum*. It properly ſignifies the repreſentation of natural objects, by figures drawn and painted in ſmall proportions; but there is ſomething arbitrary in its preſent uſe, as it is almoſt entirely confined to portraits painted with water-colours on paper, vellum, or ivory; and is not applied to ſmall figures painted in oil, on wood, ſtone, or canvas. Thus, Gerard Dow's and Adam Elſheimer's very finely executed works, wherein ſometimes are figures not more than two or three inches high, and conſequently far ſmaller than miniature portraits are uſually painted, which ought therefore, according to the preceding etymology of the word, to be called miniatures, never are ſo, but are conſtantly ſpoken of as ſmall pictures. But we conceive that the term miniature is derived, agreeably to the ſtatement of other writers, from *minium*, vermilion, whence the perſons who put the red letters, and illuminations in ancient manuſcripts, were called *miniatores*.

In this branch of the art of painting, the ſame feeling of character, the ſame taſte and underſtanding of drawing and chiaro-ſcuro are requiſite, as in oil painting; but the uſe of its materials is more facile, and leſs likely to produce, in unſkilful hands, ſuch diſcordant and unpleaſant effects, though the proceſs is more tedious. It requires great ingenuity and patience in the artiſt, as it is wholly performed with the point of the pencil, either applied in the manner termed hatching, which conſiſts of fine ſtrokes croſſing or intermingling with each other; or that of ſtippling, or laying dots of various colours over the ſurface of the picture. One of theſe modes of proceeding is neceſſary to produce ſoftneſs, with fullneſs and richneſs in miniature; becauſe ivory and vellum, from the peculiarity of their textures and ſurfaces, do not admit of the ſyſtem called waſhing, or blending the colours together in a broad ſoft manner, like aqua-tint: and in works like theſe, whoſe beauties are not diſcernible but on a near inſpection, great neatneſs and perfection in the finiſhing are imperiouſly demanded.

The miniatures which are of the oldeſt date in England were chiefly wrought on vellum, though the cabinets of our nobility and gentry contain ſome few in oil colours on thin copper-plates: and this latter ſyſtem might well have been adopted generally, but for the difficulty of producing the eſſential beauties of miniature, *viz.* clearneſs and purity, with ſo groſs a vehicle as oil is, when compared with water; and alſo, that there is much danger, if the picture be worn, of ſome of the colours changing, and becoming dark: otherwiſe, and if merely hung up for ornament, a decided preference muſt be given them for their durability over thoſe painted in water colours.

The adoption of ivory for miniature painting, in preference to vellum, which, although limited in ſize, is now almoſt univerſal, is founded on three circumſtances, *viz.* its being ſo much leſs likely to be affected by damp, capable of receiving a ſmoother texture, and having a more agreeable hue of colour, which greatly blends with the freſher hue of the fleſh, and gives it warmth and harmony. It alſo poſſeſſes a degree of abſorption, which renders the colours leſs likely to fade. So great is the effect of damp upon vellum, or of the ſubſtances employed to ſmooth and prepare its ſurface for the artiſt, that there are few miniatures painted upon it, of recent date, even the colours of which are not in ſome meaſure impaired; and in many they are almoſt totally deſtroyed.

The colours beſt adapted for miniature painting are thoſe that have the leaſt body, and that work clear and clean in hue; ſuch as lakes, carmine, ultramarine, browns, yellows, and greens made of the juices of certain herbs and flowers. Moſt of the earthy colours, as the ochres, by no means are eaſily applied to this purpoſe: their opacity and body render them unfit agents, where all ſhould be light, ſplendid, and clear. The vehicle which beſt ſuits the purpoſe is water, in which either gum Arabic or gum tragacanth is diſſolved. The colours ſhould be firſt ground in pure water, and the gum-water added afterwards, in ſufficient quantity to give them tenacity, that they may not eaſily rub off the ſurface of the ivory or vellum; but if too much gum be uſed, there is great danger of the colours cracking and falling off.

In the proceſs of miniature painting, our modern artiſts cover the ivory with colours more than was uſually done by thoſe of an early period, who were accuſtomed to leave the naked ground or colour of that ſubſtance in a large proportion in the fleſhy parts, and contented themſelves with little more than drawing very delicately the features of their ſitters on it, and rounding the extremities with ſhadows. Though much more rotundity and richneſs of effect is gained by the preſent proceſs, when ſkilfully employed; yet in hands leſs ingenious, there is great danger of heavineſs, and loſs of character and ſimplicity, thoſe prime and ineſtimable qualities in all works of art, the want of which cannot be compenſated for by all the colour and delicacy of finiſh the utmoſt ſtretch of art, without them, is capable of producing. But, in fact, the capabilities of water colours are become far more known and underſtood of late, as well as the beſt modes of applying them. A new ſchool in that branch of art has ariſen in the courſe of the laſt ten or fifteen years; ſince when, effects have been produced by them, which leave all former experience of their power far behind, and of which nothing could have been expected. Of this more under the article Water-*Colours*.

The most successful artists in miniature in this country, till the present period, were Nicholas Hilliard and Isaac Oliver, in the time of Elizabeth; and P. Oliver and S. Cooper, in that of Charles I. The works of the latter are particularly striking, and worthy of observation, for the extraordinary breadth of manner, which he appears to have caught of Vandyke; many of whose pictures he copied in miniature, and which his own pictures resemble so much, that a magnifying glass only exhibits to greater effect the simplicity of the style in which they are wrought.

We now possess a great number of very ingenious artists in this branch of the profession: but to particularize any one, when so many stand on nearly the same level, would be invidious; and the public have ample opportunities of deciding on their respective merits.

For the method of preparing ivory for miniatures, see Ivory.

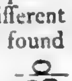
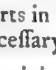
MINICULATOR, among the Romans, a servant who embellished any writing with minium.

MINIET, or Minieh, in *Geography*, a small but somewhat handsome town, compared with other places in the same country, in Upper Egypt, on the west banks of the Nile. Its streets, however, are narrow and dusty: the houses are built of unbaked bricks, cemented with mud; and many of its edifices are clumsy and irregular. The house occupied by the kiaschef or cachef, as well as those of some other persons, are built of stone, and their whiteness relieves the uniform reddish-grey of the rest. The bazars, or places where the merchants meet, are tolerably commodious; and the crowds which frequent them announce a numerous population, as well as some briskness of trade. Government has here established a toll for loaded vessels, which is easily collected, as the Nile is not wide at this place. Here are manufactured earthen vessels, called "bardacks," formed of clay in the neighbourhood, and serving to preserve the water cool. Columns of granite, broken and thrown down, and some still standing, besides heaps of rubbish, intimate that Miniet occupies the place of a more ancient city; which, according to some, was "Hermopolis," and, according to others, "Cynopolis," where the dog was worshipped. Mr. Bruce supposes Miniet to be the ancient "Philæ." It is about 50 leagues from Cairo, 22 miles S. of Abu Girgé, and 14 N. of Ashmuneim, or Achmounim.

Miniet *Rabiné*, a town of Egypt; 6 miles S. of Gizeh.

Miniet *Selamé*, a town of Egypt; 10 miles S. of Faoué.

Miniet *Semannud*, a town of Egypt; 8 miles S. of Mansora.

MINIM, in *Music*, from *minimus*, Lat., the least. In the first time-table that was framed, where the semibreve was the shortest note, and the first in a round form, the rest were square. But as the art of counterpoint was improved, and different parts in notes of different value were attempted, it was found necessary to divide the semibreve in two equal parts, , ; diminishing the length of a semibreve one half, by adding a tail to it. This invention has frequently been ascribed to Vitriaco; but it seems more properly to belong to Franco, as appears by a manuscript tract in the Bodleian library at Oxford. Franco flourished 200 years before Vitriaco. See Musica *Mensurabilis*, Time, Measure, and *Musical* Characters.

Minim, *Sextuple of the*. See Sextuple.

MINIMA Naturæ, or *Minima Naturalia*, among *Philosophers*, the primary particles of which bodies consist; the same with what are otherwise called *corpuscles*, and *atoms*.

Minima, in the *Higher Geometry*, the smallest quantities attainable in any given case. See Maxima.

Minima, *Per*. See Per *Minima*.

MINIME, in old French *Music*, was the same character for time as is now called *une blanche*. See Minim and Time-table.

MINIMENTS, or Muniments. See Muniments.

MINIMI *Digiti Extensor*. See Extensor.

Minimi *Digiti Pedis Abductor*. See Abductor.

MINIMS, Minimi, an order of religious, instituted about the year 1440, by S. Francis de Paulo, confirmed in 1473, by Sixtus IV., and by Julius II. in 1507. See Bons-*Hommes*.

These have improved on the humility of the Minors, by terming themselves *Minimi* or *Minims*, *q. d.* least, or smallest.

MINIMUS Gluteus. See Gluteus.

MINING, *History of*. To trace this subject up to its earliest stages, and to exhibit the various combinations of human ingenuity which it has in successive periods produced, though an inquiry which might afford matter for curious speculation, would be one which, if we were to take into the view the progress of mining in all the different countries where metals have been found, would extend the subject to a length hardly admissible in any work not wholly devoted to this object.

From the simplest operations, mankind have been gradually led, by following the pursuit of the metals, to efforts the most complex and astonishing. At first it may be assumed, not only from the probability of the thing, but from evidence which even this country affords, in the remains of ancient works of this kind, that metals were procured from detached fragments of the ores, such as had been separated by various causes from the upper parts of the veins in which they were originally deposited: and in this manner is gold yet procured, by washing the sands of certain rivers; and tin even now sought after, under beds of gravel, in the vallies of Cornwall and Devon.

The pursuit of scattered pieces of ore naturally would conduct the persons, who were thus employed, to the beds from which they had been detached; and in turning over the soil to procure the loose fragments, the backs of the veins would be laid open and discovered. This is a process which is even now daily going on in mining districts, only with a different object: for having found an accidental stone of ore, the miner does not now dig over the earth on the surface, for the sake of these casual deposits; but reasoning from their appearance that a vein is near at hand, goes at once to work in order to find it.

If we allow that this account of the origin of mining be true, it ought to follow that those metals were most anciently worked, whose ores are most attractive in their appearance, most easily reduced into a metallic state, or such as are most usually found near the surface of the earth. As far as the English mines afford us the means of judging, all this may be asserted to be true. The tin of Cornwall was undoubtedly the first metal sought after in Britain, and probably the first article of commerce with other nations; and the ores of tin, from their great weight, indicate their metallic contents, and yield them to the simplest treatment with fire, and are still found at inconsiderable depths. It may also be observed, that the traces of the most ancient tin works exhibit no symptoms of their having been pursued, but in situations where the soil, with which it was mixed, could be easily and expeditiously removed; or where it could

could be washed away by streams of water, conducted over it for the purpose, and which, by carrying off the lighter parts of the soil, laid bare the ores, which are kept from moving by their superior specific gravity.

This latter was an ingenious improvement upon the first ruder efforts, and is still the mode employed in many of the tin stream works; while there are numerous traces of these attempts accompanied with circumstances, which prove them of very considerable antiquity.

Lead is another metal, which not only is often found near the surface, but the ores exhibit to the eye the appearance of metal, and in general yield their contents to the heat of a moderate fire. This metal, therefore, was probably an object of pursuit in the early ages of mining.

Copper, on the other hand, is seldom found without penetrating the earth to considerable depths; and the proportion of metal in most of the ores is so small, that a certain progress in the arts of mining and smelting must be presumed to have been made, before it could have become an object of research. We believe this to have been the fact in most countries, as well as in this, where copper was certainly discovered by working mines in pursuit of tin or lead.

From the processes for finding and separating metallic ores from alluvial matter in which they were casually mixed, the next step was to procure them by digging out the veins themselves, and following them into the solid rocks in which they are formed. At first this could only have been done, where, by the elevation of the mountains, it was possible to work high enough for the waters to discharge themselves by conduits or adits from the works; and where the rock was not so hard but to yield to tools rudely formed, or perhaps to the agency of fire, which would, however, produce but a limited effect in most cases.

It was not until machines were applied to pump the waters, that the metals could be followed to any considerable depth, and not until gunpowder had furnished the means of splitting the hardest rock, that man was enabled to penetrate strata of every description that opposed his progress.

These inventions, therefore, form most important epochs in the history of mining; for, since mankind have called in the assistance of such powerful agents, neither the influx of constantly flowing water, nor the barriers which the most indurated rock can present, are obstacles in the way of the miner, where rich and productive veins of ore tempt the pursuit.

The first important era was the period in which the application of gunpowder to the purposes of mining took place, which happened in Hungary, or Germany, about the year 1620, and was first introduced into England at the copper-mine at Ecton, in Staffordshire, about the year 1670, by some German miners brought over by prince Rupert. It was in use in Somersetshire about 1684, and it was not until after this period, probably, that the Cornish miners became acquainted with this powerful assistant to their operations.

Its importance may be judged of by the amount of the present consumption in the mines of Cornwall alone, which has been calculated at an annual value of about forty thousand pounds sterling.

There are many mines which could not possibly have been worked without the aid of gunpowder, and, until it was used, subterranean operations must have been difficult and very uncertain. The hammer and wedges were probably the first instruments employed for splitting rocks, and the *pick* followed, which is used both as a hammer and a wedge. The change of form in these instruments observed in those which have been found in old works, as well as the materials of which they are sometimes made, offer evidence of considerable antiquity.

Many tools of oak have been occasionally met with, which tradition among the Cornish tinners make to have belonged to the Saxons or Danes, but it is probable that they were employed before the time of their having a footing in the country, and most likely when iron was little known here.

Wedges of dry wood were made use of by driving them into clefts of the rock, and then wetting them, so as to cause them to swell, and thus by repeated similar insertions to force the ground asunder.

Agricola describes the application of fire to the splitting of rocks, but there is no tradition of its having been applied to this purpose in England.

The means employed for raising or throwing up the ores and waste stuff to the surface, were at first as rude as the other operations of mining. The *windlass and bucket* may be reckoned an improvement which took place in a later stage of mining, as simple a one as it certainly is, and now in a great measure superseded by more effective machinery. It was, however, at the time an important addition to the apparatus of mines, as water as well as ore could thus be raised to moderate heights; and by the employment of much manual labour with a number of such machines, even considerable excavations were kept free from water, and had their produce lifted to the surface.

The windlass, probably, like most of the early improvements in mining, had its origin in Germany, and before it was introduced here from that country, the mode adopted for throwing up the stuff dug in the bottom of the deeper pits, was by making successive steps, or stages, which were called in Cornwall *shammels;* upon each of which men were placed, who raised the excavated matter from one to the other, until it thus reached the highest point.

In South America the windlass is even yet hardly known, and the ores are either carried up by the Indians employed in the mines, or, where the situation admits of sloping roads being made to the bottoms, are conveyed to the surface on the backs of mules.

When mines were worked deep, the labour of raising the water which was constantly collecting, became too great for mere manual exertion, and hydraulic machines were invented or employed for the purpose. Pumps were adapted to the shafts, and their constant action secured by giving motion to their pistons by wheels turned by descending streams of water. Where supplies of this agent can be obtained, and the form of the country admits of its application with considerable falls, nothing better can be desired, as it is a more regular power than steam, and infinitely less expensive; it has, therefore, continued in use to the present day, where circumstances admit of its being applied.

The German miners seem in all probability to have had the merit of these inventions, as they appear to have been completely in use among them when Agricola wrote, who fully describes their construction and application.

But though Germany may fairly claim the invention of these engines for this purpose, yet nothing more has been done there; but, on the contrary, they are said to remain now there in nearly the same state as at their original introduction. The English miner has improved the pump-work and the water-engines to their present high state of perfection in this country.

It is in some degree owing to necessity that this has been the case, as there are single mines in England which require that as much water be discharged from them, as the pumps of a whole province of German mines could effect. There is, is, indeed, no need to prove the capacity of English artists for mechanical improvement.

Hydraulic machines, however, as they require falls of water to put them into motion, can only be erected where the circumstances of a country afford the means of working them; and if nothing further had been done, many of our most valuable mines in Cornwall, not to mention our collieries and lead mines, would have remained unexplored and unproductive. The invention of the *steam-engine* gave to the miner a power capable of universal application, and of an effect that added, as it were, new regions of subterranean country to his controul. Depths hitherto unattainable are now placed at his command, and no limit can be assigned to his exertion, but that of the expence compared with the value of the produce.

The history of the steam-engine will be a subject for another place; but we may here observe, that the invention very early excited the attention of the mine owners of Cornwall, who successively adopted and encouraged the improvements of Savary, Newcomen, and Watt.

In this district some of the earliest efforts of these ingenious men were seconded and rewarded, and in return the mines have gained such assistance as could not have been formerly anticipated or imagined.

The general history of mining in England has never been very accurately traced; the districts famous for their mineral products have no communication with each other on this account, and have no common mineral laws or customs.

In other countries mining has been fostered and protected by the state, immunities have been granted, the workmen have been surrounded by particular privileges, and their operations encouraged by grants of timber from royal forests, or the free use of lands and waters. Thus peculiar systems of laws have often arisen where the mines were important as a source of revenue to the state. Something of this sort is indeed to be traced in the stannary laws of Cornwall; these laws, however, are not operative in the other mining districts England, but are confined to the counties of Devon and Cornwall, which are both included in the royal duchy which bears the name of the latter. Here the stannary laws still existing, now afford the miner but scanty assistance, though they effectually provide for the secure payment of the mineral revenue to the duke of Cornwall. To this object, and to the adjusting disputes touching the affairs of tin mines, the present administration of these laws may be said to be directed. The protection to the person of the tinner, as to military service and processes from other courts, has been gradually removed, and the rights of embounding lands for his pursuits, and of obtaining water-courses for his engines, have been questioned, and, in some cases, rendered doubtful. It cannot, perhaps, be contended that these laws could now be exercised in their former construction in the present state of property; but a revision, accommodating them to the fair wants of the miner, without prejudice to the land owner, would be attended with much benefit to the mining interest.

The copper-mines, being altogether of later date than those of tin, partake of none of the advantages which the stannary laws afford, and are therefore governed more by custom than any thing else; an extension of the privileges of the tin mines to these, and a legal provision for the peculiar arrangements which such undertakings require, would remove many serious obstacles to their prosecution.

Mining in England had a very early origin, compared with the progress of other arts in the country; it was in all probability the first source of trade to these islands, and the tin of Britain was known in distant parts of the world at a very remote period. It is generally believed that the Phœnicians were the nation principally engaged in trading to Britain for this metal. Tin works were carried on before iron was in use in England, as may be presumed from the tools of oak which have been found in ancient mines. Cicero affirmed that no silver was to be found in Britain, and though it has since been proved that he was wrong in that respect, yet the notice taken of the subject serves to shew that the metals of the country were the principal temptation to the Roman conquerors.

The Saxons neglected the pursuit of the metals, but the Normans appear to have worked for them to advantage, and from this time, until the reign of king John, the mines were mostly in the hands of Jews, when they are said not to have been successful, but in the reign ensuing they were worked by the same people with more effect. Edward I. caused the Jews to be banished, and the mines were, in consequence, neglected, until Edmund, the elder son of that king, and earl of Cornwall, willing to restore what had produced so large a proportion of the revenues of his domain, made grants important to the miner, which were confirmed by the king, by a charter in the 33d year of his reign; which states that

"For the advancement of the stannaries, he frees the tinners from all pleas of the natives touching the court, and from answering before any justices, &c. save only the keeper of the stannaries; (pleas of land, life, and member excepted) neither are they to be kept from work but by the said keeper." And it further "indemnifies them from tolls, &c., gives them libertie to dig tin and turf any where in the said countie, and to turn water-courses for their works at pleasure; with many other privileges."

It is from this time that the enactment of laws for the government of the stannaries may principally be dated.

Power to search for other metals besides tin was granted to individuals immediately from the crown, and we find that various persons held the right of searching for mines in the reigns of Edward III. Richard II. Hen. IV. and Hen. VI. In some of these grants, gold, silver, and copper are mentioned as well as lead.

The privileges of the tinners were not interfered with by any question relating to these metals, nor, on the other hand, did the jurisdiction of the stannaries extend to affairs connected with them.

Thus we find an appeal to the exchequer in the reign of Henry VI. relative to lead mines. *From the records, Easter term, anno 36. Regni. Devon Memorand.* "That John Bottwright, governor of the mines of Bury Ferrers in Devon, complains to this court that Robert Glover, at the command of Roger Champernown, took away 144 bouls of glance oar, valued at 15*l.* 6*s.* 8*d.* and made profit of the same without any thing allowed to the king, to the king's damage of 100*l.* and thereupon desireth the advice of the court."

The mines continued to be protected by the crown, and particularly by Henry VII., until Edward VI., when they were neglected; and fell into complete decay during the disastrous government of Mary.

When Elizabeth succeeded to the crown, the mines of the kingdom partook of the attention which this enterprising queen bestowed on every object from which an increase to the resources, or an addition to the strength of her government, might be derived.

The failure of the mines had diminished the number, and annihilated the skill, of the English miners; the queen therefore invited over Germans, and made extensive grants in different parts of England to Houghsetter and Thurland, and likewise others to William Humphreys and Christopher Shutz. She also established, in 1568, a corporation, which still exists, called "The Society for the Mines Royal," which had certain grants and privileges in several counties, and of which

which William, earl of Pembroke, was the firft governor. It does not appear that this fociety, which was originally a mining company, though now engaged in fmelting ores only, produced any important effect upon the difcovery of metals in England; the tin mines of Cornwall were not worked by them, but remained in the hands of private adventurers, under the jurifdiction of the ftannaries, and increafed in produce and value in proportion to the demand for this metal. The whole amount of tin annually raifed in Devon and Cornwall, in the following reigns of James I. and Charles, was from fourteen hundred to fixteen hundred tons. 'It is probable that the civil wars which fucceeded injured the workings of the mines, as in the reign of Charles II. it appears from a note of Mr. Scawen, of Molinek, who was vice warden of the ftannaries, and quoted by Dr. Pryce, that the tin revenues were very fmall.

In the reigns of Anne and George I. the produce of tin had again become confiderable, and amounted, one year with another, to fomething more than fixteen hundred tons; fo that in the fpace of 110 years its mean proportion was equal to fifteen hundred tons *per annum*.

Since the foregoing time a gradual increafe took place in the enfuing thirty years; for in the year 1742 a propofal was made by the Mines Royal Company in London to raife one hundred and forty thoufand pounds to encourage the tin trade by farming that commodity for feven years at a certain price. A committee of Cornifh gentlemen were appointed to confider of the propofal; and they reported, "That the quantity of tin raifed yearly in Cornwall, at an average for many years laft paft, hath been about two thoufand one hundred tons;" and refolved, "That three pounds nine fhillings for grain tin, and three pounds five fhillings *per* hundred weight for common tin, are the loweft prices for which fuch tin will be fold to the contractors, exclufive of all coinage duties and fees."

The produce of the tin mines was much more confiderable afterwards, and from 1760 to 1780 it was reckoned at about two thoufand eight hundred tons a-year, which was worth the annual fum of about 180,000*l*.

Copper began to be worked in Cornwall in the beginning of the 18th century, and the amount had attained at the period juft quoted to about the fame annual fum of 180,000*l*. making the mineral returns of this diftrict at this period, *viz.* about 1780, to be of the yearly value of 360,000*l*.

The tin mines have not been fo important to the Cornifh miners fince the difcovery of copper as they were before, the produce of the latter having increafed moft rapidly, while the former have not made any proportional progrefs. As the fubject is very interefting in eftimating the power of this country to fupply raw materials for its numerous manufactures, we fhall give ftatements of the produce and other particulars of the tin and copper mines of Cornwall and Devon, from the early part of the laft century to the prefent time.

We fhall firft ftate the produce of the tin mines, and afterwards give a more detailed account of the effect of the difcovery of copper on the mining intereft as well as the trade of the country.

The chief part of the tin in the following ftatement was produced from the mines of Cornwall alone, as although Devon had anciently yielded a large proportion of tin, yet before this period the mines, or rather the ftream works of the latter county had become exhaufted, and were incapable of producing any notable proportion of ore.

Account of the Quantity and Value of Tin raifed in Cornwall and Devon, from 1700 to 1800.

Dates.	Number of Blocks $6\frac{1}{2}$ to a Ton.	Number of Tons.	Price *per* Ton.	Periods.	Annual Quantity in Tons.	Annual Value.
			£. *s.* *d.*			£. *s.* *d.*
1700 to 1720	208,000	32,000		20 years	1600	
1720 to 1740	273,000	42,000	66 0 0	20 years	2100	138,600 0 0
1740 to 1750	162,500	25,000	65 0 0	10 years	2500	162,500 0 0
1750 to 1760	172,779	26,580	63 7 6	10 years	2658	168,450 15 0
1760 to 1770	177,302	27,277	66 6 8	10 years	2728	180,957 6 8
1770 to 1780	178,737	27,498	60 2 0	10 years	2750	165,275 0 0
1780 to 1790	192,295	29,583	68 2 0	10 years	2958	201,439 8 0
1790 to 1800	210,928	32,450	73 1 0	10 years	3245	227,047 2 6

From this table we may obferve a regular increafe in the quantities raifed, the improvements in mining which took place having contributed, without doubt, to produce this effect. The price of the metal did not advance in proportion to the increafe of the charges on labour, and the enhanced value of the articles ufed in the mines, and therefore we cannot account for the greater produce from increafed demand, but from the power derived by improved means of working, and thus of bringing the metal to market at a cheaper rate. About the year 1770 the quantity raifed appears to have been greater than the demand required, and the price feems to have been lower than at any former period, which was probably likewife affected by the war, and by the influx of tin imported into Europe by the Dutch from their poffeffions in the Eaft Indies, where it is raifed as well as in England. The advance in price that followed in the next period, may be attributed to the revival of trade, in confequence of the peace which followed the American war, but this again produced an over quantity in the market, followed by a depreffion in value, very injurious to the miners, which was feverely felt about 1789, when, by the exertions of Mr. G. Unwin, an export of tin to China, through the Eaft India company, took place, that abforbed the furplus which the European market did not require, and thus the price advanced again to a rate higher than any preceding one. This export to India has continued ever fince, and may probably increafe notwithftanding that tin is found in fome confiderable quantity in Afia.

From 1800 to the prefent time the tin mines of Cornwall have rather declined, and are probably gradually exhaufting, this metal not being found to penetrate fo far into the earth as copper, and therefore but few mines have been found to continue productive at very confiderable depths.

Any decline that may have taken place in the tin mines of Cornwall has, however, been more than compenfated by the

rapid

rapid advances which the copper mines have made in that and the neighbouring district, which of late years have been so great as to render them of the highest consideration, and to give these concerns the precedence over all similar undertakings of any country. For whether we consider the quantity of their produce, the immense capitals invested, the power and number of their engines, the skill with which they are conducted, or the spirited and rapid execution of the works, they will probably be found to take the rank here assigned to them.

Cornwall possesses many eminent advantages as a mining country, of which its maritime situation is among the most important, but another is that it is peopled by a race of men peculiarly fitted for this employment. The Cornish miners unite great courage to personal strength and activity, while we may observe in their character intelligence mixed with persevering enterprize, and patience of fatigue with a considerable independence of spirit.

There is no doubt but that the system of management adopted in the mines, which long usage has matured into a system as beneficial to the mine owners as stimulating to the exertions of the workmen, has tended much to render the latter what they now are, though their insulated situation has likewise probably preserved to them much of their original character as a people.

With such advantages, and with a sufficient quantity of the metallic ores distributed throughout it, a district only requires capitalists of sufficient wealth, intelligence, and enterprize, to render it of consequence as a mining country, and it has happened to Cornwall to have gentlemen possessed of all these requisites.

The statements which follow will shew how the discovery of a valuable metal has been followed up, and an intimate acquaintance with the Cornish mines would prove how great the exertions must have been, to have produced effects in a short time which the labour of ages in other countries have scarcely equalled.

We have before observed that copper began to be sought after in Cornwall about the beginning of the eighteenth century, and, as might be expected, we have no exact accounts of the success of the undertakings for its pursuit in their earliest stage. In a few years, however, the quantity produced had attained to a considerable amount, and we shall be enabled to trace pretty accurately the progress afterwards made.

The first document on the subject is the following:

Statement of the Returns of Copper Ores in Cornwall, from 1726 to 1775.

Years.	Tons of Ore.	Average Price *per* Ton.			Amount.	Annual Quantity of Fine Copper.
		£	*s.*	*d.*	£	(Probably)
1726 to 1735	64,800	7	15	10	473,500	700 Tons.
1736 1745	75,520	7	8	6	560,106	830
1746 1755	98,790	7	8	0	731,457	1080
1756 1765	169,699	7	6	6	1,243,045	1800
1766 1775	264,273	6	14	6	1,778,337	2650

This account is taken from Pryce's "Mineralogia Cornubiensis," excepting the last column of the quantities of metal produced from the ores, which it was desirable to exhibit, in order to compare the increase of late years, of which the quantity of *fine copper* is the only true criterion, the ores often differing materially in their metallic content. The statement is, however, given as respects this part of it only as a near approach to the truth, as we have no certain data to calculate from; the assay and price of copper, by which the value paid to the miner was determined, being in a great part of the period above quoted not easily ascertained. The amount of metal is, however, calculated from the most probable supposition.

From the table we see, that in Cornwall the produce of copper increased in fifty years from about 700 tons of fine metal *per annum* to 2650 tons.

Copper mines were not attended to in England much before the dates in the preceding table, the discovery of this metal probably having taken place in working the tin mines, which had been wrought time immemorial. Soon after that discovery, in 1691, a charter was granted to sir Joseph Herne and others, merchants of London, who were thereby incorporated as a company for the purposes of refining and purifying copper ores.

This company still exists, and is now commonly called the English Copper Company.

The Mines Royal Company, which had been incorporated near 100 years before this time, appear originally to have designed to apply their resources to the opening and working mines in various parts of the kingdom, and they had grants for searching for copper among other metals, although it does not appear that any important discovery of this metal took place in consequence of their exertions, nor is mining one of those pursuits which is ever likely to flourish in the hands of large companies.

In 1694, a copper coinage of halfpence and farthings took place, and government paid at the rate of 18*d.* a pound for the copper, which was of Swedish produce.

In 1717, a further coinage took place, to the amount of 700 tons of English copper, for which government paid at the rate of 15¾*d. per* pound, or 147*l. per* ton.

In 1702, the first brass work in England was erected near Bristol, which has continued to this time, but with great additions and improvements. Many other copper and brass houses have been since erected in this country, and by that spirit, energy, and enterprize, for which the people of it are so distinguished above all others, the most valuable branches of the copper and brass trade have been established in England, which had before been altogether, and for ages, carried on in Germany and Holland.

For the first twenty or thirty years of the last century, and always before, most of the copper and brass utensils for culinary and other purposes of this country were imported from Hamburgh and Holland, procured from the manufactories immemorially established at Nuremberg and various other parts of Germany; even brass pans for the purposes of the dairies of our country could not be procured but of the German make.

So late as 1745, 1746, and 1750, copper tea-kettles, saucepans, and pots of all sizes were imported here in large quantities from Hamburgh and Holland; but through the persevering industry, capitals, and enterprising spirit of our miners and manufacturers, these imports became totally unnecessary, being all made here, and far better than any other country could produce.

During all this time the price of copper will be found to have been as high as it has been in the last three or four

years;

years, 1808, 1809, 1810, and 1811, notwithſtanding the great difference in the value of money, and conſequent advance of price on materials uſed in mining, and of the wages of labour employed therein.

It appears above that government paid for copper uſed in their coinages in the year 1694 at the rate of 18*d.* a pound, or 168*l.* a ton for metal the produce of Sweden; and in 1717, they were ſupplied with Engliſh copper at the rate of 15¾*d.* a pound, or 147*l.* a ton.

The reduction here ſpecified in value may fairly be accounted for by the increaſing produce of the Engliſh mines, and accordingly the price went on to lower nearly in proportion to the quantity which was thus brought into the market.

In the year 1720 copper was ſold for about 130*l.* a ton, and declined towards the year 1772 to the price of 100*l.* a ton.

About the year 1773, new copper mines being diſcovered in Derbyſhire and Wales, and freſh ſupplies of fine copper coming from thence to market in competition with the Corniſh copper, the price of it fell gradually until 1781. In this year the Eaſt India company firſt paid ſo little as 79*l.* a ton for cake copper. This great reduction was owing to a warm conteſt which took place between the owners of the Corniſh mines and thoſe of the Paris Mountain mine in Angleſea, which had become amazingly productive, and ſo as to alarm the fears of the former.

Arrangements were afterwards made between the parties principally concerned in the mines of theſe two diſtricts, by which the price was ſomewhat advanced, but did not exceed at any time 84*l.* a ton, and continued at nearly the ſame rate until the year 1791.

By this time England, inſtead of depending upon foreign mines for a ſupply of copper, had become one of the principal ſources from which the world at large was furniſhed with this uſeful metal.

Accordingly, in the year 1791 we find that the exports of different articles in which copper either formed the whole or the principal ingredient, amounted to a very conſiderable branch of trade, and that theſe articles went in large quantities to thoſe very countries upon which England had formerly depended for a ſupply. Among theſe may be noticed Holland, Germany, and even Sweden itſelf.

The total exports were, in 1791,

	Tons.	C.	qrs.	lbs.		£	s.	d.
Wrought copper	3082	3	3	11	value	358,844	9	1
Braſs and plated goods	2324	2	0	11		209,769	8	9
	5406	5	3	22		568,613	17	10

Comparing this with the produce of copper in Cornwall in the year 1775, as above quoted from Dr. Pryce, which was only 2650 tons, and allowing for what might be brought to market from Angleſea, we may, in ſome meaſure, judge of the increaſe in the quantity of metal from the Corniſh mines in this period of ſixteen years, even under the diſcouraging circumſtance of great competition and reduced prices.

Beſides this vaſt export, a new ſource of conſumption for copper had in the mean time ariſen at home in the uſe of it very extenſively in ſheathing and faſtening ſhips, and this alone would require conſiderable quantities.

The demand having apparently kept pace with the quantity brought to market, the queſtion will naturally be aſked, how it happened that the price continued to fall, or at leaſt to remain at a rate ſo much under what it brought 100 years before? Though the anſwer to this queſtion muſt include other conſiderations than thoſe connected with mere mining, it may be proper to go a little out of our way to anſwer it, particularly as it relates to the mines of Cornwall, which were at one time threatened almoſt with ruin, from the value of their produce not bearing any proportion to the increaſe in their expences, from the diminiſhed value of money, and the rapidly accumulating charges occurring from the great depths to which moſt of the productive mines were by this time worked.

The reaſon, then, of the price of copper not bearing a proportion to the coſt of procuring it, and the demand of the article, appears to have been ſimply this. Neither the miners nor the great conſumers of the copper were ſmelters of the ore; but this buſineſs was in the hands of a very few companies, employing immenſe capitals in their works, who thus had the power of managing the market, and of preventing that ſalutary competition, which alone can regulate fairly the due courſe of trade.

The principal ſmelters, by a contract which had been entered into improvidently with them by the majority of the miners, had poſſeſſed themſelves of the greater part of the copper ores of the county of Cornwall at a fixed price; and this price being found inadequate to meet the increaſing charges of working the mines, diſcontents aroſe, which ſpread among the labouring miners, who feared the loſs of their employ by the ruin of the mines, which was anticipated. Many of the proprietors, or adventurers as they are uſually called, who were not perſonally parties to the contract, refuſed to be bound by the act of their co-adventurers, and conſiderable confuſion enſued.

The ſmall proportion of the ores, not included in the contract, continued to go to public ſale, where the price was advancing; but theſe ſales were attended by a few ſmelting companies only who had not joined the others, until the following circumſtance occurred, which materially contributed to open a free market to the miner for the ſale of his ores, upon a plan that enſures a fair and equitable price, according to the demand, as far as is poſſible, where the number of buyers muſt be neceſſarily ſmall.

Many of the principal manufacturers of Birmingham, who were large conſumers of copper, had obſerved the difference between the price of the metal in the ore paid to the miner, and the price at which they bought it when ſmelted. They ſaw no other reaſon for the intervention of a third party between the miner and conſumer, but the capital neceſſary for the erection of ſmelting works; and this being eaſily raiſed by ſhares, a company was formed under the name of the Birmingham Mining and Copper Company: their object being to encourage the production of copper, by adventuring in the mines, as well as to procure it for their manufacture, by purchaſing and ſmelting the ores.

As ſoon as the company was eſtabliſhed, they propoſed to revive the old mode of the ſale of ores, which had, owing to the contract, nearly fallen into diſuſe, called a *ticketing;* by which, on certain days, the ores of any number of mines, being previouſly ſampled and aſſayed, are offered for ſale by tenders or tickets, produced by the agents of each ſmelting company, and delivered to the chairman of the meeting which is held for the purpoſe, who declares the offer of each, and the higheſt the buyer.

This revival of the ticketings was effected by the Birmingham company joining the ſmall number of ſmelting companies who were not concerned in the contract, and the competition was rendered complete. A new ſpirit was infuſed into the working mines, by an increaſe of the price of their produce. Other ſmelting companies were afterwards formed upon ſimilar principles; and the demand for copper advancing rapidly, while the quantity produced in Angleſea and other parts of England leſſened, the mines of Cornwall flouriſhed in proportion.

The

The advance on copper began to be felt about 1792, when it had attained the price of 100*l.* *per* ton; and in a very few years after (1799), it had reached 124*l*: being still, however, much lower than it was in the beginning of the 18th century.

We may recollect that the quantity of copper raised in Cornwall, in the year 1775, was about 2650 tons a-year: in 1789 it had increased to about 3000 tons; which increase was progressive, as in the year 1797, according to the report laid before the house of commons, the quantity amounted to 5093 tons; and in the following year (1798), was 5427 tons.

So that we see in the period of about 70 years from 1726, the annual quantity produced by this district had risen from 750 to 5427 tons; and that the aggregate amount of an article, valuable as a raw material, affording, after it passes from the hands of the miner, the means of subsistence and profit to thousands, had risen from the sum of 47,350*l.* to about 600,000*l.* a-year. Even this great increase of produce was far exceeded in the course of the next eight or nine years, when, as we shall see heareafter, half as much more was added to the quantity, and more than that proportion to the value.

Early in the year 1799 the Birmingham manufacturers, finding the price of copper rapidly increasing, began to be alarmed lest a diminution of their trade should be the consequence, and having apparently overlooked the plain rule of commerce, that, without unfair restraint, demand must govern price, applied to government to impose prohibitions on the export, and other regulations, which would have amounted in effect to the fixing a maximum on the price, and consequently a ruinous restraint on a valuable source of national wealth, and laudable enterprise and exertion. It may be justly wondered at, that any ministry should have listened to such a proposal; but great as were the boasted talents of the then premier, he appears to have been led to the warm support of it, by the narrow consideration which was held out to him, of supplying the navy with copper at a somewhat lower price; not looking forward to the probability that any step which might ruin the British copper mines, must eventually make the British navy dependent on other countries for this essential article of equipment.

The contest that ensued between the miners and the manufacturers produced many curious documents, which were laid before the committee of the house of commons appointed to investigate the subject, and from which we are now enabled to state particulars of the mines of Cornwall, more exactly than could have been obtained, had not such an occasion called them forth.

The matter came fully before parliament, the good sense of which defeated the impolitic wishes of the proposers of the restrictions, and left a ministry unaccustomed to defeat in a minority on the question.

That the predictions of the manufacturers were groundless may be inferred from what took place afterwards: the price of copper advanced 50 *per cent.* in the next seven years, and the Birmingham trade, notwithstanding, increased in activity and consequence. The high price stimulated the enterprise of the miner, until an over-supply began to operate; and in the last few years, this, together with the unfortunate state of foreign trade, has again reduced the price of copper, so as once more to endanger the existence of a great proportion of the copper mines.

From the documents before alluded to, we find that, in February 1799, there were in Cornwall then working sixty copper mines, which were divided into classes, to shew their relative conditions. The accounts are made up for the six months preceding the statement.

Class 1. Includes the old deep mines, which produced in the six months more than half of all the copper raised in Cornwall.

2. Includes the profitable mines, which produced about three-eighths of the copper.

3. The new mines which were carrying on in the hopes of their improvement, and the greater number of which, in fact, had not begun to yield any ore.

The result of the statement is as follows, in which it is to be observed that the value of the ores is accounted for, after deducting the proportion paid to the owner of the soil, and therefore does not exhibit an account of all that was raised. The first column of loss refers to the money sunk in the six months for which the account is taken; and the last column of unrecovered loss includes all the money laid out from the commencement of each mine, which had not been paid off by adequate returns.

State of the Copper Mines of Cornwall for six Months, to the end of February 1799.

	Quantity of fine Copper.	Adventurers' Amount of the Value.	Cost of working the Mines.	Total of Profit on some Mines.	Total of Loss on others.	Capital employed in the Mines.	Unrecovered Loss.
	Tons. C. q. lbs.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Class 1.—Including ten old and deep mines	1388 3 1 21	115,121 13 10	116,209 1 6	3153 0 3	4240 7 11	102,489 0 0	69,181 2 10
Class 2.—Seven profitable mines	1083 12 2 24	86,377 15 3	49,311 11 1	37,066 4 2		66,813 0 0	5483 17 2
Class 3.—Forty-three new mines, of which thirteen only had begun to raise any ores	141 17 1 13	14,517 13 3	31,813 5 9		17,295 12 6	16,267 0 0	90,124 16 8
	2613 13 2 2	216,017 2 4	197,333 18 4	40,219 4 5	21,536 0 5	185,569 0 0	164,789 16 8

By

By this ftatement we fee, that the total profit of the fix months, in all the mines, exceeded the lofs by the fum of 18,683*l.* 4*s.* 0*d.*, and in the lofs is included a confiderable amount, which it does not feem clear fhould have been placed there, *viz.* the fums expended on the new mines in the period, as this may more properly be called an inveftment of capital with a view to future expected profit.

The unrecovered lofs is fubject to the fame remark, though it is ufual to reckon in mining the expenditure as lofs until the profits have repaid it. The capital, however, which means the value of ftock upon the mines, ought to be deducted from this unrecovered lofs; and if this be done, and a fair allowance be made for the value of fuch new mines as might have been fuppofed likely to become profitable, the account gives no unfavourable impreffion of the general refult at that time.

Another obfervation may be made on this account which feems neceffary, as it does not appear on the face of it. Credit is only given for the adventurers' part of copper ores; but feveral of thefe mines returned tin as well as copper, of which no account is taken, and which muft, in all probability, have increafed the profits of the fix months, if ftated.

The next table fhews the general receipts and difburfements on the copper mines of Cornwall for feven years, ending the 31ft December, 1798, which cannot be deemed fo favourable as the former, which related to the latter part of this fame period.

General State of the Copper Mines of Cornwall for Seven Years, ending the 31ft of December, 1798.

Years.	Adventurers' Amount of Ores.			Labour.			Materials.			Total Coft.			Profit.			Lofs.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
1792	279,331	15	10	150,824	12	3	91,361	6	4	251,865	19	11	27,465	15	11			
1793	283,853	12	11	176,333	2	7	110,122	15	2	294,226	15	0				10,373	2	1
1794	293,853	10	11	179,187	15	5	111,093	19	11	294,775	19	5				922	8	6
1795	305,320	6	9	189,713	10	1	111,640	2	3	312,047	7	5				6727	0	8
1796	348,836	12	11	201,995	18	6	105,925	12	1	324,897	18	4	23,938	14	7			
1797	320,606	15	9	189,821	15	11	109,008	7	3	309,060	14	10	11,546	0	11			
1798	405,488	15	9	253,601	12	3	146,253	16	3	408,248	7	11				2759	12	2
	2,237,291	10	10	1,341,478	7	0	785,405	19	3	2,195,123	2	10	62,950	11	5	20,782	3	5

N. B.—The columns of labour and materials, added together, do not make up the total coft, becaufe the accounts fent from fome mines do not diftinguifh the amount of labour from materials; and, therefore, could be no otherwife arranged than by being carried at once to the column of total coft.

The average annual coft of working the copper mines of Cornwall for this period appears to have been 313,589*l.* Out of this fum the labour appears to have coft about 197,640*l.*, and the materials employed about 115,950*l.* The proportion of the one to the other being nearly as 5 to 3.

The great amount of the latter may be attributed to the great depth of many of the mines, whereby the charge for coals for the fteam-engines, and the wear and tear in the fhafts of cordage and other articles, is prodigioufly increafed.

If, taking the amount of labour at the above fum, we allow 40*l.* as the annual earnings of each man employed, which is nearly the ufual proportion, we fhall find it would fhew that there are about 5000 men employed. But as a certain proportion belongs to the boys working under ground, and the women and children who drefs the ores on the furface, who altogether are paid after a much lower rate, the whole number of hands, including men, women, and children, may not, at this period, perhaps be over-rated at from 6 to 7000.

In order to fhew the refpective ftate of each mine at this time, we infert the following table, which exhibits the name of each, with the particulars of their expenditure and returns, as far at leaft as copper is concerned; for, as was remarked before, no notice is taken of the tin produced from any of them.

We take the year 1798, the laft of the feven years to which the ftatement given above refers to.

Such is the fluctuation of concerns of this fort, that at the prefent time, 1812, very few of thofe which appear at the head of the following lift as moft important in confequence and produce, are now working to much extent, while others, which either then lay neglected, or in which difcoveries had not been made, have fucceeded to fupply their places.

State of the Copper Mines in Cornwall for the Year 1798.

Mines.	Adventurers' Amount of Ores			Labour.			Materials.			Total Cost.			Profit.			Loss.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
North Downs -	51,388	14	6	33,350	2	1	18,890	19	9	52,241	1	10	147	12	8			
United Mines -	36,194	8	4	20,196	0	3	20,241	19	3	40,437	19	6				4243	11	2
Consolidated Mines	35,613	11	10	21,547	4	2	1[illegible],877	14	0	32,424	18	2	3188	13	8			
Herland -	29,233	10	9	16,922	2	0	13,789	11	6	30,711	13	6				1478	2	9
Stray Park and Wheal Gons	12,125	10	10	6660	11	0	3182	13	0	9843	4	0	2282	6	10			
Poldice -	6993	19	9	4945	19	3	5677	3	1	10,623	2	4				3629	2	7
Wheal Unity -	41,330	8	7	10,851	2	5	13,510	17	10	24,362	0	3	16,968	8	4			
Crenver and Oatfield -	19,429	14	7	9392	10	2	10,016	9	11	19,409	0	1	20	14	6			
Wheal Treasury -	19,978	4	10	20,050	18	8	5541	4	2	25,592	2	10				5613	18	0
Cook's Kitchen -	18,098	5	4	16,102	2	4	3468	13	7	19,570	15	11				1472	10	7
Wheal Rock -	995	19	7	1533	5	0	417	10	4	1950	15	10				954	16	3
Tin Croft -	35,242	17	1	15,233	10	2	6105	4	3	21,338	14	5	13,904	2	8			
Tresavean -	7609	2	9	5437	1	9	3069	2	3	8506	4	0				897	1	3
Prince George -	12,538	16	5	9045	3	5	1068	4	0	10,113	7	5	2425	9	0			
Camberne Vean -	6456	17	3							2885	1	2	3571	16	1			
Wheal Jewel -	19,035	18	2	10,710	6	8	5311	3	3	16,021	9	11	3014	8	3			
Pednandrea -	5078	7	10	10,587	16	8	7287	9	1	17,875	5	9				12,796	17	11
Wheal Fortune -	20,767	0	3	9450	18	7	2560	13	10	12,011	12	5	8755	7	10			
Wheal Gorland -	9032	0	8	3975	17	0	1893	19	5	5869	16	5	3162	4	3			
Wheal Providence	257	8	0							252	7	4	5	0	8			
Wheal Hope -				400	3	6	247	9	6	647	13	0				647	13	0
Scorrier -	102	14	6	509	10	6	103	14	7	613	5	1				510	10	7
Cherry Garden -	22	13	9	321	3	0	56	11	11	377	14	11				355	1	2
Wheal Susan -	1407	8	9	1956	13	0	1465	1	8	3421	14	8				2014	5	11
Wheal Squire -										820	3	7				820	3	7
East Wheal Sparnon -				356	6	3	45	10	5	401	16	8				401	16	8
Drollas Downs -	1075	14	7	1847	5	11	41	19	2	1889	5	1				813	10	6
Wheal Captain -	643	9	9							1617	16	7				974	6	10
Creegbraws -	77	3	10	1054	7	3	154	18	6	1209	5	9				1132	1	11
West Wl. Unity -										83	19	9				83	19	9
Wheal Penrose -				108	6	8	12	0	2	120	6	10				120	6	10
Wheal Tremayne				127	14	5	2	19	0	130	13	5				130	13	5
Wheal St. Aubyn				53	19	10	15	1	3	69	1	1				69	1	1
Rose Lobby -				270	7	8	138	9	5	408	17	1				408	17	1
Heart's Ease -				273	13	8	4	19	10	278	13	6				278	13	6
Bosprowall -	1377	11	3	1413	1	0	398	5	2	1811	6	2				433	14	11
Druid -	17	18	11	421	12	4	264	5	1	685	17	5				667	18	6
Wheal Fanny -				640	16	4	468	19	6	1109	15	10				1109	15	10
New Roskeir -	475	19	3	1106	9	3	1280	1	2	2386	10	5				1910	11	2
Polgine -										1220	3	9				1220	3	9
Wheal Christoe -				43	7	10	10	19	0	54	6	10				54	6	10
Wheal Drim -										56	16	5				56	16	5
Dopps -	15	10	0	241	12	7	31	9	10	273	2	5				257	12	5
Nanjiles -				71	3	7	18	18	0	90	1	7				90	1	7
West Downs -				612	2	10	187	13	2	799	16	0				799	16	0
Wheal Abraham -				1618	11	5	815	18	5	2434	9	10				2434	9	10
West Good Success				156	12	2	34	7	9	190	19	11				190	19	11
Whitefield -				418	3	6	198	5	4	616	8	10				616	8	10
Wheal Pink -										118	18	9				118	18	9
Penstruthell -				195	11	2	33	18	7	229	9	9				229	9	9
Wheal Damsel -				373	14	5	101	16	5	475	10	10				475	10	10
Wheal Quick -	121	17	7	537	9	5	204	13	2	742	2	7				620	5	0
North Good Success				81	0	5	1	6	7	82	7	0				82	7	0
Carried over	393,738	19	6	241,203	12	0	139,250	5	1	387,509	4	5	57,446	4	9	51,216	9	8

Mines.	Adventurers' Amount of Ores.			Labour.			Materials.			Total Coſt.			Profit.			Loſs.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Brought over	393,738	19	6	241,203	12	0	139,250	5	1	387,509	4	5	57,446	4	9	51,216	9	8
Wheal Bounty				122	9	10	61	11	4	184	1	2				184	1	2
Wheal Rachel				123	6	5	20	1	9	143	8	2				143	8	2
Wheal Royal										66	16	1				66	16	1
Wheal Clinton				60	2	0	38	9	8	98	11	8				98	11	8
Tolcarne	641	6	1	1248	0	9	532	12	4	1780	13	1				1139	7	0
Weſt Tolcarne	13	4	8	98	3	2	24	13	8	122	16	10				109	12	2
Wheal Union				102	14	0	20	10	6	123	4	6				123	4	6
Eaſt Wheal Vogue				71	15	4	17	3	0	88	18	4				88	18	4
Wheal Spinſter				36	2	6	4	5	4	40	7	10				40	7	10
Treſkerby				111	8	4	14	16	3	126	4	7				126	4	7
Cardrew	30	2	6	212	2	0	23	14	0	235	16	0				205	13	6
Wheal Leeds	39	6	4	430	19	9	447	11	5	878	11	2				839	4	10
Trenethick Wood										685	6	5				685	6	5
Wheal Muttral	639	9	8	641	17	8	18	2	11	660	0	7				20	10	11
Treſkow	7495	14	8	5375	19	8	2576	18	10	7952	18	6				457	3	10
Penberthy Crofts	281	2	9	1912	0	6	686	8	3	2598	8	9				2317	6	0
Wheal Kayle				135	17	3				135	17	3				135	17	3
Eaſt Wheal Park				345	5	6	160	6	0	505	11	6				505	11	6
Wheal Ruth				136	9	5				136	9	5				136	9	5
Wheal Carpenter										53	1	11				53	1	11
Wheal Chance										226	14	0				226	14	0
Weſt Wheal Jewel	1551	17	5	1243	6	2	2356	5	11	3599	12	1				2047	14	8
Wheal Bog, ore and materials ſold	1057	12	2							295	13	7	761	18	7			
	405,488	15	9	253,611	12	3	146,253	16	3	408,248	7	10	58,208	3	4	60,967	15	5

About this period a part of the county of Devon began to attract notice as a mining diſtrict, although it might rather ſeem to belong to Cornwall, if a diviſion had been made between the counties by a line that an obſerver of the geology would have chalked out, rather than by the arbitrary limit of a river. The mines of Devon may, therefore, fairly be ranked as a branch of the great mineral country adjoining, as their features are nearly alike, the products very ſimilar, and the ſyſtem of working derived from Cornwall. A ſpace of no inconſiderable extent indeed is to be found lying between the weſtern and moſt conſiderable mines in Cornwall, and thoſe on its eaſtern limits, which intervening tract is comparatively unproductive in mineral treaſures.

The tin mines of Devon have been before alluded to, and we have ſeen that they had gradually declined into inſignificance. Copper had now been found, and purſued with ſome ſucceſs, and though the quantity was not very great at this period, it ſoon led to greater exertion, which in turn was repaid by the diſcovery of new mines and an enlarged return of valuable produce.

It is probable that before 1800 the mines of Devon, which are moſtly ſituate within a few miles of the town of Taviſtock, did not yield more in any one year than about 100 tons of fine copper, and even this was a very recent diſcovery; we ſhall now ſee that they went on, together with thoſe of Cornwall, augmenting in importance.

From 1798 to 1804, the produce of the Corniſh mines appears to have continued pretty ſteadily at about 5500 tons of fine copper a-year; while the Devon mines in the ſame period increaſed their returns very rapidly, which had reached, about this time, to about 300 tons of fine copper a-year.

The price of the metal we mentioned to have been, in 1799, about 124*l.* a ton, and until 1804 a gradual increaſe was experienced, although the ſupply was at leaſt ſomewhat larger. In the following year, however, owing to the flouriſhing ſtate of the export trade, the value of copper roſe very rapidly, and reached the unprecedented price of 180*l.* a ton to the miner. The conſequences of this were ſoon felt, and, by the exertion produced by this ſtimulus, the returns of the Corniſh and Devon mines reached to more than 7000 tons of fine copper, fetching, at the firſt hand, the ſum of 1,260,000*l.*

From this time to the preſent, the value of copper has experienced violent and rapid fluctuations, being, at one time, at half the price of the year 1805; and as this has proved a cauſe of great embarraſſment and loſs to the adventurers in the mines, ſo it has tended to reduce again the quantity of copper raiſed.

The year or two following 1805 were, as might be expected, even more productive than that in which the price attained its higheſt pitch, for the exertions it cauſed operated long after the price began to decline.

The following Table exhibits a Statement of the Quantity of Copper Ores and Fine Copper produced by the Mines of Cornwall and Devon during the last four Years, taken up to the End of June in each Year, and the Value calculated according to the Average Standard, or Miner's Price of the Metal.

		Copper Ores.			Fine Copper.				Average Standard *per* Ton.			Annual Amount after deducting Charges of Smelting.		
		Tons.	cwt.	qrs.	Tons.	cwt.	qrs.	lbs.	£	s.	d.	£	s.	d.
1808	Cornwall -	73,434	2	1	7118	5	1	17						
	Devon - -	3725	0	0	369	10	0	0						
		77,159	2	1	7487	15	1	17	107	0	0	781,348	16	7
1809	Cornwall -	72,038	12	2	6972	17	0	24						
	Devon - -	3210	0	0	365	1	3	0						
		75,248	12	2	7337	18	3	24	122	0	0	875,784	2	3
1810	Cornwall -	76,525	14	3	6651	18	2	5						
	Devon - -	3713	0	0	354	15	0	0						
		80,238	14	3	7006	13	2	5	141	0	0	969,376	19	0
1811	Cornwall -	70,039	0	1	5948	7	0	22						
	Devon - -	3540	0	0	323	13	0	0						
		73,579	0	1	6272	0	0	22	125	0	0	767,379	4	0

We have now brought the history of the copper mines up to the present period, and we have found what has been done in one district in the space of about 100 years after the discovery of the metal. We may observe, that in the beginning of the 18th century the annual produce of the mines consisted of about 6500 tons of ore, and 700 tons of fine copper, yielding to the miners, who, from their ignorance of the subject, did not then receive from the smelters a price for their ores adequate to the value of the metal they contained, no more than 45,000*l.* a-year. And we have found this produce increased, at the early part of the present century, to the annual quantity of near 80,000 tons of ore, yielding more than 7000 tons of fine copper, worth to the miners an annual sum little short of 1,000,000*l.*

The copper mines now working in Cornwall and Devon may be known from the following list, which contains such only as are more or less productive, and does not include such as make no returns, but may, notwithstanding, be prosecuting with a view to future discovery, many of which kind were stated in the former account of the mines working in Cornwall in 1798.

By referring to that statement, we shall find the productive mines to be forty in number, and the unproductive to amount to thirty-six.

The following list will be found to contain sixty-one productive mines, with the quantity of ores estimated from the account of sales at the ticketings, where the computed weight of each parcel of ore is stated, and the exact quantity determined after the sale has taken place.

It is possible that some few mines may exist which do not appear in this list, and which sell their ores by private contract, but they are not important.

We subjoin to the list the Devon mines, with their quantities of ore, taking account, as in Cornwall, of such only as are productive; and the whole is made up to the end of December 1811.

A list of Copper Mines, with the Quantities of Ore offered for Sale at the Ticketings from each, in the Year 1811.

In the county of Cornwall there are 61 mines.

Names of the Mines.	Tons of Ore.
Wheal Alfred - - -	8946
Dolcoath - - -	8544
Wheal Unity - - -	5545
Wheal Abraham - -	3950
Poldice - - -	3659
Wheal Damsel - - -	3357
Gunnis Lake - - -	2600
West Wheal Fortune - -	2594
Wheal Towan - -	2158
Wheal Fanny - - -	1802
Crennis - - -	1696
Oatfield - - - -	1630
Treskirby - - -	1578
Wheal Gorland - - -	1485
Cook's Kitchen - -	1342
Crenver - - -	1287
Tin Croft - - -	1138
North Downs - - -	1153
Wheal Friendship - -	1038
Wheal Jewel - - -	968
Wheal Virgin - -	942
Saint George - - -	938
United Mines - - -	934
West Wheal Virgin - -	921
Wheal Fortune - - -	916
Wheal Quick - - -	679
Camborne Vean - -	655
Wheal Chance - - -	597
Wheal Spinster - - -	584
Carried over	63,636

Wheal

Brought over	63,636	
Wheal Neptune - - -	539	
Wheal Gons - - -	443	
Godolphin - - -	411	
Creegbraws - - -	316	
Trefavean - - -	311	
Nangiles - - -	266	
Botallack - - -	244	
Penberthy Crofts - -	212	
Wheal Clinton - - -	209	
Chacewater - - -	204	
Wheal Baffett - - -	204	
Wheal Dolphin - - -	183	
Wheal Druid - - -	177	
United Hills - - -	177	
Benner Downs - - -	175	
Wheal Maid - - -	151	
Wheal Strawberry - -	148	
Union - - -	146	
Wheal Mufic - -	145	
Wheal Sparnon - -	97	
Wheal Maudlin - - -	95	
Wheal Margaret - - -	90	
Wheal Lufhington - -	81	
Unanimity - - -	49	
Wheal Squire - - -	45	
Reliftian - - -	41	
Wheal Spearn - -	20	
Wheal Mary - - -	20	
Trenowith - - -	18	
Wheal Freedom - - -	16	
Rofkear - - -	10	
Rofewarne - - -	7	
		68,886
In the county of Devon feven Mines.		
Wheal Friendfhip - -	1102	
Wheal Crebor (*Taviftock Canal*)	1308	
Wheal Crowndale - -	863	
Eaft Crowndale - - -	913	
Ding Dong - - -	250	
Wheal Hope - - -	6	
Wheal Huckworthy - -	10	
		4,452
	Tons	73,338

Hence it will appear, that the copper mines have of late been declining in their produce, which is to be referred to the general ftate of trade rendering the price of the metal unequal to the charge of producing it.

The prefent value of copper, as was obferved in a former part of this article, is as low as it was 100 years ago, and we may account for the poffibility of this happening without abfolute ruin to the mines, by the facilities which the great improvements in all the various operations of mining have given for leffening manual labour and confequent expence.

This very improvement has, however, contributed to a more rapid exhauftion of the ores, and though difcovery has hitherto in this diftrict kept pace with the gradual wafte, yet it is impoffible not to forefee that as the country is even now very fully explored, a time muft arrive when the quantity of metal produced will grow lefs, and the price in confequence muft advance.

This period we conceive is not fo diftant as fome may imagine, but it is a fubject not eafily reduced to any very probable calculation.

The hiftory of the mining of a particular diftrict would naturally lead to an interefting enquiry on this fubject, and to the difcuffion on the probability of a future and continuing fupply of the metals which the bowels of the earth have hitherto yielded fo abundantly. As this queftion regards one country, it may be affumed that the fupply muft have its limits; as it regards the whole world, it becomes difficult even to conceive what extent or number of depofits of metal may exift.

That certain diftricts may become exhaufted is more than probable, but others now unexplored by the hand of man may be found. New powers, as far furpaffing thofe of the fteam engine as they did all former ones, may give the means of penetrating the earth to depths now unattainable, and veins may hereafter be followed to fituations which are forbidden at prefent by the value of their produce or the want of fufficient exertion.

The ftores which the earth yields from its bowels are unlike thofe which its furface produces; the former are limited and are not renewed, the latter are conftantly produced by the encouraging hand of induftry. The one are gradually exhaufting, and feem to demand frugality in their expenditure, the other grow and increafe in proportion to our care and exertion.

The refult of a gradual exhauftion of mines now exifting feems likely to be this; at firft the price of metals will increafe in proportion to their fcarcity, this advance in value will lead to a greater produce by new efforts even in the diftricts which are exhaufting, and after thefe begin again to fail, which they will do more rapidly from the increafed exhauftion, new diftricts will be fought after, and perhaps uncultivated countries even become peopled by the want of what is now become fo neceffary to human life.

The variation in thefe affairs may at fome time make material changes in the ftate of civilization, a pofition which will not be denied by thofe who duly confider the effects that the ftores of coal and metal have had on the profperity of Britain.

Mining *Proceffes*, according to the practice of the mineral diftricts of Cornwall and Devon.

The means purfued for the difcovery of veins containing metal, and the appearances which ferve as indications of the probable quantity which may be found in them, are treated of in a former article. See Lode.

The works which follow the difcovery are at firft but fimple and limited, but they increafe afterwards in proportion as the profpects of future fuccefs become more certain; or, on the contrary, they are difcontinued when the trial offers but little encouragement to proceed with the adventure.

By a reference to the article above quoted, it will be underftood how the depofits of metal are ufually fituated in the veins; and as the miner's object in his firft operations is to get at fome fhoot or bunch of ore as quickly as poffible, and to open as much of the lode as he conveniently can, the moft promifing part on the furface is chofen for the commencement of a *fhaft*, which is either funk upon the vein fo as to follow its dip or underlay, or otherwife is carried down perpendicularly from fome fpot on the fide to which it dips, fo as to interfect it at a given depth, and then is ufually called an *underlayer*.

As water is commonly foon met with in fuch quantities as to impede the workmen, means for removing it muft be provided, and it fpeedily becomes neceffary to take fteps for this purpofe. Where the elevation of the ground will admit of an *adit* or water-level being made, this is ufually firft had recourfe to, particularly when it may be obtained by driving a moderate a moderate distance, or when it can be pursued on the course of the lode, and so serve the double purpose of a drain and a level for trying the appearances of the vein.

When the shaft becomes deeper than the adit, or indeed when the latter cannot well be had, machinery to draw out the water is erected and employed, such as steam-engines, or overshot water-wheels where streams to drive them can be obtained: in both cases these engines are employed to work pumps to raise the water.

As soon as a shaft is sunk sufficiently deep, and it becomes desirable to pursue the lode horizontally, it is stopped for a time, and a level is commenced on each side of it, and this is usually continued in two opposite directions upon the course of the vein. The ends of this level being driven out of the way of the shaft, sinking may again be undertaken, and continued until it is deemed proper to drive another level; and thus a succession of these galleries or drifts are opened under each other, and the vein is divided into parallel portions, which are left to be worked for the ore contained therein, and which portions are called *backs*.

New openings to the surface from these levels are afterwards made by sinking more shafts at proper distances, and communications from one level to another are formed by sinking a kind of small underground shaft, called a *winze*, probably because the only machine employed in their execution for hauling the stuff is the common windlass, which, in Cornwall, has generally the same abbreviated or corrupt appellation.

When a mine is put into this state, and any quantity of ore discovered, proper engines provided with sufficient power to admit the constant deepening of the mine by keeping the bottom of the engine shaft, called the *sump*, dry, so as to be regularly sinking: when the ventilation is completed by proper means for that purpose, and machines constructed for hauling up the ores and waste to the surface called *whims*, a mine, in the technical language of Cornwall, is said to be in due course of working.

The agents who attend daily to the works are called *captains*; they contract with the different classes of miners, and direct the operations, under the orders either of the principal adventurers, or a manager appointed by them.

The shafts and levels are kept regularly sinking and driving to lead to further discovery, or to open more of the lode for working, and the parts of the vein or lode left between the passages thus made are worked away, where the ore will pay the expence of so doing, by men, who contract for this work within certain limits, being paid a proportion of the value when merchantable, which is called a *tribute*, and which varies with the degrees of facility with which the ore can be procured, either from the different states of richness of the lode, or the hardness or softness of the rock which must be broken to obtain it.

The ore is usually conveyed in wheelbarrows through the levels under ground by boys to the nearest shaft, and there raised in buckets or *kibbles* to the surface. These kibbles are wound up by the whims, which are turned either by horses, steam, or water.

In preparing the ores for smelting, a variety of processes is employed, which require the labour of many hands; these are carried on upon the surface, and chiefly by women and children. The object being to separate from the ore both the stony and sparry waste, and the mundic or other useless metallic mixtures with which it is combined, considerable skill is required, from the different specific gravities of the various substances, which render it impossible by mere washing to separate the ores entirely from the different mixtures which accompany it.

To dress ore properly, it is essential that the whole should first be brought into such a state of division, that the different parts may be separated by washing or sifting: and, therefore, the richer the state in which the whole is raised from under ground, the less the labour required in breaking or stamping. The better parts of the ore are broken to a proper size for smelting, either by flat hammers, or, as is now usual in the mines in Devon, by iron cylinders driven by water. For the coarser parts much more labour is required in stamping, sifting, and washing, the particular detail of which will be found under the article ORE.

The stamping-mills, and other apparatus for dressing the ores, are usually fixed as near the mouths of the shafts on the surface as possible, consistently with the power of leading streams of water to them. And plots, or *floors*, are prepared near them for receiving the merchantable ores until they are sold to the smelting companies.

The management of these processes is usually confided to a *dresser* or *grass captain*, who regulates the whole, the expence being borne by the men who raise the ore on tribute, who take their proportion of the value according to the amount of the sales, and, therefore, pay every previous charge.

The erections on the surface of a mine comprize, besides steam or water-engines, whims, stamping-mills, and sheds on the dressing floors, a suitable counting-house for the captains and clerks, where the people are paid monthly, and the bargains or contracts made by a kind of public auction. A forge, or blacksmith's shop, accommodated to the extent of the mine, where men are generally at work by night as well as by day, to sharpen tools as well as to make or repair the iron-work of the different engines. A carpenter's shop, or *timber-house*, for work of that description, which is always going on to a considerable extent.

From the account given in the *History of* MINING, and the statement of the disbursements and returns there exhibited of all the concerns of that description in Cornwall and Devon, it may be seen how extensive some of them are in that respect. It may further be here observed that great depth has been attained in many of the older ones; in Dolcoath, which we believe is rather the deepest, the lowest part is somewhat more than 220 fathoms from the surface. Some individual mines in Cornwall employ near 1000 persons, and have several steam-engines working for the different purposes of pumping the water and raising the ore. In the county of Devon, streams of water being at hand, large over-shot wheels are employed for working the pumps, and several have been erected of late years equal in power to the larger steam-engines. Within a very late period, the same economical means have been applied in a very ingenious manner to the winding up the ores from under ground, which, from the crookedness of the shafts of copper mines, was a work of more difficulty than might at first appear.

We propose to give more detailed accounts of the processes of breaking, raising, and dressing the *Ores*, under the article bearing that title; and shall describe the operations of sinking shafts and driving the levels from them under the head of SHAFT. The pump-work of mines, and the means for ventilating drifts, will be treated of in their proper places.

MINION, in *Geography*, a small island in the straits of Mozambique, near the W. coast of Madagascar. S. lat. 12° 40′. E. long. 49° 32′.

MINION, a sort of cannon, or piece of ordnance, of which there were formerly two kinds; large and ordinary, answering to our six-pounders. See CANNON.

MINION is also the name of a type used by printers.

MINISH, or Mynish, in *Geography*, one of the many iſlands on the weſt coaſt of the county of Galway, Ireland. It belongs to the barony of Ballinahinch.

MINISINK, a town or rather village of America, in New Jerſey, in the N.W. corner of the ſtate, and on the W. ſide of Delaware river; 57 miles N.W. of Brunſwick.—Alſo, a townſhip of Orange county, New York; containing 3594 inhabitants.

MINISTER, one that ſerves or conducts the public worſhip of God.

In the reformed church, prieſts, or thoſe ordained to preach and do the other functions of the prieſthood, are called abſolutely and ſimply miniſters.

In which ſenſe, biſhops, &c. are ſaid to be miniſters of God, miniſters of the Word, of the Goſpel, &c. In ſome churches they are alſo called *paſtors*.

Ministers *of the Altar* are properly thoſe who attend and aſſiſt the prieſt at the adminiſtration of the euchariſt. See Deacon and Subdeacon.

Officers of ſtate, &c. are called the king's miniſters; as adminiſtering the affairs of juſtice, policy, &c. for him.

Minister *of State*, is he with whom a prince entruſts the adminiſtration of his government; or to whom he commits the care and direction of the principal affairs thereof.

Boethius is propoſed as a model for miniſters of ſtate.

The grand vizier is the prime miniſter of the Ottoman empire.

Ministers, *Foreign*, or the miniſters of foreign princes, are their ambaſſadors, envoys, agents, or reſidents in the courts of other princes.

There are two kinds of foreign miniſters. Miniſters of the firſt rank, who are alſo called *ambaſſadors*, and *envoys extraordinary*.

And miniſters of the ſecond rank, who are the ordinary reſidents.

Thoſe of the firſt rank have a repreſentative character, which the others have not; though theſe laſt are ſometimes inveſted with fuller powers than the former.

Minister is alſo the title which certain religious orders give to their ſuperior.

In this ſenſe we ſay, the miniſter of the Mathurins, or Trinitarians.

Minister, among the *Jeſuits*, is the ſecond ſuperior for each houſe; thus called, as being an aſſiſtant to the ſuperior, or rector.

The general of the Cordeliers order is alſo called the *miniſter-general*. See Jesuits.

MINISTRY, or Ministery, a profeſſion, office, or employment, which a perſon diſcharges for the ſervice of God, the public, or ſome particular perſon.

In which ſenſe we ſay, a biſhop muſt account to God for his miniſtry, &c.

Ministry is alſo uſed for the government of a ſtate, by ſome great miniſter, under the ſovereign authority.

In which ſenſe we ſay, the miniſtry of the cardinal de Richelieu, &c.

Ministry is alſo frequently uſed as a collective word, ſignifying the miniſters or officers of ſtate.

Thus we ſay, the miniſtry oppoſed a thing; meaning the miniſters oppoſed it.

MINITOBA, in *Geography*, a lake of Canada, 100 miles long, and from 10 to 15 wide. N. lat 50° 40′. W. long. 100 20′.

MINIUM, in the *Natural Hiſtory of the Ancients*, a name given to what we now call cinnabar, or native mineral of a ſhining red colour, out of which quickſilver was extracted. See Mercury.

As the prepared cinnabar is much preferable to the native as a pigment, it has long been a conſiderable article of chemical manufacture; and the Dutch having had the reputation of making the beſt, we ſhall ſubjoin their method of proceeding, given by M. Tuckert (Ann. de Chem. iv. p. 25.) cited in Aikin's Dictionary. This manufacture conſiſts of two diſtinct operations, the one being the preparation of the æthiops, the other the converſion of the æthiops into cinnabar. To make the æthiops, a boiler of iron poliſhed on the inſide, and about $2\frac{1}{2}$ feet in diameter, and 1 in depth, is charged with 1080lbs. of mercury, and 150lbs. of ſulphur (or *per cent.* 87.8 mercury, and 12.2 ſulphur); a moderate heat is then applied gradually increaſing, and accompanied by ſuitable ſtirring of the ingredients till the whole appears to be thoroughly mixed and combined. The black ſulphuret of mercury thus formed, is then removed from the boiler and pulverized. In order to convert this into cinnabar, three large earthen ſubliming pots are placed in a furnace, and gradually brought to a red heat by means of turf: at this time the cover of each (which conſiſts of a ſimple ſquare plate of iron) is removed, and the contents of an earthen veſſel, holding about a pint and a half of æthiops, are poured into each pot. In a few ſeconds a column of flame riſes out of the pots, to the height of five or ſix feet, and, as ſoon as it begins to leſſen, the further eſcape of the contents is prevented by putting on the iron cover. In a ſhort time after a ſecond charge is poured in, to which ſucceeds a third, and ſo on, till at the end of thirty-four hours the whole of the æthiops has been equally divided between the three pots, making 410lbs. for each. The fire is now kept up as ſteadily as poſſible for thirty-ſix hours longer, in order to accompliſh the ſublimation, care being taken to ſtir up the materials at the bottom of the veſſels at leaſt once every half hour, by an iron rod made for the purpoſe and introduced at the top. At the ſame time the workman aſcertains how the proceſs is going on by the flame which appears when the cover is removed; if it riſes to the height of two or three feet, the heat is too great, as on the other hand it is too feeble if the flame only lightly quivers about the mouth of the pot; the proper temperature is marked by the flame riſing vigorouſly, yet not exceeding three or four inches in height. When the laſt thirty-ſix hours are expired, the furnace is extinguiſhed, and the whole allowed to cool: the ſubliming pots are then taken out, the iron hoops with which they are bound are knocked off, and the pots themſelves are broken; the cinnabar is found ſublimed in the upper part of the veſſel to the amount of 400lbs. being 10lbs. leſs than the æthiops that was put in: or, in other words, the loſs of weight ſuſtained by the converſion of æthiops into cinnabar, amounts to $2\frac{1}{8}$ *per cent.*

Minium, or red lead, is a calx of lead of a vivid yellowiſh-red colour, which colour it acquires by a ſlow calcination and reverberation.

The method in which minium is made in large quantities with us, is conciſely deſcribed in our article Lead.

The proceſs by which minium is prepared is deſcribed in the following manner by M. Jars. The furnace is of the reverberatory kind, with two fire-places at the ends; each fire-place being ſeparated from the area, or body of the furnace, by a wall twelve inches high. The fire-places are fifteen inches broad, and their length is equal to the breadth of the whole furnace, which is about eight or nine feet. The length of the area from one place to the other is nine or ten feet. The quantity of lead uſed in one operation is about 1500 pounds, of which nine parts are lead obtained from furnaces where the ore is ſmelted, and one part is lead extracted from the ſcoria which is formed in ſmelting the ore. This

This latter kind is said to be necessary, as the former could not alone be reduced into powder. All the lead is at once put into the area, the bottom of which is level. The calx, as fast as it is formed, is drawn to one side by means of a rake suspended by a chain before the mouth of the furnace. In four or five hours the whole quantity of the lead is calcined; or, if any pieces remain uncalcined, they are separated and kept for the next operation. The heat employed is that of a cherry-red, and the fire-places and mouth are kept open, that the air may accelerate the calcination. The powder or calx is to be frequently stirred to prevent its concreting, and when this operation has been continued about twenty-four hours, the matter is taken out of the furnace, and laid on a flat pavement. Then cold water is thrown on it, to give it weight, as the workmen say; but rather (as M. Jars thinks) to make it friable. It is then to be ground in a mill, and the finer part is separated by washing, while the coarser part, reserved for some following operation, is to be placed at the mouth of the furnace in order to retain the melted lead. The fine powder, which is now of a yellow colour, is again put into the same or a similar furnace, and exposed to a very moderate fire, from thirty-six to forty-eight hours: during which time it is stirred frequently to prevent its concreting; and the powder gradually acquires its proper red colour. The minium is then to be taken out of the furnace, cooled, and sifted through an iron sieve placed in a cask. Mem. de l'Academie Royale à Paris, 1770. In Holywell, Flintshire, minium is made from litharge, which saves the previous calcination.

A portion of the lead during the operation is lost by volatilization; part of it being dissipated in the air and part settling in the chimnies, and on the roofs of the furnace, in form of a yellowish-white soot, with crystallized lumps intermixed: this is collected from time to time, and either reduced into lead, or mixed with the lead in the subsequent calcination. The quantity of sublimate thus collected cannot be accurately ascertained. Dr. (bishop) Watson, in his "Essays," estimates it at about $\frac{1}{480}$dth of the minium produced. From the circumstances above recited it is not possible to determine the full increase of weight which lead should acquire by its conversion into minium. On an average the actual increase is about $\frac{1}{10}$th; 20 cwt. of lead producing 22 cwt. of minium.

Minium, in the *Materia Medica*, and the *Arts*, &c. For medical purposes it is used externally; it obtunds the acrimony of the humours, allays inflammations, and is excellent in the cleansing and healing of old ulcers: it is used on these occasions in many of the plasters and ointments of the shops; it is an ingredient in the officinal composition, called *emplastrum de minio*, used as a deficcative and cicatrizer; though more rarely than that made in the same manner with litharge, because it does not stick so well, and is more difficult of preparation. See Emplastrum, Lead, in *Medicine*, and Unguent.

It was with minium the ancient Roman and Grecian ladies tinged their nails and faces of a red colour. For, as to our modern paints, without doubt, they were not known in those days.

The bright orange colour of minium might render it valuable in painting, if it could stand with certainty in either oil or water. But as it is subject to become black, it cannot be safely trusted, except in hard varnishes: and is, therefore, seldom used in oil, or even in water, unless for very gross purposes, or as a ground for vermilion. The goodness of the minium may be distinguished by the brightness of its colour: and the adulteration to which it is liable may be detected, by putting an ounce of it into a crucible, with an equal quantity of charcoal-dust, well mixed together, and placing the crucible in a common fire sufficient to melt lead, which is to be covered with another small crucible inverted into it. When it has been continued for some time on the fire, take it out and strike it against the ground, the minium will thus be reduced to its metallic state; and its diminished weight, when freed from the charcoal-dust and cold, will indicate the proportion of adulterated matter. Minium is also used as a flux in forming the enamel for grounds, and in glazing, &c.

MINNIGAFF, in *Geography*, a town of Scotland, in the county of Kircudbright; 15 miles S.W. of New Galloway.

MINNIN, a stringed instrument of music among the ancient Hebrews, having three or four chords to it. Though there is reason to question the antiquity of this instrument; both because it requires a hair-bow, which was a kind of plectrum not known to the ancients, and because it so much resembles the modern viol. Kircher took the figure of this, the *machul chinnor*, and *psaltery*, from an old book in the Vatican library. Hawkin's Hist. Music, vol. i. p. 255.

MINO, in *Geography*, one of the smaller Philippine islands, near the E. coast of the island of Bool. N. lat. 10° 6'. E. long. 124° 30'.

MINOMEIT, a town of Prussia, in Oberland; 13 miles W.N.W. of Heilsperg.

MINONG, or Isle Royal, an island of Canada, in lake Superior, 30 miles long and 10 broad. N. lat. 48°. W. long. 89°.

MINOR, a Latin term, literally denoting *less*, used in opposition to *major*, greater.

Thus we say, St. James Minor, Asia Minor, the minor excommunication, &c.

Minor *Ædilis*. See Ædile.
Minor *Anticus Serratus*. See Serratus.
Minor *Barons*. See Baron.
Minor, *Canis*. See Canis.
Minor *Gastricus*. See Gastric.
Minor *Oculi Obliquus*. See Obliquus.
Minor *Orders*. See Orders.
Minor, *Rectus*. See Rectus.
Minor, *Teres*. See Teres.
Minor, *Ursa*. See Ursa.

Minor, in *Law*, denotes a person under age, or who, by the laws of the country, is not yet arrived at the power of administering his own affairs, or the possession of his estate.

Among us, a person is a minor till the age of twenty-one; before which time his acts are invalid. See Age and Infant.

It is a maxim in the common law, that in the king there is no minority, and therefore he hath no legal guardian: and his royal assents and grants to acts of parliament are good, though he has not in his natural capacity attained the legal age of twenty-one.

The minority of the kings of Sweden, Denmark, and the provinces of the empire, terminates at eighteen years; and that of the kings of France at fourteen, by an ordonnance of Charles V. in 1374.

It is also provided by the custom and law of parliament, that no one shall sit and vote in either house, unless he be twenty-one years of age. This is likewise expresly declared by stat. 7 & 8 Will. III. cap. 25. with regard to the house of commons.

Minor, in *Logic*, is the second proposition of a formal or regular syllogism, called also the assumption.

Minor, in *Music*, is applied to certain concords, which differ

differ from, or are lower than, others of the same denomination by a lesser semitone, or four commas.

Thus we say, a third minor, or lesser third: or a sixth major and minor.

Concords that admit of major and minor, *i. e.* greater and less, are said to be imperfect concords.

MINORS, or *Friars Minors*, an appellation which the Franciscans assume, out of show of humility; calling themselves *fratres minores*, i. e. *lesser brothers*; and sometimes Minorites.

There is also an order of regular Minors at Naples, which was established in the year 1588, and confirmed by Sixtus V.

MINORBINO, in *Geography*, a town of Naples, in the province of Bari, the see of a bishop; 85 miles S. of Naples. N. lat. 41° 5'. E. long. 15° 59'.

MINORCA, INSULA MINOR, the lesser, when compared with Majorca, and the second of the Balearic isles, an island of the Mediterranean, is long and narrow, forming part of a circle from the S.E. end to the N.W., the hollow part being towards the S. It is thought to be 13 leagues in length at the longest part, and near 38 leagues in circumference; it lies about ten leagues to the N.E. of Majorca, and 50 E. from the mouth of the Ebro. Minorca has successively fallen under the dominion of the Carthaginians, the Romans, the Vandals, the Moors, the Aragonese, and the Castilians; and for a century, from 1708, it has been in the possession of the house of Austria, the English, French, and Spaniards, by turns. This island is situated in the middle of a number of small rocks, banks, and islands; on the south the shore is level. The air is moist, and the soil dry. The administration is divided into districts, or terminos, the chief towns of which are Ciudadella, Mahon, Alayor, Ferarias, and Mercadal. The principal ports are Mahon, on the E.; Fornella, on the N.; and Ciudadella, on the W. The isle is level, and there is only one mountain distinguished by its elevation, *viz.* Monte Toro. Ciudadella, or Samna, the capital, is situated at a small distance from the coast, towards the N.W., 11 leagues from Mahon; it was in the fifth century the see of a bishop, and the residence of the governor of the island, and also the seat of civil and ecclesiastical jurisdiction. In the time of the Carthaginians and Romans it was a considerable place; but its splendour has declined; and port Mahon disputed with it the superiority, when the English established their tribunals and seat of government in the island. (See PORT *Mahon*.) The port is small and marshy, formed by a canal, bounded by rocks. On the right and left are towers, corresponding to each other, to repeat the signals, and two cannons of a large calibre, upon swivels, sufficient to stop a privateer. The entrance is difficult of access. The city is surrounded in part with ancient walls, erected by the Moors; the rest is modern, formed of bastions and curtains of hewn-stone. The streets are of ancient form, being narrow and shady, paved with large unhewn stones; and in the city are a cathedral, flanked by a beautiful square tower, and supposed to be built in the third century, two churches, three convents, and an hospital. The termino, of which Ciudadella is the capital, bearing its name, is above 5½ leagues long, and 2¾ wide; and its total population amounts to about 800 persons. Alayor is situated about 4½ leagues from Mahon, being the chief town of the termino of that name, containing about 112 hamlets or manors, and rather more than 4000 people. The streets are uneven, narrow, crooked, and ill paved: but the houses are well built. At the entrance into the town is a church, built of free stone, in a simple Gothic style of architecture without, and within decorated with sculptures and paintings. The monastery of Cordeliers has a handsome church. Here are also an hospital, and a barrack capable of accommodating 250 men. The town is well provided with cisterns, and the water is fresh and salubrious. About one league from Alayor is *Mercadal*; which see. The most remarkable ports of this island, besides those of Mahon and Ciudadella, are Fornella and Adaya. Port Fornella is about six miles from mount Toro, of a circular form, with a narrow entrance, and facing the north. The bay is capable of containing the largest fleet, perfectly sheltered, and defended at the entrance by a small square fort, with bastions and fosses. The establishment is capable of containing 300 men. The entrance to the port of Adaya is concealed by eminences towards the north; it is only used for fishing. The strength of the island depends upon circumstances. When the English retook it, in 1798, the Spaniards had in it 6000 troops, and the English, exclusive of their naval force, disembarked only 3000 soldiers. When the Spaniards, four years after, were reinstated, they left a garrison with 3000 infantry, 1500 light infantry, 500 engineers and miners, and 90 heavy cavalry.

Of the islands, or islets, surrounding Minorca, the most considerable are to the S., about ¾ of a mile from Cabo Bufara. The island of Coloms is elevated, and forms with the cape a narrow canal. Near it are two small islets. The large and small islands of Adaya are near the port of the same name. To the S.E. is situated the large island of Aguila. The isle of Sanitge is near the port of the same name on the W. coast; at some distance is an islet, and beyond that the island of Bleda. Beyond the rocks of Alayor, are a small island named named Galera, and an islet called Codrell. The isle of Layre de Mahon is within reach of the ancient fort of St. Philip, and there are several small islands near Mahon.

Monte Toro is at a little distance from Mercadal, and by its elevation commands the whole island: at its base it is some miles in circumference, and its form is that of the frustum of a cone. Mount St. Agatha is situated N.W. of Mercadal, and rises above several mountains that surround it. Upon the summit is a chapel, held in great veneration. The whole of this canton is inhabited by shepherds, whose flocks subsist upon a part of the mountains, and the valley beneath is abundantly fertile.

Minorca is not sheltered from the north winds, which check vegetation; nevertheless snow is seldom seen here in winter, and in the spring the air is always temperate and pure; the heat of summer is great, and the drought is productive of inconvenience. In the autumn there is much rain. The soil of the plains is less fertile than that of the coast; and the earth upon the mountains, though thinly spread over the rocks, is rich and fertile. In the vallies and plain, the soil is argillaceous and thin, but it is fertilized with that which is washed down from the mountains. Upon the whole, this island is, in many parts of it, rich in vegetation. The principal grains cultivated in the island are wheat, barley, and a small quantity of maize. Red and white wines are exported; olive trees are numerous, and here is abundance of every kind of fruit, such as oranges, pomegranates, lemons, figs, &c.; and the island furnishes great variety of garden and culinary vegetables. The water-melons are very fine; and the honey of the island, some of which is exported, is reckoned very good. The horses, mules, and asses, are estimated at about 2000; the horned cattle at 7000; the sheep, goats, and small animals, at about 45,000; the pigs at nearly 10,000. Poultry is scarce, but birds of different species are very numerous. The fish all round the island is abundant at all seasons, and very good. The inhabitants have

have no manufacture or fabric for furnishing articles of exchange in commerce. Their export trade consists of a small quantity of cheese sent into Italy, and a small surplus of wool, which produce about 2500*l.* sterling; salt, wine, honey, and wax produce from about 17,083*l.* to 17,292*l.* The island receives from abroad corn, brandy, rice, sugar, coffee, tobacco, spices, linen, fine cloths, boards, pitch, cordage, &c., and some pieces of furniture. The natural history of this island presents to us a natural and very interesting grotto, called La Cava Perella, two miles to the S. of Ciudadella; and also a subterranean lake; a quantity of coral is found near the sea-shore, and a small variety of shells. In many parts of the island are mines of iron and lead, and quarries of stone and marble. The inhabitants are a quiet, peaceable people, attached to their own customs, and little disposed to change. They regard with reverence the ceremonies of religion. The same language is spoken in Minorca and Majorca. In this island, and particularly in the territory of Alayor, they have some altars of ancient date. It has also furnished Phœnician, Macedonian, Carthaginian, Celtiberian, Grecian, Roman and Spanish medals, in gold, silver, and large and small bronze. In this island, also, a small Gothic bronze coin has been discovered, the impression on which is a crowned head in the centre of a circle, with these words, "Alphonsus Rex;" supposed to belong to the end of the 13th century. The island also has presented to the antiquarian ancient sepulchres, vases, lamps, urns, lacrymatories, composed of a reddish earth, and marked with illegible inscriptions. N. lat. 39° 59′. E. long 3° 45′.

MINORCA, *Cape*, a cape on the E. coast of Majorca. N. lat. 39° 50′. E. long. 3° 12′.

MINORE, Ital., the same as *minor*, Engl.

MINORESSES. See *St.* CLARE.

MINORI, in *Geography*, a town of Naples, in Principato Citra, the see of a bishop, suffragan of Amalfi, near the sea; three miles N.E. of Amalfi. N. lat. 40° 37′. E. long. 14° 26′.

MINOS, a small island near the coast of South Carolina. N. lat. 33° 48′. W. long. 78° 38′.

MINOS, *Los*, a town on the N. coast of Masbate, one of the Philippine islands. N. lat. 12° 33′. E. long. 123° 10′.

MINOS, in *Mythology*, one of the three judges of hell, of rank superior to the other two, *viz.* Æacus, who, according to Plato, judged the Europeans; and Rhadamanthus, who, having left Crete, and fixed his residence in Asia, had the Asiatics and Africans for his lot; and Minos, as chief president of the infernal court, decided the differences that arose between the two other judges. All the poets are agreed in assigning to him the superiority over his colleagues. Homer represents him as sitting with a sceptre in his hand, in the midst of the ghosts of departed mortals, who plead their respective causes in his presence. Virg. Æn. vi. v. 432, places an urn by him, containing the several lots of mankind; while the stern Rhadamanthus sees to the execution of the sentences which his brother pronounces. The particular district of Ades, over which he was supposed to preside, was Erebus: and it was his office to determine the character and final condition of the spirits cited to his tribunal. Minos, it is said, was the first king of Crete, and considered as the wisest legislator of antiquity; on which account he obtained the honour of being judge in the invisible world. This Minos, whose institutes are said to have served as a model for those of Lycurgus, flourished, according to Selden, and others, who refer for authority to the Arundelian marbles, 1462 years, but, according to the abbé Banier, only 1340 years before Christ.

Minos, with a view of giving greater authority to his laws, retired into a cave at Crete, where he feigned that Jupiter, his father, dictated them to him, and every time he returned from the cave he announced some new law. Hence, Homer (Odyss. 19.) gives him the title of Jupiter's disciple, Διος μεγαλου ὀαριστης, which is thus expressed by Horace (Odyss. 10.), "Et Jovis arcanis Minos admissus." Josephus is the only ancient writer, who says that Minos had received his laws from Apollo, and that he had travelled to Delphi to receive them from that god. (Lib. ii. against Appian.) This Jewish writer owns, that Minos was the only one among the ancients who deserved to be compared to Moses. If we give credit to Huetius, Minos was the same with Moses, and he alleges that they lived about the same time. But the opinion of the learned prelate is contradicted by the decisive testimony of all antiquity; nor is the parallel which he has ingeniously drawn between these eminent lawgivers sufficient to convince impartial and candid inquirers. Banier allows, that some confused knowledge of the laws of Moses furnished Minos with a model for those of Crete.

Minos, after having governed his subjects with a mild and gentle sway, died in Crete, and being interred there, had this epitaph inscribed upon his tomb, ΜΙΝΟΣ ΤΟΥ ΔΙΟΣ ΤΑΦΟΣ; Minos F. Jovis Sepulchrum; when in process of time the name of Minos was defaced, and there remained only the two last words of the epitaph, the Cretans gave out that this was the tomb of Jupiter. This inscription, it is said, was defaced by the malice of the Cretans, who boasted of possessing the tomb of the father of the gods, whom they pretended to have brought up in his infancy. Accordingly, Callimachus, in a hymn addressed to Jupiter, sharply reproaches them on this account; for he says thus to the following purpose: "The Cretans are always liars, since they vaunt that they have thy tomb, O great king, who livest for ever!" To this passage the apostle alludes, when he upbraids the same people in the words of Callimachus, with the vice of lying.

MINOTAUR, MINOTAURUS, in *Antiquity*, a fabulous monster, much talked of by the poets; feigned to be half man and half bull.

The minotaur was brought forth by Pasiphae, wife of Minos II., king of Crete. It was shut up in the labyrinth of that island; and at last was killed by Theseus.

The fable of the minotaur was invented by the Greeks to make Minos odious. The occasion was this. Minos, having laid siege to Athens, reduced the inhabitants to great distress; when, consulting an oracle, they were directed to supplicate peace of Minos, the king of Crete. This he granted to them on condition that every ninth year, according to Plutarch and Ovid, or every seventh year, according to Diodorus Siculus and Apollodorus, the Athenians should send to him seven youths, and as many virgins. This article being agreed to, Minos raised the siege and withdrew to Crete, carrying with him those who were chosen by lot to be the first victims to the preservation of their country. Hence the fable originates. The Greeks said, that the king of Crete condemned the Athenian youths, who were sent to him, to fight in the labyrinth which Dædalus had built, with the minotaur, that was the offspring of the infamous passion of Pasiphae, his queen, for a white bull which Neptune had produced from the sea; that Dædalus, who was obliged to leave Athens, and remove to Crete, had favoured that monstrous passion of the queen; that from the conjunction sprung the minotaur. It was, without doubt, the hatred of the Greeks against Minos that made them invent this fable; for Plato says, that

that the favourable character which Homer and Hesiod had given of this great prince was of no avail against the malice of his enemies; and Plutarch adds, that it is dangerous to provoke a knowing people, who have it always in their power to take revenge. Servius gives us the following explication of this fable. He says, that a secretary of king Minos, named Taurus, *bull*, had an intrigue with the queen Pasiphae, in the chamber of Dædalus; and that she was at length delivered of twins, one of which resembled Minos, and the other Taurus. This occasioned the production to be reputed monstrous.

In order to account for that part of the fable, that ascribes the destruction of the minotaur to Theseus, we observe, that this young hero, having obtained his father's permission, prepared with the other youths, who had cast lots, to set out for Crete. After the performance of certain rites, Theseus set sail, and with a favourable wind speedily arrived at Crete. His fine address attracted the notice of Ariadne, Minos's daughter (see the article ARIADNE), who gave him a clue, which he happily made use of to find his way out of the labyrinth, after vanquishing the minotaur: that is, Ariadne taught her lover to vanquish Taurus, furnishing him with arms; and by the clue we may understand the draught and plan of the labyrinth which the princess gave him, and of which he made use to find his way thence after the encounter. Some indeed have said, that Theseus encountered Taurus, not in the labyrinth, but in a public place; and that this young hero, animated by the presence of the fair Ariadne, defeated Taurus, an event which gave great joy to all, even to Minos himself, who thus got rid of a formidable rival. Our author says, that the son of Pasiphae and Taurus making great desolation in the mountains to which Minos had confined him, this prince sent all the Athenian slaves to combat with him; and Theseus having gone thither in his turn, put him to death with the sword which his mistress Ariadne had given him.

MINOVERY, formed of the French *main-œuvre, q. d. handy-work*, a trespass committed in the forest, by something that is a man's handy-work; as an engine to catch deer, &c.

MINOW, or MINIM, in *Ichthyology*, a name given by the English to the small fish, called by authors the phoxinus. See CYPRINUS *Phoxinus*.

MINROW, in *Geography*, a town of Hindoostan, in the Dooab; 50 miles W. of Paltiary.

MINSFELDEN, or MUNZFULDEN, a town of Germany, with a citadel; 25 miles E. of Coblentz.

MINSK, a town of Russian Lithuania, and capital of a palatinate of the same name, situated on the Swislocz; 250 miles N.E. of Warsaw. N. lat. 53° 43′. E. long. 27° 40′.

MINSTER, a town of Lower Bavaria; seven miles N.E. of Brannau.

MINSTER, Saxon, *Mynster*, or *Mynstre*, anciently signified the church of a monastery or convent.

MINSTREL, an ancient term for a fiddler, or player on any other kind of musical instrument.

Borel derives the word from *manus* and *histrio*, one who diverts with the hand; or from *minor histrio, little buffoon*: Du-Cange from *ministellus*, a diminutive of *minister*, because the minstrels were anciently ranked among the lower officers, ministers, or servants.

According to Dr. Percy, in his Essay on the Ancient English Minstrels, the word is derived from the French *menestrier*; and was not in use here before the Norman conquest: and it is remarkable, that our old monkish historians do not use the words *citharoedus*, *cantator*, or the like, to express a minstrel in Latin; but either *mimus*, *histrio*, *joculator*, or some other word that implies gesture. Hence it should seem that the minstrels set off their singing by mimickry or action; or, according to Dr. Brown's hypothesis, united the powers of melody, poem, and dance. These minstrels were probably the genuine successors of the ancient bards, who joined the arts of poetry and music, and sung verses to the harp of their own composing. After the conversion of the Saxons to Christianity, the poets and minstrels became two separate professions: and the latter continued to be a distinct order of men, and got their livelihood by singing verses to the harp at the houses of the great: where they were hospitably and respectfully received, retaining many of the honours shewn to their predecessors, the Bards and Scalds. And though some of them only recited the compositions of others, many of them still composed songs themselves, and all of them could probably invent a few stanzas on occasion.

Mr. Ritson, in his Introduction to "Ancient English Metrical Romances," blends the English minstrels with the jugglers, whose tricks of legerdemain formed another branch of the amusement of our ancestors. Although it be allowed, that the same person might occasionally practise both arts, yet we see no reason for doubting, that they were separate and distinct professions; nor can we admit the supposition of Mr. Ritson, that the minstrels, whose profession was music and the recitation of poetry, were not frequently themselves poets. Their daily bread depended upon their stock of tales and songs; and it must have been as natural for them to have composed the romances which they sung, as for a modern musician to compose the pieces which he performs. Above all, we cannot see why the arts of composition, which are admitted to have been exercised by the minstrels of France, should be supposed unattainable by those of England. Subsequent to the reign of Edward III., most of the popular French romances were translated into English, which then became the language, as well of the nobles as of the vulgar. Why the minstrels, who were most interested in these translations, should be deemed unequal to the task of accomplishing them, we can see no good reason for believing. As a wandering and idle race of men, attendant on the barons who went to war in France, they had time to acquire both languages; and the art of rhyming must have been easy to persons who almost every day of their lives were employed in poetical recitation. Minstrels and bards are often employed as synonimous terms, although the poetic powers of the bards are indisputable. As late as the reign of queen Elizabeth, this combination occurs in the poem of a Scottish satirist describing London.

"Bot yet the menstrallis and the bairdis,
Thair trowand to obtain rewardis,
About his ludgene loudlie played."

Legend of the bischop of St. Androis.

A proof how far the task of the poet and of the reciter were required from the minstrel, occurs in a very ancient poem, of which there is one MS. in the British Museum, and another in the library of Peterborough cathedral. It contains the history of an intrigue betwixt Thomas of Erceldoune, called the Rhymer, and the queen of fairies, by whom, as every one knows, he was transported to the the "Lond of Faerie," and gifted with those supernatural powers of poetry and prophesy, by which he was afterwards distinguished. The following dialogue passes betwixt

twixt the bard and his faery leman upon this memorable occasion.

> " Fare wel. Thomas, I wend my way,
> I may no longer ftande with the.—
> Gif me fum tokyn, lady gaye,
> That I may fay I fpake with the.—
>
> To harp and carpe, Thomas, wher fo ever ze gon,
> Thomas, take the thefe with the.—
> Harping, he faid, ken I non,
> For tong is chefe of mynftralcie.—
>
> If thu wil fpelle, or talys telle,
> Thomas thu fhal never make lye ;
> Wher fo ever thu goo, to fryth or felle,
> I pray thu fpeke never non ille of me."

From this decifive declaration, which a poet and minftrel made on the nature of his own profeflion, it appears plainly, that, in more ancient times, the minftrel's principal and moft honourable occupation referred to poetry, rather than mufic; and the Rhymer might have been juftly defcribed as one "who united the arts of poetry and mufic, and fung verfes to the harp, of his own compofing," if he had not difdained the mufical fkill to which it was Mr. Ritfon's perfuafion that the talents of the minftrel were exclufively limited. See Edinb. Rev. No. XIV. p. 394, &c.

Mr. Ellis, in the Introduction to his " Specimens of early Englifh Metrical Romances," has given us a plain and comprehenfive view of the rife and progrefs of the minftrels and their poetry. Of his account we fhall avail ourfelves in the compilation of this article.

Normandy appears to have been the cradle of minftrelfy. The Northmen who wrefted that province from the feeble fucceffors of Charlemagne, had, doubtlefs, like all other barbarous people, efpecially the Scandinavian tribes, their national poets, under the name of fcalds, or by whatever other term they were diftinguifhed. On their fettling in Neuftria, their native fpeech fpeedily melted down into the more commodious and extended language ufed by the inhabitants of Northern France, which was called *romance*, being, in fact, a corrupted Latin, introduced by the Romans into their Gallic province. In this language, the minftrels compofed moft of their works, until, from that circumftance, the word romance, from fignifying the early Norman-French, came at length to mean thofe chivalrous tales ufually compofed in that tongue.

" It appears likely," fays Mr. Ellis, " that they were carried by Rollo into France, where they probably introduced a certain number of their native traditions; thofe, for inftance, relating to Ogier le Dancis, and other northern heroes, who were afterwards enlifted into the tales of chivalry; but that, being deprived of the mythology of their original religion, and cramped, perhaps, as well by the fober fpirit of Chriftianity, as by the imperfection of a language whofe tamenefs was utterly inapplicable to the fublime obfcurity of their native poetry, they were obliged to adopt various modes of amufing, and to unite the talents of the mimic and the juggler, as a compenfation for the defects of the mufician and poet. Their mufical fkill, however, if we may judge from the number of their inftruments, of which very formidable catalogues are to be found in every defcription of a royal feftival, may not have been contemptible; and their poetry, even though confined to fhort compofitions, was not likely to be void of intereft to their hearers, while employed on the topics of flattery or fatire. Their rewards were certainly, in fome cafes, enormous, and prove the efteem in which they were held; though this may be partly afcribed to the general thirft after amufement, and the difficulty experienced by the great in diffipating the tedioufnefs of life; fo that the gift of three parifhes of Gloucefterfhire, affigned by William the Conqueror for the fupport of his *joculator*, may, perhaps, be a lefs accurate meafure of the minftrel's accomplifhments, than of the monarch's power and of the infipidity of his court.

" To the talents already enumerated, the minftrels added, foon after the birth of French literature, the important occupation of the *difeur*, or *declaimer*. Perhaps, the declamation of metrical compofitions might have required, during their firft ftate of imperfection, fome kind of chant, and even the affiftance of fome mufical inftruments, to fupply the deficiencies of the meafure; perhaps, the aids of gefture and pantomime may have been neceffary to relieve the monotony of a long recitation: but at all events it is evident, that an author who wrote for the public at large, during the eleventh, twelfth, and thirteenth centuries, was not lefs dependent for his fuccefs on the minftrels, than a modern writer of tragedy or comedy on the players of the prefent day. A copyift might multiply manufcripts for the fupply of convent-libraries; but while ecclefiaftics alone were able to read, there was no accefs to the ears of a military nobility, without the intervention of a body of men who travelled in every direction, and were every where welcomed as the promoters of mirth and conviviality.

" The next ftep was eafy. Being compelled to a frequent exercife of their talent in extemporaneous compofitions, the minftrels were probably, like the *improvifatori* of Italy, at leaft equal, if not fuperior, to more learned writers, in the merely mechanical parts of poetry; they were alfo better judges of the public tafte. By the progrefs of tranflation they became the depofitaries of nearly all the knowledge of the age, which was committed to their memory: it was natural, therefore, that they fhould form a variety of new combinations from the numerous materials in their poffeffion; and it will be fhewn hereafter, that many of our moft popular romances were moft probably brought by their efforts to the ftate in which we now fee them. This was the moft fplendid era of their hiftory, and feems to have comprehended the latter part of the twelfth, and perhaps the whole of the thirteenth century. After that time, from the general progrefs of inftruction, the number of readers began to increafe; and the metrical romances were infenfibly fupplanted by romances in profe, whofe monotony neither required nor could derive much affiftance from the art of declamation. The vifits of the minftrels had been only periodical, and generally confined to the great feftivals of the year; but the refources, fuch as they were, of the ponderous profe legend were always acceffible. Thus began the decline of a body of men, whofe complete degradation feems to have been the fubfequent refult of their own vices. During the period of their fuccefs they had moft impudently abufed the credulity of the public; but it is a whimfical fact, that the fame fables which were difcredited while in verfe, were again, on their transfufion into profe, received without fufpicion. It fhould feem that falfhood is generally fafe from detection, when concealed under a fufficient cloak of dulnefs."

This hiftory folves a difficulty which Mr. Ritfon, already cited, found in reconciling the degraded ftate of the minftrels to the high rewards and countenance which they fometimes received, even in preference to thofe of the clerical profeffion. It appears, on one occafion, that two mendicant friars foliciting hofpitality at the gate of a convent, were received with acclamation under the idea of their being minftrels, and kicked out again when they announced their real character. It is alſo proved, we believe, that one minſtrel received four ſhillings for his performance, and ſix prieſts only ſixpence, at the ſame feſtival. But ſuch inſtances of extravagant reward to individuals of a claſs which dedicates perſonal exertions to public amuſement, are conſiſtent with the general diſreſpect to which this body in general is condemned.

There are two remarkable facts in hiſtory, which prove that the profeſſion of a minſtrel was held in great reverence among the Saxon tribes, as well as among their Daniſh brethren. In the year 878, when king Alfred wiſhed to learn the true ſituation of the Daniſh army, which had invaded his realm, he aſſumed the dreſs and character of a minſtrel, *fingens ſe joculatorem, aſſumpta cithara*, &c. and under this character, though he could not but be known to be a Saxon, obtained an honourable reception. About ſixty years after, a Daniſh king made uſe of the ſame diſguiſe to explore the camp of our king Athelſtan. The minſtrel was, therefore, a privileged character with both theſe people: and ſo late as the reign of Edward II. the minſtrels were eaſily admitted into the royal preſence; an inſtance of which is mentioned by Stow (Survey of Lond. 1703, p. 469.) In the fourth year of Richard II. John of Gaunt erected at Tutbury, in Staffordſhire, a court of minſtrels, with full power to receive ſuit and ſervice from the men of this profeſſion within five neighbouring counties, to enact laws and determine their controverſies, &c. for which they had a charter. See Plott's Hiſt. Staff. p. 435, &c.

The minſtrels continued down to the reign of Elizabeth; in whoſe time, however, they had loſt much of their dignity, and were ſinking into contempt and neglect; yet ſtill they ſuſtained a character far ſuperior to any thing we can conceive at preſent of old ballads. Towards the end of the ſixteenth century this claſs of men loſt all credit, and were ſunk ſo low in the public opinion, that in the thirty-ninth year of Elizabeth, a ſtatute was paſſed by which minſtrels, wandering abroad, were included among rogues, vagabonds, and ſturdy beggars, and were adjudged to be puniſhed as ſuch. This act ſeems to have put an end to the profeſſion, for after this time they are no longer mentioned. Judge Blackſtone obſerves, that in ſome manors, the copyholders were bound to perform many ſervile offices for the lord, who found them meat and drink, and ſometimes (as is ſtill the uſe in the Highlands of Scotland) a minſtrel or piper for their diverſion. Comm. b. ii.

The firſt compoſitions of the minſtrels, according to Mr. Ellis (ubi ſupra), ſeem to have been unadorned annals or hiſtories, reduced to meaſure for the convenience of the reciter, who was to retain them upon his memory. This field, however, ſoon became too barren and unintereſting. Other ſources of narration were ſought for. Some occurred in the ancient ſongs of the ſcalds, the legitimate productions of the minſtrels. Others of Arabian origin found their way to France through Spain. But a much more numerous claſs was derived from the tales of the Armoricans, the neighbours of the Normans, who derived themſelves from a Welſh colony. From this ſource, the minſtrels probably drew their firſt accounts of

> "——————— What reſounds
> In fable or romance, of Uther's ſon,
> Begirt with Britiſh and Armoric knights."

This theme, however, acquired its chief popularity after the acquiſition of England by William the Conqueror. It is now completely proved, that the earlieſt and beſt French romances were compoſed for the meridian of the Engliſh court, where that language continued to be excluſively uſed, at leaſt till the time of Edward III. When the Norman race of monarchs had once ſecured themſelves on the throne of England, and identified the honour of that country with their own, they began to feel an intereſt in its early hiſtory, and to liſten with applauſe to the feats of its heroes. The legends of the Welſh, on theſe occaſions, were much more acceptable than thoſe of the Saxons. The latter were the people whom the Normans had conquered, and whoſe kings they had diſpoſſeſſed: the praiſe, therefore, of their departed heroes revived ſentiments of diſcord, better forgotten by all parties. But the exploits of the Britiſh were carried back to ſo ancient a period, and ſo intermingled with Celtic fable, that they recalled no ſentiments of ancient independence, and ſuggeſted no ideas dangerous to the Norman race. The exploits of Arthur were therefore unanimouſly adopted as the ſubject of tales and romances without end; and theſe were drawn by the Norman minſtrels from the Britiſh traditions flowing from Wales, and floating in what had lately been the Britiſh kingdom of Cumberland; but eſpecially from the works of Geoffrey of Monmouth.

Mr. Ellis ſhews, that the ſtate of Wales, during the eleventh, twelfth, and thirteenth centuries, was favourable to an exchange of literary materials betwixt the bards of that country and the Norman minſtrels, as well as between the former and their brethren of Armorica.

But as there is reaſon to believe that the Britiſh lays were ſeldom if ever committed to writing, it might be expected that different minſtrels would tell the ſame ſtory with ſome variations; that, unable to retain in their memory the whole of a long narrative, they would carry off, in the firſt inſtance, detached adventures, which they would afterwards connect as well as they were able; and that a ſyſtem of traditional hiſtory, thus imperfectly preſerved through the medium of a very looſe tranſlation, and already involved in much geographical and chronological confuſion, would aſſume the fabulous appearance which we find in the French narratives called romances. See Romance.

MINT, the place in which the king's money is coined. Anciently there were mints in almoſt every county in England; but as it is one of the prerogatives of the king to coin the money of the realm, the buſineſs of coining was carried on principally in the Tower of London, from the time of William the Conqueror to the year 1811. At this latter period a very elegant building was completed on the eaſtern ſide of Tower-hill, in which the coinage is now performed with a ſimplicity, diſpatch, and accuracy that can ſcarcely be conceived by any who have not been witneſſes of the ſeveral operations.

Coining metallic money was originally performed by the hammer, and afterwards by what was called the ſcrew-preſs, or mill and ſcrew. Theſe operations have been amply deſcribed under the word Coinage, to which we beg to refer our readers. In this place we ſhall endeavour, in very few words, to conduct them through the ſeveral offices of the New Mint, and deſcribe, as well as we can, the buſineſs and proceſſes carried on in each.

Almoſt all the money, now coined in this kingdom, is from bullion received from the Bank of England; from which it is ſent to the "maſter of the mint's aſſay-office:" here it is received into what is called the ſtrong-hold, and there kept till its fineneſs is aſcertained, in order that its true value may be computed.

This being aſcertained, the parties concerned are deſired to attend at the office of receipt and delivery to witneſs its weight, and to be informed of its fineneſs, and, conſequently, of its value; the ſtandard weight of the bullion being determined by the calculation of the reſpective offices.

A mint-

A mint-bill is now made out and given to the owner of the bullion, by which he knows the exact value of his deposit. The next thing is to deliver the bullion to the melting-house, which is furnished with a variety of apparatus, adapted, not only to the melting of the gold and silver, but the lifting in and out the pots containing the precious metals, with safety, ease, and expedition. The silver is melted in pots of cast-iron, but the gold is melted in smaller pots manufactured from black-lead, which, according to the modern chemistry, is a carburet of iron. The silver is run into plates ten inches long, seven wide, and about five-eighths of an inch thick: the gold-plates are ten inches in length, four in breadth, and three-eighths of an inch in thickness. While the metal is pouring into the moulds, there are three portions taken, from the top, the middle, and bottom of each pot, and carried to the king's assay-office, there to be examined by the master of that office, and not permitted to pass into work until the fineness of the metal is accurately determined. The furnaces used are air-furnaces, and the fuel is coke.

In the process of melting there will necessarily be waste: every thing, therefore, that can possibly contain any portion of the precious metals, such as the sweepings of the melting-house, &c. are collected and carried to another apartment, in which are erected two grinding and two triturating mills, where the sweep is worked up, and the fine metals in part recovered, in the manner practised by refiners and gold-smiths.

The sweep, thus brought together, is ground into a powder, and passed through a fine sieve, by which the larger grains of metal are obtained. The sweep is then put, in small portions, into a wooden bowl, having two iron handles, by which it is carefully washed: the lighter particles, being absorbed by the water, are collected in a large tub; the heavy or metallic ones are found deposited at the bottom of the bowl. By these means the most considerable of the particles of gold and silver are obtained. The powdered sweepings, however, which have been collected after the washing process, still contain portions of metal; to obtain these, the sweep, in certain portions, is put into a mill, containing generally about one hundred weight of mercury, the remainder of the mill being filled with water: this is commonly called the triturating mill, and each charge is agitated about four hours with an iron instrument, having four arms placed horizontally, in the shape of a cross, and fixed to the centre of the mill; and for the better agitation of the sweep and mercury, the motion of this mill can be reversed at pleasure.

From the melting-house, the plates above described, provided they are found by the assay-master to be of the exact degree of fineness, are carried to the ROLLING-*Mill*, (which see.) They are first hot-rolled, that is, made red-hot, in a furnace adapted to the purpose, and then passed through a pair of cast-iron rollers. In the room in which this operation is performed there are four pair of rollers, which (as they require an immense power) are put in motion by a steam-engine, of a power equal to that of thirty horses. The rollers are placed very near the furnaces, and the metal, being brought to what is called a blood-red heat, is taken out by a man with a pair of smith's tongs, and immediately returned by another man, and again passed through while hot two or three times, by which it is greatly extended: after this, it is annealed. See NEALING.

This process is called the breaking-down rolling, and when finished the plates of silver are about $\frac{3}{16}$ths of an inch thick. They are then cut into slips by a pair of circular shears attached to the shafts, by which the rollers are worked, after which they are finished in what are called the adjusting rollers, which are also made of cast-iron, and very finely polished. In this process the slips are rolled cold, and when a piece cut from the middle of each is found of the proper standard weight, they are carried to another apartment, called the cutting-out room, containing twelve machines worked by a steam-engine of the power of sixteen horses. With these machines the blank pieces are cut out from the strips or laminæ just mentioned with great ease and velocity. The only manual labour required, is that performed by a boy nine or ten years old at each machine; he quickly learns the art of presenting the laminæ to the cutters, which instantly cut out the blank pieces of metal; these so struck fall through a hole that conducts to a box placed below to receive them. Each machine will cut 60 pieces in a minute, of course the twelve will produce 720 in a minute, or 43,200 in an hour. Formerly these machines were worked by hand by a man or boy at each cutter, but no manual labour can operate so accurately and well as the power obtained by the steam-engine. The instruments with which the blanks are cut (called a bed and punch), are made of steel, of the exact diameter of the piece of money required.

From this apartment the blanks are carried to the adjusting-room, where every piece is most accurately weighed, the gold twice, at least, and the silver once: those pieces that are found too heavy are reduced by the file, called a float, and those that are found too light, which occasionally occurs, are re-melted.

The blanks, now properly adjusted, are carried to the milling-room. Into this, the writer of the present article was not allowed to enter; the process of milling being a secret by the very constitution of the mint. This has always been the case since the time of Peter Blondeau, who introduced the milling in 1662, as appears from an extract from Mr. Folkes, in his "Tables of English Silver Coins," in which he observes, and the observation holds good even now, though at the distance of sixty-five years; that "it may be noted that this practice of keeping secret the manner of edging the money, is still observed in our mint, all those who are entrusted with it being sworn not to discover it: notwithstanding, the manner in which the same operation is performed in several foreign mints, is there publicly shewn."

The blanks, when milled, are annealed, or softened, in order that they may be fitted to receive the impression.

The next operations are pickling and cleaning. The process of pickling is to throw the pieces of gold, thus annealed, into a strong solution of super-sulphat of alumine, those of silver into a solution of the super-sulphat of potash.

When the pieces are properly blanched, they are taken into another room to be dried and cleaned, which operation is performed by agitation in sieves, containing saw-dust, over a gentle heat.

They are now taken to what is properly called the coining-room. In this apartment there are eight coining-presses worked by a ten horse-power steam-engine; the apartment also is, in the winter months, heated with steam, so as to be kept to an uniform temperature. The machines are worked with the most perfect accuracy, and with such rapidity, that each will produce about 60 in a minute; and on the average, allowing for the necessary delays in working forty pieces of money, that is 320 guineas, &c. will pass through the eight machines in a minute, or about 19,200 in an hour. These machines require also one boy of ten or twelve years of age to each, who, by supplying the machine with the planchets, runs no risque of injury to his fingers, as the machine contains in itself a self-feeder or layer-on; the busi-

ness

nefs of the boy being only to fill the layer-on, through a tube with the blanks. From this tube, the machine places the blanks upon the dye, and when ftruck, difplaces one piece and replaces another, and fo on as long as the fteam-engine is kept at work. The coin thus completed is carried to the mint-office, where the king's affayer attends, and where the procefs called PIXING, (which fee,) takes place, to afcertain the weight and finenefs of the monies before delivery.

The two faces of the coin are ftruck at once, the upper and under dye being both engraved for the purpofe. The dyes are the workmanfhip of fome capital engraver; he, of courfe, makes the pattern upon foft fteel: from this, many others are taken at an office in the mint, and hardened, as is defcribed under the article CASE-HARDENING. The engraver is called upon to verify the accuracy of the dyes made ufe of, with the pattern or mould which he has furnifhed.

In the time of Charles II., when the Englifh coins were brought to great perfection, John Roetier, a native of Antwerp, and Thomas Simon, were engravers to the mint. They were both called upon to make models or pattern pieces of money, to be exhibited at court; his majefty is faid to have given the preference to thofe by Roetier, which were ordered to be followed in the puncheons or dyes to be made for the new money. "Which preference," fays Mr. Folkes, "fo far exafperated Simon, who did not value his performances lefs than they deferved, nor knew how to fubmit to a foreign rival; that he thereupon immediately quitted the mint, or, for fome apprehended mifbehaviour upon the occafion, was foon after removed from the office of one of the chief engravers."

It was in the year 1663, that he produced that inimitable crown, with the petition round the edge, that is now valued by the curious as a mafter-piece in this fort of workmanfhip. It refembles what were the common milled five fhilling pieces, but the king's head is larger; the face and the garment are covered with a fort of frofted work. The letters are expreffed by outlines frofted in the middle, and under the head is the name of Simon: upon the reverfe there is a centre, inftead of the ufual ftar, the figure of St. George on horfeback, encircled with the garter. The date is 1663, and upon the edge is the artift's petition, *viz.* "Thomas Simon moft humbly prays your majefty, to compare this his trial-piece with the Dutch, and if more truly drawn and emboffed, more gracefully ordered, and more accurately engraven, to relieve him." It is faid, there were not more than twenty of thefe pieces ftruck off with the petition, and a fmall number without. We have feen one of the twenty in poffeffion of the Rev. Dr. Difney, from the collection of the late Mr. J. Hollis; it is in the higheft ftate of prefervation: and in the memoirs of Mr. Hollis is a fine engraving of the medal, a little magnified. It is not afcertained what relief Simon obtained upon this petition, but it is pretty clear he was never afterwards employed in the mint

MINT, *Officers of the*, are, 1. The warden, who is the chief, and is to receive the bullion, and overfee all the other officers. This officer has under him a deputy and two clerks. 2. The mafter-worker, with three clerks; he receives the bullion from the warden, caufes it to be melted, and delivered to the moniers; and takes it from them again when coined. 3. Comptroller, with a deputy and clerk, who is to fee that the money be made to the juft affize, and to overfee the officers. 4. The affay-mafter, who weighs the filver and gold, and fees whether it be ftandard. (See REMEDY.) This officer, called the king's affay-mafter, has under him a clerk. 5. The mafter's affay-mafter, and the probationer affayer. 6. The furveyor of the melting, who is to fee the filver caft out, and that it be not altered after it is delivered to the melter, *i. e.* after the affay-mafter has made a trial of it. 7. The clerk of the irons, who is to fee that the irons be clean, and fit to work with. Thefe two offices are united in one perfon, who has a deputy and clerk. 8. The chief engraver, who engraves the dyes and ftamps for the coinage of money: there is alfo an affiftant engraver, and a probationer engraver, with a fmith, affiftant to the engravers. 9. The melters, who melt the bullion before it comes to coining. 10. The blanchers, who anneal, or boil and cleanfe the money. 11. The porter and office-keeper, who keep the gate, &c. of the mint. 12. The provoft to the company of moniers, acting as engineer, who provides for all the moniers, and overfees them. And, laftly, the company of moniers; fome of whom fhear the money, fome forge it, fome ftamp or coin it, and fome round and mill it. In this office, there are alfo the weigher and teller; receiver; king's clerk, and clerk of the paper; furveyor of the money-preffes; folicitor and affiftant; warden's deputy, mafter's deputy, comptroller's deputy, and fubordinate clerks. See COINAGE, and the preceding article.

MINT, *Roman*, has been juftly regarded as one of the moft effential ornaments and finews of the ftate. It derived great importance from the extent of the empire through which its produce was to circulate. The "Quæftor" feems at firft to have had the direction of the mint, as well as of the treafury. About the time of the firft coinage of filver in Rome, or 266 years B. C., the "Triumviri Monetales" feem to have been created; though Pomponius afcribes their firft creation to the year of Rome 463, or 289 B. C. Thefe were at firft of the fenatorial rank, until Auguftus appointed them from the equeftrian, which alteration feems to have continued. The title "Triumviri," however, remained till after Caracalla, as appears from infcriptions given us by Gruter, and by Bouterouc. Under Aurelian, it is probable there was but one mafter of the Roman mint, called the "Rationalis;" a change fufpected by Pinkerton to have taken place under Gallienus. Aurelian, having conquered the revolted provinces, and united the whole empire again, feems to have altered the form of the mints in the capital provincial cities, and to have ordered them all to ftrike money with Latin legends, and of the fame forms; for with him firft appear coins on this plan with mint-marks of cities and offices. He feems alfo to have permitted the provincial cities to ftrike gold and filver as at Rome: and we know from his coins that the "Aureus," which had diminifhed by degrees to about 80 grains, was by him reftored to 100. On this occafion, the moniers, who loft half their profits, and three-fourths of whom loft their work, caufed commotions, which terminated in a rebellion, the fuppreffion of which was attended, on the part of Aurelian, with the lofs of 7000 of his beft troops. About this time, the "Procurator Monetæ" feems to have fucceeded the "Rationalis." In the Roman colonies, the direction of the mint appears to have been committed to the "Duumviri," or two annual magiftrates, elected in imitation of the confuls at Rome. The engraving of the dye was a work of labour and of genius; and at Rome Greek artifts were ufually employed in it. The engravers of the dye were called "Cœlatores:" other officers employed in the mint were the affayers of the metal, "Spectatores," "Expectatores," or "Nummularii." The refiners were denominated "Cenarii;"

narii;" the melters "Fufarii," "Flatuarii," "Flaturarii." The "Equatores Monetarum" adjufted the weight. The "Suppoftores" put the pieces in the dye, and the "Malleatores" ftruck it. A "Primicerius" was at the head of each office; and there was a foreman, called "Optio et Exactor." Pinkerton's Eff. on Med. vol. i.

MINT was alfo a pretended place of privilege in Southwark, near the king's bench, put down by ftatute. If any perfons, within the limits of the mint, fhall obftruct any officer in the ferving of any writ or procefs, &c. or affault any perfon therein, fo as to receive any bodily hurt, the offender fhall be guilty of felony, and be tranfported to the plantations, &c. Stat. 9 Geo. I.

MINT, in *Botany*, &c. See MENTHA.

MINT, *Corymbiferous*, a name given by fome to a fpecies of tanzy.

MINT, *Cat's*, the Englifh name of a genus of plants, called by botanical writers *cataria*. See CATMINT.

MINTERS, or MONIERS. See MONEYERS and MINT.

MINTING is fometimes ufed for the coining of money.

MINTON, in *Geography*, an ifland in the Indian fea, near the W. coaft of the ifland of Sumatra, a little S. of the line. E. long. 97° 8'.

MINTURNÆ, in *Ancient Geography*, a town of Italy, in Latium, upon the Appian way, near Formiæ on the W., and Sueffa Arunca on the E. fituated on the Liris, at fome diftance from its mouth. Livy fpeaks of it as a very ancient city. The Romans gained poffeffion of it by treafon, in the year of Rome 439, and planted a colony in it. But the event which rendered it particularly memorable, was the imprifonment of Marius in this town, and his efcape, in confequence of ftriking terror into the mind of the foldier who was fent to affaffinate him. See MARIUS.

MINUARTIA, in *Botany*, fo called by Lœfling in commemoration of a Spanifh botanift of the name of Minuart, an apothecary at Madrid, with whom Lœfling was acquainted while in Spain, and from whom he received many botanical obfervations, as appears by various paffages in his letters publifhed by Linnæus.—Lœfl. It. 48. Linn. Gen. 42. Schreb. 58. Willd. Sp. Pl. v. 1. 492. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 1. 184. Juff. 300. Lamarck Illuftr. t. 52.—Clafs and order, *Triandria Trigynia*. Nat. Ord. *Caryophyllei*, Linn. and Juff.

Gen. Ch. *Cal.* Perianth inferior, erect, long, compreffed, of five, awl-fhaped, rather ftiff, permanent leaves. *Cor.* none. Nectary compofed of a few depreffed glands within the calyx. *Stam.* Filaments three, capillary, fhort, inferted into the receptacle; anthers roundifh. *Pift.* Germen fuperior, triangular; ftyles three, fhort, thread-fhaped; ftigmas thickifh. *Peric.* Capfule oblong, triangular, a little fhorter than the calyx, of one cell and three valves. *Seeds* not numerous, roundifh, compreffed.

Obf. *Minuartia montana* is faid occafionally to be found with traces of five minute petals, which are poffibly what Lœfling defcribed as nectariferous glands.

Eff. Ch. Calyx of five leaves. Corolla none. Capfule with one cell and three valves. Seeds few.

1. M. *dichotoma*. Linn. Sp. Pl. 132. Lœfl. It. t. 1. f. 3.—Leaves briftle-fhaped. Stem fimple, erect. Flowers feffile, crowded together in a forked manner.—Very plentiful on the hills about Madrid.—This little annual fcarcely exceeds an inch in height. The *ftem* is fimple, erect, rarely branched, dichotomous at the upper part. *Leaves* oppofite, awl or briftle-fhaped, erect, fo clofe as to cover the whole ftem. *Flowers* feffile, cymofe, forming a little fquare head, clofely forked. *Bracteas* long, awl-fhaped, rigid, twice or thrice as long as the flower. *Seeds* from five to eight, kidney-fhaped. The whole plant affumes a brownifh-herbaceous colour.

2. M. *montana*. Linn. Sp. Pl. 132. Lœfl. It. t. 1. f. 4. —Flowers crowded, lateral, alternate, fhorter than the bractea.—Found in wet fandy fituations on the fides of hills about Madrid.—*Root* annual, fibrous, very fmall. *Stem* fimple, fcarcely an inch in height, jointed, fmooth. *Leaves* oppofite erect, briftle-fhaped, broader at the bafe, ftriated, acute, rigid. *Flowers* feffile, about three together, rarely folitary. *Seeds* from three to feven, fmall.

3. M. *campeftris*. Linn. Sp. Pl. 132. Lœfl. It. 122.— Flowers crowded, terminal, alternate, fhorter than the bractea.—Found in fituations fimilar to the two laft fpecies. —*Root* annual, very flender and fimple, fomewhat twifted. *Stem* quite fimple, and very fhort, covered with leaves, round. *Leaves* oppofite, flat, awl-fhaped, ftriated, rigid, clofe to the ftem, numerous. *Flowers* terminal, forming a compact little head, partially forked, but not univerfally fo, and in this refpect the plant chiefly differs from *M. dichotoma*. *Seeds* five or fix, compreffed, kidney-fhaped.—The whole plant has a fcaly or hufky afpect.

MINUCCIO D'AREZZO, in *Biography*, according to Boccaccio, an exquifite finger and player on the viol, in great favour with Peter of Roan, king of Sicily.

MINUET, or MENUET, in *Mufic*, a compofition anfwering to a kind of dance of the fame name, faid to be invented at Poictou; the motion of which is triple, with three crotchets in a bar $\frac{3}{4}$, though it is commonly performed in the time $\frac{3}{8}$. It has commonly two ftrains, each played twice over; the firft has four or eight bars, the laft note of which fhould be either the dominant or mediant of the mode, never the final; and the fecond has eight bars, it ufually ends on the final of the mode, with a pointed minim or whole bar.

The word is faid to be derived from the French *menu*, *little*, and fignifying a fmall pace.

It feems as if the air and dance of that name, in fuch high favour and ufe during the laft century in all the courts of Europe, as well as that of France, whence it was adopted, was either unknown to Broffard, or its character muft have been very much changed fince his time. In his Dict. de Muf. he defines *minuetto*, or *menuet*, *Danfe fort gaye*, a very lively dance. But fo far from lively and gay was this dance, that its characteriftics were grace and gravity. It has been even faid to be the only grave dance fince the difufe of the louvre, fit for perfons of high rank and dignity to dance alone at courts or great balls. But as the country-dance, at the latter end of the laft century, was fupplanted by the cotillon, the cotillon by the waltz, the inftrumental minuet by the jig, the dance itfelf of the flow minuet is wholly abolifhed. For a further account, fee MENUET.

MINUETTO *per Ballo*, Ital. a dancing minuet.

MINURI, in *Geography*, a town of Naples, in Principato Citra; 9 miles S.W. of Salerno.

MINUS, in *Algebra*. See CHARACTERS, in *Arithmetic*.

MINUS *Quo*, in *Law*. See QUO *Minus*.

MINUSCULÆ, in *Printing*, denote the fmall and running letters; as contradiftinguifhed from *majufculæ*, or capitals.

MINUTE, from the Latin *minutus*, *fmall*, in *Geography* and *Aftronomy*, is the fixtieth part of a degree.

In which fenfe minute is alfo called *prime*, or *prime-minute*.

The divifions of degrees are fractions, whofe denominators increafe in a fexagecupal ratio; that is, a minute or prime is $= \frac{1}{60}$th; a fecond, or fecond minute, $= \frac{1}{3600}$dth, &c.

In

In astronomical tables, &c. minutes are expressed by acute accents, thus, ′; the seconds by two, ″; the thirds by three, ‴.

Minute, in *Computation of Time*, is used for the sixtieth part of an hour.

Minute, in *Architecture*, usually denotes the sixtieth, sometimes only the thirtieth, part or division, of a module.

Minute is also used to signify a short memoir, or sketch of any thing hastily taken in writing.

In this sense we say, the minutes of the proceedings of the house of lords, &c.

Minutes *of Emersion*. See Emersion.

Minutes, *Meridional*. See Meridional.

Minute *Tithes*, *Minores Decimæ*, small tithes of wool, lambs, pigs, butter, cheese, &c. See Tithe.

MINUTIUS, Felix, Marcus, in *Biography*, an able apologist for Christianity in the third century, probably a native of Africa, who flourished towards the close of the reign of the emperor Septimius Severus, or about the year 210. He was educated to the profession of the law, and became an eminent pleader at Rome; where he renounced the heathen religion, and embraced that of Christ. He was author of an excellent defence of Christianity, entitled "Octavius," written in the form of a dialogue, between a heathen and a Christian, in which Minutius himself sits as judge and moderator. By this contrivance, he replies to the objections and arguments brought forward by the adversary, and refutes the calumnies cast upon Christians by the heathen philosophers, and at the same time exposes the absurdities of their creed and worship, powerfully demonstrating the reasonableness and excellence of the Christian religion. This work was, for a considerable time, attributed to Arnobius; but in the year 1560, Francis Baldwin, a learned lawyer, published it at Heidelberg, and made the discovery, in a preliminary dissertation, that Minutius was its true author. It has, since that time, gone through many editions, of which the best is that printed at Cambridge in 1712, with the dissertation of Baldwin prefixed, and "Commodiani Instructiones adversus Gentium Deos," added in the way of appendix. Gen. Biog. Lardner.

MINUZIANO, Alessandro, a learned printer in the 15th century, was born at St. Severo, in Puglia. After studying under George Merula at Milan, he succeeded him as professor of rhetoric, and held that chair, with the professorship of history, several years. He interested himself very much in the editing of the learned works that issued from his press, and at length established a printing-press of his own. The first specimen that he gave was a fine edition of all Cicero's works, in four vols. folio. After this, he published editions of various authors, ancient and modern, to many of which he prefixed learned prefaces, written in an elegant style. He was a diligent collator of old manuscripts, and took vast pains to establish the most authenticated readings. He was not free from the unfair practice, at that period but too common among printers, of pirating each other's works: and when Leo X. caused the "Annales" of Tacitus to be printed for the first time at Rome, he found means, by bribing some of the workmen employed upon it, to obtain the sheets as they were worked, and brought out a rival edition. On account of this he incurred the pope's displeasure, and involved himself in troubles from which he was scarcely able to extricate himself.

MINX, in *Zoology*, is the name of an animal in North America, very much resembling the otter. See Mustela *Vison*.

MINYA, in *Ancient Geography*, a town of Greece, in Thessaly, called also "Almonia."—Also, a town of Asia, in Phrygia.—Also, a town of the island Amorgos, situated in the most western part of the island.

MINYÆ, Minyans, an ancient people of Greece, who were dispersed through different countries. The most ancient people of this name were settled in Bœotia, and the inhabitants of Orchomené are said to have derived it from Minyas, one of their kings. Some of these Minyans conducted a colony to Iolcos, and hence the Argonauts have been sometimes denominated Minyans. Others of them joined themselves to a colony which the sons of Codrus conducted to Ionia; and they established themselves, under the direction of Athamas, at Theos, a town situated to the south of the isthmus which connects the peninsula with the continent, W. of Smyrna. Others of them, tracing their derivation from the Argonauts, settled in the isle of Lemnos, whence they were driven by the Pelasgians. These fugitives sailed to Laconia, and having encamped on mount Taygetus, the Lacedæmonians gave them land, and they intermarried with the Lacedæmonians. Of these Minyans, some in process of time aspired to the government, and rebelled against the powers that enforced the existing laws; and they were arrested, thrown into prison, and threatened with death. But their wives, having obtained permission to visit them in prison at the time when they were to be executed, changed clothes with them, and thus afforded them the means of rescue. They then retired to mount Taygetus, where they must have perished, if Theras, of the race of Cadmus, had not obtained their pardon.

MIOGA, in *Botany*, the Japanese name of a plant of the natural order of *Scitamineæ*, called by Kæmpfer *Dsjooka*, vulgarly *Mjoga*, *Mionga*, or *Megga*, Amœn. Exot. 826. (Amomum Mioga; Thunb. Jap. 14. Kæmpf. Ic. t. 1. Willd. Sp. Pl. v. 1. 7. Zingiber Mioga; Roscoe Tr. of Linn. Soc. v. 8. 348.)—Kæmpfer describes it as "one of the eatable kinds of Ginger, of a mild taste, with a reedy stem and leaves, resembling those of wild Ginger (*Zingiber Zerumbet* of Roscoe). Its flowering bulb grows from the root near the stem, at the surface of the ground. The flowers are produced in succession, each proceeding from between scales, hooded, two inches long, of a pale colour, resembling the flowers of Ginger, with a faint smell of *Petasites*, or Butter-bur."

This curious plant was sent to Kew garden in 1796, by the right hon. sir Joseph Banks, but has not yet flowered. By Kæmpfer's plate the flower-stalk appears remarkably short for a *Zingiber*, and more resembling a true *Amomum*, but there is no essential difference. The coincidences between the characters of the flowers, and the qualities of the roots, in these several species, confirm the solidity of Mr. Roscoe's arrangement, which is one of the happiest efforts that have been made in scientific botany. See Scitamineæ.

MIOKECK, in *Geography*, a town of Sweden, in West Gothland; 36 miles S.E. of Gotheborg.

MIOLENS, a town of France, in the department of Mont Blanc, at the conflux of the Arche and Isere; 10 miles E. of Chambery.—Also, a town and fortress of France, in the department of the Lower Alps; 9 miles W. of Barcelonetta.

MIOLLON, a small island on the W. side of the gulf of Bothnia. N. lat. 63° 4′. E. long. 18° 20′.

MIONIKIALLE, a town of Persia, in the province of Mazanderan; 42 miles S. of Fehrabat.

MIOSS, a lake of Norway, in the government of Aggerhuus, about 50 miles long from N. to S., and from 2 to 16 broad, containing one island, 8 miles in circuit: the southern extremity is 30 miles N.E. of Christiania.

MIOUTOLON, a fmall ifland in the Indian fea, near the coaft of Africa.

MIPARTY, *Chamber of.* See CHAMBER.

MIPROVETZ, in *Geography*, a town of Bulgaria, the fee of a Greek archbifhop ; 52 miles N.W. of Sophia.

MIQUELETS, a kind of foot foldiers, inhabiting the Pyrenean mountains : armed with piftols under their belts, a carbine, and a dagger. The miquelets are dangerous people for travellers to meet.

MIQUELON, in *Geography*, a fmall ifland in the Atlantic ocean, eight miles S.W. of Cape May, in Newfoundland. It is not more than three-fourths of a league in length, and its foil is indifferent. It was ceded to the French by the peace of Paris in 1763. The English deftroyed the fettlement in 1778, and kept the ifland till the year 1783, when it was reftored by the peace ; and in 1793 it was retaken by the Englifh, and reftored at the peace of Amiens. N. lat. 46° 56'. W. long. 56° 5'.

MIR, a town of Lithuania, in the palatinate of Novogrodek ; 24 miles S.E. of Novogrodek.

MIR *Nafer*, a town of Perfia, in the province of Adirbeitzan ; 30 miles W.N.W. of Urmia.

MIRA, a town of Italy ; 10 miles E.N.E. of Padua ; eight miles W. of Venice.—Alfo, a town of Moldavia ; 44 miles S.W. of Birlat.—Alfo, a town of South America, in the province of Chocos ; 50 miles N. of Zitara.—Alfo, a town of Portugal, in the province of Beira ; 16 miles N.W. of Coimbra.—Alfo, a river of Para, which runs into the Pacific ocean, N. lat. 1° 40'.

MIRABAT, or MIRBAT, a town of Arabia, in the province of Oman ; 260 miles S.W. of Mafcat.

MIRABAUD, JOHN BAPTIST, in *Biography*, a man of letters, was defcended from a family of Provence, and born at Paris in 1675. He was intended, in early life, for the military profeffion, and was prefent at feveral battles. After this he became a member of the congregation of the Oratory, to which fociety he continued warmly attached through the remainder of his life. Having fpent many years in literary purfuits he engaged in the fervice of the houfe of Orleans, and was entrufted with the education of two young princeffes of that family. As an author he was firft known by his tranflation of Taffo's "Jerufalem Delivered." This work gave him an entrance into the French academy in the year 1726, though not without fome murmurs from original writers, who did not fcruple to fay that the patronage of the houfe of Orleans had more contributed to procure him this diftinction, than his merit as an author. He next tranflated the "Orlando Furiofo," which was alfo favourably received by the public. In 1742 he was elected perpetual fecretary of the French academy, on the acceptance of which poft, he infifted upon renouncing the right to a double fee of attendance, which his predeceffors had enjoyed. In return for this difinterefttednefs, the academy procured for him an apartment in the Louvre, and a penfion was attached to the fecretaryfhip. Having occupied the place for feveral years, he refigned it to Duclos, who, however, infifted upon Mirabaud's retaining the penfion and apartment in the Louvre, where he died, with perfect tranquillity, in 1760, at the age of 86. He was of a mild and equal temper, and a true philofopher in his conduct and fentiments. He had compofed various works on interefting topics of literature, hiftory, and philofophy ; to the "Syfteme de la Nature," publifhed in 1770, his name is prefixed, but it is now generally believed that he was not the author.

MIRABEAU, VICTOR RIQUETTI, marquis of, a French political writer, and one of the leaders of the fect of Economifts, was born of an ancient family of Provence. His firft literary work, entitled "L'Ami des Hommes," publifhed in 1755, in three volumes, contains many ufeful ideas on rural and political economy, and difplays liberal and judicious views of the great interefts of fociety. It obtained fo much public approbation and celebrity, that the name of the work became an epithet of the author, who is diftinguifhed as "Mirabeau l'ami des hommes." He afterwards wrote in favour of provincial adminiftrations, and publifhed "Théorie de l'Impôt :" all his writings are faid to breathe a fpirit of improvement and reform, which, together with his ftrictures on the financiers, was fo little agreeable to the court, that he was for a fhort time imprifoned in the Baftile. He is varioufly reprefented, according to the different notions and feelings of the perfons who have fpoken of him and his works. He died in 1790, at the commencement of the revolution, after he had fhewn an attachment to the court, while his fon was a moft diftinguifhed leader among the popular party. All his writings were publifhed collectively in eight volumes 12mo., with the exception of one, entitled "Hommes à celebrer," in two volumes 8vo., which he fent in manufcript to his friend, father Bofcovich, by whom it was printed at Baffano.

MIRABEAU, HONORE-GABRIEL RIQUETTI, count of, fon of the preceding, was born in 1749. The impetuofity of his temper led him to difdain the ordinary purfuits of youth, though it has been thought that a contempt for thefe purfuits was the principal caufe of his want of application, for when Locke on the "Human Underftanding" was put into his hands, he fat down to the perufal of it with the clofeft attention, and after making fome progrefs in it, exclaimed "This is the book I wanted." While he was ftill a ftripling he exhibited an ungovernable and daring fpirit, with a propenfity to almoft every irregularity. Between him and his father there was the moft irreconcileable difference, fo that the marquis, who has been charged by La Harpe with tyranny in his family, obtained a lettre de cachet againft his fon, then only feventeen years old, and had him clofely confined in the ifle of Rhè for two years. On his liberation he procured a commiffion in the regiment of dragoons, with which he ferved a year in Corfica. On his return to France he precipitated himfelf into every extravagance, and became involved in great difficulties. He married a young lady of family and great fortune, but his father contributed, on the occafion, nothing more than his confent to this union, and his diffipations foon brought him into new difficulties. His conduct towards his wife was brutal, and his irregularities became fo exceffive and notorious that he was feveral times imprifoned, and once, on account of his feducing a lady, the wife of the marquis de Monnier, he was committed to the caftle of Vincennes, where he was confined nearly four years. Thefe imprifonments, by checking his career of diffipation, tended to improve and ftrengthen his mind, as he found in them no employment fo interefting as laying in ftores of information and reflection, and acquiring the habit of compofition. At Vincennes he became an author, and publifhed an abridgment of French grammar, and fome licentious productions. Thefe were followed by his celebrated "Effai fur les Lettres de Cachet, et les Prifons d'Etat," in which he pleaded for the right of every citizen to perfonal liberty, until he had been deprived of it by a legal trial, with all the energy and eloquence of one who had been a fufferer under uncontrolled authority. He next commenced an action againft his father for maintenance and arrears, in which he was fuccefsful. With the affiftance of Chamfort, a man of letters of fome celebrity, he compofed a work entitled "Confiderations fur l'Ordre de Cincinnatus," the fubject of which was a projected fociety in the United States of North America, which the friends of republicanifm looked

looked upon with jealoufy. During its compofition, he frequently confulted Dr. Franklin, then at Paris. He now became a writer by profeffion, and with a view to his maintenance went to London, where he publifhed fome volumes of a work called "Le Confervateur," in which an analyfis was given of the moft valuable current publications. In London he met with very fmall encouragement, and returned to Paris, where he wrote fome tracts on public finance. In 1786 he went to Berlin, to obferve the politics of the court, and was admitted into the prefence of, and had a converfation with, Frederic the Great, who was then attacked with his laft illnefs. From his obfervations he wrote two very free and important letters of advice, or memorials, to the next king on his acceffion. He probably had fome views to employment in the new reign, but his hopes were fruftrated by his licentious character, and his open profeffion of atheifm. He chiefly occupied his time at Berlin, with laying in materials for his ftatiftical account of the Pruffian and Saxon ftates, and for his fecret and fatirical hiftory of the court of Pruffia; he became a member of the fociety of *Illuminati*, and publifhed an "Effay on the fect of Illuminées," which appearing to difclofe its fecrets, is thought to mix with them fo many abfurd fictions as to involve the whole in ridicule.

Upon the affembling of the Notables he returned to Paris, and by the freedom of fome of his remarks, in a pamphlet againft ftock-jobbing, an order was iffued for his apprehenfion, which he fortunately evaded by a temporary concealment near Liege. He did not continue long there, but on his return to the metropolis ingratiated himfelf with the minifter Brienne, by writing againft Neckar. In 1787 he vifited Berlin, and was employed, in conjunction with his friend Mauvillon, in preparing for the prefs the work entitled "Hiftoire de la Monarchie Pruffienne," which was publifhed in the following year, in four volumes 4to. and in eight of the 8vo. fize, and obtained for the author a high reputation for political and fatirical knowledge. In 1789 appeared "Hiftoire Secrete de la Cour de Berlin," in which the reigning king of Pruffia, and feveral other great perfonages in his court, were treated with fo much difrefpect, that the work was ordered, by the parliament of Paris, to be burnt by the common hangman.

The affembling of the States-General excited in Mirabeau's mind the higheft expectations, and he, without doubt, viewed the approaching troubles of the kingdom as pregnant with events, in which his abilities would lead him to take a very confpicuous part. At the time of the elections he went to Provence, with the hope of being chofen one of the deputies of the nobleffe for that province, but being rejected as not poffeffing any property in it, he opened a grocer's fhop at Aix, put on an apron, fold his wares, and rendered himfelf fo popular, that he was elected, with the greateft acclamations, a deputy of the tiers état of that city. On the meeting of the ftates, he fet up a daily paper, which he entitled "Lettres de Mirabeau à fes Commettans," which gave fuch an account of the debates as might ferve the interefts of the popular party. Some feeble attempts were made to crufh it, but without any effect, and its circulation became very extenfive. He foon diftinguifhed himfelf as the moft eloquent fpeaker, and took a leading part in thofe difputes between the different orders, which ended in the affumption of the character of "National Affembly" by the tiers-état. It was on this occafion that a declaration was iffued by the affembly, which among other fubjects obferved, that "the denomination of 'National Affembly' is the only one befitting the affembly in the actual fituation of affairs, becaufe the members compofing it are the only reprefentatives lawfully and publicly acknowledged and verified; becaufe they are fent by almoft the whole nation, and becaufe the Reprefentation being one and indivifible, none of the Deputies chofen, in whatever order or clafs, has a right to exercife his functions feparately from the prefent Affembly." On another occafion, after a royal fitting, as it was called, the deputies were ordered by the king to depart, and the order was repeated by M. de Brèzè, grand-mafter of the ceremonies. Mirabeau rofe, and addreffing Brèzè in authoritative language, bid him go and acquaint thofe who fent him, that they were affembled by the will of the people, and that nothing but the bayonet fhould feparate them. This fpeech confirmed the tiers-état in their refiftance to the royal authority, and Mirabeau followed it by propofing and carrying a decree, declaring the inviolability of the perfons of the members. About this time he attached himfelf to the duke of Orleans, but finding that prince incapable of carrying into effect any great defigns, he withdrew from his councils. The death of his father in 1790 was of no advantage to his fortune, on account of the embarraffment in which he left his affairs, yet he found means to pay off large debts, and to live in a fplendid ftyle, which was generally attributed to the donations of the duke of Orleans. His motions were fometimes of a popular kind, fometimes tending to the fupport of authority. Though apparently a friend to order, he was thought fecretly to have been the inftigator of the worft outrages committed by the mob, over whom he poffeffed a greater influence than any other individual. In the infancy of the Jacobin club he was a conftant attendant upon its meetings, but when the members feemed defirous of overfetting the whole fyftem, he deferted and oppofed them. In May 1790 he was the warm advocate for the right of peace and war as inherent in the executive power; from this period it was generally faid that he had fold himfelf to the court, and his popularity was for fome time much impaired. He had however enough of art and management to recover his influence, though he ftill treated the Jacobins with great contempt. It is imagined that he was engaged in a plan to procure the diffolution of the national affembly, and the liberty of the king, by means of an appeal to the nation, when he was attacked by a violent difeafe which proved fatal. The danger of no individual ever excited fo univerfal an alarm; all Paris, as it were, crowded round his door, with eager enquiries, and the king himfelf fent meffages to learn the ftate of his health. He died April 2d, 1791, at the age of 42. The honours paid to his memory were almoft unprecedented. All public fpectacles were fufpended till his funeral, which was attended by all the minifters and deputies, and a vaft number of other perfons, to the Pantheon, where his body was depofited by the fide of that of Defcartes. His buft was placed in the halls of moft of the municipalities of the kingdom, and funeral fervices were performed for him in feveral of the provincial capitals. Such, however, were the mutations of the public mind, that in the very next year, when republicanifm was triumphant, his bufts were deftroyed, and his remains diffipated. Befides the works already mentioned, he publifhed a variety of pamphlets. In his perfon, Mirabeau was grofs and repulfive; in his manners, paffionate and brutal. He was the moft fplendid figure in the earlier fcenes of the French revolution, but, like a meteor, he dazzled and difappeared without leaving any lafting traces of his exiftence. No man of the time was perhaps equally qualified to fhine in political warfare. Poffeffed of great eloquence, he was capable of bearing all before him in popular debate, and of a prefence of mind which no emergency could difconcert; accuftomed to lead the opinions of the public, and deriving more popularity from the boldnefs of his writings, than he loft by the diffolutenefs of his morals, he was perfectly fitted

to

to act on the tumultuary theatre of revolutionary politics. His want of principle muft exclude him from the rank of a real patriot, yet he was probably, on conviction, a friend to thofe public rights upon which all juft and enlightened government is founded. Gen. Biog. Rabaut's Hift. of the French Revolution.

MIRABEL, in *Geography*, a province of Crete or Candia, lying to the E. of that of Candia, is populous, fertile, and abounding with oil, grain, and fruit. Formerly this province fupplied feveral French veffels with oil, and thus kept up its price for the benefit of the inhabitants; but they have fince been obliged to carry it, at a great expence, to Candia, and to fell it at a low price to the Turkifh proprietors of the foap houfes eftablifhed in that town. In confequence of this reduction of price, the cultivation of olive trees, and the manufacture of oil, have declined. The road of Mirabel faces the eaft, and affords to veffels a tolerably fafe anchorage. It is fheltered and defended by two fmall iflands fituated in front. The town is greatly diminifhed fince commerce has taken another direction. Here are ftill reckoned 1500 inhabitants, moft of whom are Greeks and cultivators. South of Mirabel lies the province of "Hiera-Petra," or "Gera-Petra," which produces, like the other province, oil, grain, various fruits, honey, wax, flax, &c. but it fuffers equally with Mirabel from the prohibition, iffued by the pacha, of felling commodities any where but at Candia. Olivier.

MIRABEL, a town of France, in the department of the Lot; nine miles N. of Montauban.

MIRABELLE, a town of Naples, in the county of Molife; 14 miles S.E. of Molife.—Alfo, a town of Naples, in Principato Ultra; 10 miles S.E. of Benevento.—Alfo, a town of Sicily, in the valley of Noto; four miles N.E. of Piazza.

MIRABILE, RETE. See RETE.

MIRABILIS, in *Botany*, a name which originated with the Spaniards, who applied to the beautiful plant, which ftill bears this name, the appellation of *Marabillas del Peru*, the Wonder, or Marvel, of Peru, on account of the great diverfity of colour in its flowers, even on the fame root. At firft, as profeffor Martyn obferves, every thing that came from the new continent was thought wonderful. The French call the plant of which we are fpeaking *Belle de nuit*, becaufe the flowers expand, and fmell fweet, at night only. Indeed the botanifts of that nation feem to have taken a violent diflike to the original name, and all that belongs to it. Tournefort called this genus *Jalapa*, which is founded in error; and Juffieu *Nyctago*, derived from the French idea. The latter is unexceptionable, but fuperfluous.—Linn. Gen. 96. Schreb. 114. Willd. Sp. Pl. v. 1. 999. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 1. 382. Stokes Mat. Med. v. 1. 311. Lamarck Illuftr. t. 105. Gærtn. t. 127. (Nyctago; Juff. 90. Jalapa; Tourn. Inft. 129. t. 50.)—Clafs and order, *Pentandria Monogynia*. Nat. Ord. *Aggregatæ*, Linn. *Nyctagines*, Juff.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, in five erect, rather deep, unequal fegments, permanent. *Cor.* of one petal, funnel-fhaped; tube flender, long, gradually dilated upwards, its bafe permanent, hardened, invefting the feed; limb fomewhat fpreading, plaited, in five flight equal fegments. Nectary fpherical, flefhy, furrounding the germen, obfcurely five-toothed at the margin. *Stam.* Filaments five, inferted into the edge of the nectary, attached to the tube of the corolla, thread-fhaped, inclining, unequal, extending rather beyond the tube; anthers roundifh, afcending; pollen glutinous. *Pift.* Germen turbinate, fuperior, within the nectary; ftyle thread-fhaped, the length and pofition of the ftamens; ftigma globofe, rough, afcending. *Peric.* none, except the permanent hardened bafe of the corolla. *Seed* folitary, ovate, obfcurely five-fided.

Eff. Ch. Calyx inferior, five-cleft. Corolla funnel-fhaped, its bafe inflated and permanent. Nectary a gland furrounding the germen. Seed folitary, coated.

1. M. *dichotoma.* Forked Marvel of Peru. Linn. Sp. Pl. 252. (Jalapa officinarum; Mart. Decad. 1. t. 1.)—Flowers nearly feffile, axillary, folitary, erect.—Native of Mexico, from whence its feeds were brought very early to Europe. The plant is naturally perennial, having a thick oblong flefhy *root*; but if raifed on a hot-bed, it will flower and feed the fame feafon, like the ufual race of tender annuals. If kept in a green-houfe, or planted in the open air clofe to the wall of a hot-houfe, it will endure many years, and flower more abundantly throughout the fummer. The *ftem* is herbaceous, fucculent, very bufhy, forked, knotty at the joints, three feet high, round, fmooth except a narrow hairy line at the two oppofite fides. *Leaves* oppofite, ftalked, ovate, fomewhat heart-fhaped, pointed, entire, very flightly downy or hairy at the margin and ribs. *Flowers* from the forks of the ftem, on very fhort ftalks, fweet-fcented, of a fcarlet red; their tube one and a half inch long. Calyx bell-fhaped, a quarter of an inch in length.—This plant was by fome botanifts miftaken for the Jalap of the fhops, which is now known to be a *Convolvulus*, and has bloffomed this feafon, 1812, in the garden of A. B. Lambert, efq. at Boyton, Wilts; a rare occurrence in Europe, fince the plant was fent over by Houfton, 80 years ago.

2. M. *Jalapa.* Striped Marvel of Peru. Linn. Sp. Pl. 252. Curt. Mag. t. 371. (Admirabilis peruana, rubro flore; Cluf. Hift. v. 2. 89. Mirabilia peruviana, flore luteo; Ger. em. 343.)—Flowers crowded, ftalked, erect. Leaves nearly fmooth.—Native of the Eaft and Weft Indies. Very clofely related to the foregoing, except that the *calyx* is longer, and the *flowers* more crowded together, on longer *ftalks.* The *leaves* are not quite fmooth at the edges. The *corolla* varies remarkably in colour, on which account, as well as its fragrance in the evening, the plant is highly defirable. What is faid above of the treatment of *M. dichotoma,* is equally applicable to this. Some flowers are of an uniform fcarlet red, others ftriped or fpeckled with red and white, in endlefs variety, on the fame plant. On fome they are all of an uniform very delicate yellow; while other individuals bear parti-coloured red and yellow bloffoms. Moft botanifts, and among them Linnæus, have believed this to be the real officinal Jalap; a miftake to which we have already alluded. See alfo CONVOLVULUS, fp. 90, *Jalapa.*

3. M. *longiflora.* Long-flowered Marvel of Peru. Linn. Sp. Pl. 252. Stockh. Tranf. for 1755. 176. t. 6. Sm. Exot. Bot. v. 1. 43. t. 23. (Atzoyatl, Mirabili Mexicana; Hernand. Mex. 170.)—Flowers crowded, terminal, feffile, very long, flightly drooping. Leaves downy.—Native of the more cool and mountainous parts of Mexico, flowering in September. The feeds of this elegant fpecies were fent by the French aftronomers, about the middle of the laft century, from South America, to M. le Monnier at Paris, by whofe liberality they were difperfed throughout Europe. The plant has ever fince been preferved, either as a tender annual, or the roots taken up, and kept from year to year in fand, they being, like thofe of the two former, truly perennial, and very large, externally black. The *ftem* is three or four feet high, round, repeatedly forked, downy. *Leaves* oppofite, heart-fhaped, entire, foft, downy, and vifcid, fœtid when bruifed; the lower ones ftalked; the reft feffile. *Flowers* feffile, many together at the leafy top of each branch. *Calyx* very clammy and fœtid. *Corolla* four inches long,

long, with a downy green and purplifh tube; limb white, with a purple eye. *Anthers* orange. *Stigma* large, hairy, of a rich purple. *Seed* with a curioufly teffellated dark brown coat, as big as the kernel of a filbert.

The flowers are highly fcented. A few of them gathered in an evening, when they expand, without the fœtid calyx, and placed in a glafs of water, will perfume a large apartment all night. We do not however recommend them for a bedchamber, or any clofe room. Each flower lafts only one night, but there is a copious fucceffion till the clofe of autumn.

Mirabilis, in *Gardening*, furnifhes plants of the flowery perennial kind, of which the fpecies cultivated are, the common marvel of Peru (M. jalapa); the forked marvel of Peru (M. dichotoma); and the fweet-fcented marvel of Peru (M. longiflora).

The firft fort has feveral varieties in the colour of the flowers, as purple and white, and variegated purple and yellow, but which refolve themfelves into two principal varieties; as with purple and white flowers, which are variable; fome being plain purple, others plain white, but moft of them variegated with the two colours, and all found occafionally on the fame plant; and with red and yellow flowers, generally mixed, but fometimes diftinct on the fame plant; fome plants having only plain flowers, others only variegated: but the plants which are raifed from feeds of the purple and white never produce red and yellow flowers, or the contrary.

All thefe varieties are highly ornamental during the months of July, Auguft, and September, and, when the feafon continues mild, often laft till near the end of October. The flowers opening only towards the evening, while the weather continues warm, but in moderate cool weather, when the fun is obfcured, they continue open almoft the whole day, and are produced fo plentifully at the ends of the branches, that when expanded the plant feems entirely covered with them, and from fome being plain, others variegated on the fame plant, have a fine appearance.

The fecond fpecies is common in the Weft Indies, where it is termed the *Four-o'clock flower*, from the circumftance of the flowers opening at that time of the day.

Method of Culture.—In all thefe forts the propagation is effected by fowing the feed in the fpring feafon, either on a warm border or on a hot-bed; but the latter method produces the plants confiderably more early, and in the greateft perfection. When cultivated on warm fouth borders, in the places where the plants are to remain, the feed fhould be fown about the middle of April, either in patches or in fhallow drills, half an inch deep, and fix inches afunder: and when the places can be covered with hand-glaffes, or a frame and lights, or the feed be fown in pots under thofe protections, or any other occafional fhelter during the night time or in cold weather, it will greatly forward the germination of the feed, as well as the growth of the young plants afterwards. In the latter mode about June, the plants will be fit to plant out into the borders or into pots. Moift weather fhould be chofen for this purpofe, and water and occafional fhade be given till well rooted: they then readily grow, and acquire a tolerable fize; but they do not attain to a large fize, or flower fo early by a month or fix weeks as thofe forwarded in the hot-bed.

But in the latter method of raifing them, a hot-bed fhould be prepared in March, or early in April, under frame and lights, and earthed over about fix inches deep, then fowing the feed in the earth of the bed in fhallow drills half an inch deep, as directed above, or in pots of rich earth the fame depth, plunging them in the earth of the bed. The latter is the better method. The plants foon rife; when they fhould have frefh air daily, in common with the other plants of the bed, and frequent refrefhings of water; and when nearly two inches high, be planted out into another frefh hot-bed to forward them, placing them either in the earth of the bed, four or five inches afunder, or fingly in fmall pots (thirty-twos), plunging them in the bed; water and fhade fhould be immediately given till frefh rooted, continuing the care of admitting frefh air every mild day; and about the middle or latter end of May, when they have acquired a good fize and ftrength, they fhould be inured by degrees to the full air, fo as that they may be removed into it fully about the beginning of June, choofing mild cloudy moift weather, if poffible, for the bufinefs; taking up fuch as grow in the beds with balls of earth about their roots, and planting them in the borders; but thofe in the pots may he turned out with the whole ball entire, and planted in that way. Some fhould alfo be removed into large pots for moving into particular fituations. Water fhould be directly given, and occafional fhade to fuch as require it, repeating the waterings to the whole, till they have ftruck frefh root and begun to grow, when they will not require any further culture, except the occafional fupport of fticks, which is moft neceffary in the laft fort.

As the feed ripens well, it will frequently prevent the trouble of preferving the roots. But when thefe are taken out of the ground in autumn, and laid in dry fand during the winter, fecure from froft, and planted again in the fpring, they grow much larger and flower earlier than the feedling plants: or when the roots are covered in winter with tanners' bark to keep out the froft, they often remain fecure in the borders, where the foil is dry. When the roots thus taken out of the ground are planted the following fpring in large pots, and plunged into a hot-bed, under a deep frame, they may be brought forward, and raifed to the height of four or five feet, and flower much earlier in the feafon.

It fhould be noticed that in collecting the feeds, care fhould be taken not to fave any from the plants which have plain flowers; and in order to have variegated flowers, the plain flowers fhould be pulled off from thofe plants which are intended to ftand for feed. As the fecond fort is lefs hardy than the firft and third, unlefs the plants are brought forward in the fpring they feldom flower till very late, and their feeds do not ripen perfectly.

All the forts are proper for the principal borders of pleafure grounds, being very ornamental in their large branchy growth, as well as in their extenfive flowering.

Mirabilis *Aqua*. See Water.

MIRABOLANS, or Mirobalans, in *Pharmacy*. See Myrobalans.

MIRACHOW, or Mirchau, in *Geography*, a town of Pruffian Pomerelia; 12 miles W. of Dantzic.

MIRACLE, in a popular fenfe, is a *prodigy*, or an extraordinary event, that furprifes us by its novelty.

Miracle, in a more accurate and philofophical fenfe, is an effect that does not follow from any of the regular laws of nature; or which is inconfiftent with fome known law of it; or contrary to the fettled conftitution and courfe of things: accordingly all miracles prefuppofe an eftablifhed fyftem of nature, within the limits of which they operate, and with the order of which they difagree.

Spinoza denies that any power can fuperfede that of nature; or that any thing can difturb, or interrupt, the order of things; and accordingly defines a miracle to be a rare event, happening in confequence of fome laws that are unknown to us.

Divines define a miracle, an extraordinary and wonderful effect above the power of nature, wrought by God, to manifeft his power or providence; or to give credit to fome meffenger ſenger ſent from himſelf. Thus Jeſus Chriſt evinced the truth of his miſſion, and his doctrine, by miracles; and thus alſo did Moſes. But there are ſcarcely any theological writers, that preciſely agree in their definition of a miracle. Mr. Locke defines it to be a ſenſible operation, which being above the comprehenſion of the ſpectator, is, in his opinion, contrary to the courſe of nature, and taken by him to be divine. Dr. Clarke's definition of a miracle, in the theological ſenſe of the word, is this: that it is a work effected in a manner unuſual, or different from the common and regular method of Providence, by the interpoſition either of God himſelf, or of ſome intelligent agent ſuperior to man, for the proof or evidence of ſome particular doctrine, or in atteſtation to the authority of ſome particular perſon. According to Dr. Sykes, a miracle is a deſigned effect, ſenſible, unuſual in itſelf, beyond the art and power of man to do. Dr. Chandler ſays, that a miracle is an action done, or an operation viſibly performed by any being, which is really and truly above the reach, natural power, and capacity of that being who does it, of himſelf, and without the aſſiſtance of ſome ſuperior agent to perform. With this Dr. Hutcheſon's definition nearly coincides, *viz.* that it is a work far exceeding human power, yet performed by the command, or upon the volition of a man. And the ſame writer further obſerves, that though miracles may prove the ſuperintendency of a voluntary agent, and that the univerſe is not guided by neceſſity or fate; yet that mind muſt be weak and inadvertent, who needs them to confirm the belief of a wiſe and good Deity; ſince the deviation from general laws, unleſs upon very extraordinary occaſions, muſt be a preſumption of inconſtancy and weakneſs rather than of a ſteady wiſdom and power; and muſt weaken the beſt arguments we have for the ſagacity and power of the univerſal mind. Inquiry into the Original of the Ideas of Beauty, &c.

Mr. Farmer, a late ingenious and learned writer, objects to all thoſe definitions of miracles, which repreſent them as effects unuſual, above human power, and manifeſting the interpoſition of ſuperior power: becauſe, he ſays, the term unuſual does not diſtinguiſh real miracles from many things which are not miraculous, ſuch as the rare and uncommon appearances of nature: nor does the calling a miracle an effect above human power, diſtinguiſh it from all other effects equally above human power, produced by ſuperior beings, when acting within their uſual ſphere, which, for that reaſon, cannot be miraculous. Beſides, as this definition comprehends many things, which are not miraculous, and to which no perſons apply the term; ſo it excludes many things which are allowed by all to be proper miracles. For there ſeems to be a difference between effects above human power, or which argue a higher degree of power, and effects which argue a power barely different from human, and in no manner ſuperior to it. According to this definition, beaſts and birds may work miracles; for they do many things that are above the power of man. Moreover, this definition, inſtead of deſcribing miracles by the nature of the works themſelves, deſcribe them by their author, and the degree of power neceſſary to their performance. To which it may be added, that works which argue only a power more than human, can be no abſolute proofs of a divine interpoſition: and farther, the laſt part of the definition, manifeſting the interpoſition of ſuperior power, is ſuperfluous; becauſe it is only ſaying effects above human power muſt be produced by a power above it.

This writer conſiders the contrariety or conformity of the event itſelf to thoſe laws by which the world is governed in the courſe of God's general providence, as the only circumſtance which denominates and conſtitutes it a proper miracle or not: and, therefore, before we can pronounce with certainty any effect to be a true miracle, it is neceſſary (and nothing more is neceſſary than) that the common courſe of nature be in ſome degree firſt underſtood. Miracles, in this view, are not impoſſible to the power of God, nor neceſſarily repugnant to our ideas of his wiſdom and immutability. Neither do they imply any inconſiſtency in the divine conduct, or a defect or diſturbance of the laws of nature: ſo that in the general idea of miracles, conſidered as variations from the common courſe of nature, there is nothing that can furniſh a certain univerſal proof againſt their exiſtence; and there is a power ſuperior to nature, which is ever able, and which in certain circumſtances may reaſonably over-rule what was at firſt eſtabliſhed. The writer, now cited, farther maintains, that miracles are neither the effects of natural cauſes, nor of ſuperior created intelligences, acting from themſelves alone; but that they are always to be aſcribed to a divine interpoſition; *i. e.* that they are never wrought, but either immediately by God himſelf, or by ſuch other beings as he commiſſions and empowers to perform them. In proof of this propoſition, he alleges, that the ſame arguments which prove the exiſtence of ſuperior created intelligences, do much more ſtrongly conclude againſt their acting out of their proper ſphere. Farther, the ſuppoſition of the power of any created agents to work miracles of themſelves, in this lower world, is contradicted by the obſervation and experience of all ages; there being, in fact, no proper evidence of the truth of any miracles, but ſuch as may be fitly aſcribed to the Deity. Moreover, the laws of nature being ordained by God and eſſential to the order and happineſs of the world, it is impoſſible God ſhould delegate to any of his creatures a power of working miracles, by which thoſe divine eſtabliſhments may be ſuperſeded and controlled. Beſides, the aſcribing to any ſuperior beings, God excepted, and thoſe immediately commiſſioned by him, the power of working miracles, ſubverts the foundation of natural piety, and is a fruitful ſource of idolatry and ſuperſtition. It is further urged, that if miracles were performed in favour of falſe doctrines, mankind would be expoſed to frequent and unavoidable deluſion: and, if they may be performed without a divine permiſſion, and in ſupport of falſhood, they cannot be credentials of a divine miſſion, and criterions of truth. So that, upon the whole, if ſuperior beings really poſſeſs the miraculous powers which ſome writers have aſcribed to them, the exerciſe of thoſe powers, by good and evil agents, would either expoſe mankind to neceſſary and invincible error, or entirely deſtroy the credit and uſe of miracles, under the idea of criterions of truth and authentic credentials of a divine miſſion. If we appeal to the evidence of revelation, on this ſubject, we ſhall find, that the view which the ſcripture gives us of good angels, of the devil and his angels, as alſo of the ſouls of departed men, is inconſiſtent with their liberty of working miracles; and the view which the ſacred writers give us of the gods of paganiſm is alſo abſolutely inconſiſtent with their poſſeſſing a power of working miracles. Nevertheleſs, it has been much diſputed, how far it may be in the power of the devil to work miracles? or wherein the ſpecific difference lies between the miracles of Moſes, and thoſe of Pharoah's magicians? thoſe of Jeſus Chriſt and the apoſtles, and thoſe of Simon Magus and Apollonius Tyaneus? Whether the latter were any more than mere deluſions of the ſenſes; or whether any ſuper-natural and diabolical power concurred with them. See MAGICIAN; under which article it is ſhewn, that the magicians, diviners, and ſorcerers of antiquity, who pretended by the aſſiſtance of the heathen deities, &c. to foretel future events, or to work miracles, are branded in scripture as mere impostors, incapable of supporting their pretensions by any works or predictions beyond human power or skill. The scripture likewise reproaches the pretences to inspiration and miracles, made by false prophets, in support of error and idolatry, as the sole effects of human craft and imposture. And, therefore, since angels, whether good or evil, the spirits of departed men, the heathen deities, magicians, and false prophets, are the only agents, who have ever been conceived as capable of working miracles, either in opposition to God, or without an immediate commission from him; and the scripture denies to all these the power of performing any miracles; it does in effect deny, that any single miracle has ever been performed without the immediate interposition of God. It is likewise alleged, that the scriptures represent the one true God, as the sole creator and sovereign of the world, which he governs by fixed and invariable laws; that to him they appropriate all miracles, and that they urge them as demonstrations of his divinity and sole dominion over nature, in opposition to the claims of all other superior beings. The scriptures also uniformly represent all miracles, as being, in themselves, an absolute demonstration of the mission and doctrine of the prophets, at whose instance they are performed; and never direct us to regard their doctrines as a test of the miracles being the effect of divine interposition. Accordingly, the miracles of Christ, in particular, were a demonstration (not a partial and conditional, but a complete and absolute demonstration) of his mission from God: and they were farther designed to evince his peculiar character as the Messiah or anointed; *i. e.* his regal commission and power, or his right by divine designation to dominion and judicature over mankind. And it may be observed, with respect to all the miracles of the New Testament, that their divinity, considered in themselves, is always either expresly asserted, or manifestly implied; and they are accordingly urged as a decisive and absolute proof of the divinity of the doctrine and testimony of their performers, without ever taking into consideration the nature of the doctrine, or of the testimony to be confirmed. It is also shewn, that the scriptures have not recorded any instances of real miracles performed by the devil; in answer to the objections drawn from the case of the magicians in Egypt, from the appearance of Samuel, after his decease, to Saul, which was either the work of human imposture or a divine miracle, and from our Saviours's temptation in the wilderness, which the writer, to whom we now refer, considers as a divine vision. Miracles, considered as the peculiar works of God, afford a divine testimony to the person on whose account they are wrought, and to that doctrine or message, which he delivers in the name of God. And this proof from miracles of the divine commission, and doctrine of a prophet, is in itself decisive and absolute. It is also the most natural and agreeable to the common sense of mankind in all ages. It is the most easy and compendious proof of a new revelation. Miracles are farther a very powerful method of conviction, making a strong impression upon the heart, at the same time that they carry light to the understanding. Nor is the necessity of miracles less evident than their propriety and advantage, in attesting a divine commission and propagating a new revelation. They also serve to revive and confirm the principles of natural religion, and to recover men from those two opposite extremes of atheism and idolatry. Finally, the evidence of miracles, whether of power or knowledge, is the fittest to accompany a standing revelation; because it is not confined to one age or nation, but may be extended over the whole globe, and conveyed to the most distant generations. On the nature and design of miracles, already illustrated in this article, see Farmer's Dissertation on Miracles, &c. 8vo. 1771, passim.

On the other hand, Dr. Clarke, who allows that miracles may be wrought by other agents besides the Deity, observes that it cannot certainly be distinguished, by the miracle itself, whether any extraordinary interposition of some power superior to men be the immediate interposition of God himself, or of some good angel, or of some evil angel. The only possible ways, says this learned writer, by which a spectator may certainly and infallibly distinguish whether miracles be indeed the works either immediately of God himself, or of some good angel employed by him; and consequently the doctrine witnessed by the miracles be infallibly true and divinely attested: or whether, on the contrary, the miracles be the works of evil spirits, and consequently the doctrine a fraud and imposition upon men, are these: if the doctrine attested by miracles be in itself impious, or manifestly tending to promote vice; then, without all question, the miracles, how great soever they may appear to us, are neither wrought by God himself nor by his commission. If the doctrine, attested by miracles, be in itself indifferent, or such as cannot, by the light of nature and right reason alone, be certainly known whether it be true or false; and at the same time, in opposition to it, and in proof of the direct contrary doctrine, there be wrought other miracles, more and greater than the former, or at least attended with such circumstances as evidently shew the power, by which the latter are wrought, to be superior to the power that produced the former: then that doctrine, which is attested by the superior power, must necessarily be believed to be divine. This, he apprehends, was the case of Moses and the Egyptian magicians. (See MAGICIAN.) If, in the last place, the doctrine attested by miracles be such as, in its own nature and consequences, tends to promote the honour and glory of God, and the practice of universal righteousness among men; and yet nevertheless be not in itself demonstrable, nor could, without revelation, have been discovered to be actually true; and there is no pretence of more or greater miracles, on the opposite side, to contradict it: which is the case of the doctrine and miracles of Christ; then the miracles are unquestionably divine, and the doctrine must, without all controversy, be acknowledged as an immediate and infallible revelation from God. In order to obviate the objection, that we prove in a circle the doctrine by the miracles, and the miracles by the doctrine; he adds, that the miracles, in this way of reasoning, are not at all proved by the doctrine; but only the possibility and the good tendency, or at least the indifferency of the doctrine, are a necessary condition or circumstance, without which, the doctrine is not capable of being proved by any miracles. The doctrine must be in itself possible and capable of being proved, and then miracles will prove it to be actually and certainly true. Boyle's Lecture, Sermons, &c. p. 226, &c.

The sufficiency of the argument in attestation to the truth of Christianity, deduced from miracles, has been controverted by several sceptical writers; and particularly by Mr. Hume. It has been alleged, that experience is the ground of the credit we give to human testimony. Having found in past instances that men have informed us right, we are disposed to believe them in future instances; but this experience is by no means constant; for we often find that men prevaricate and deceive. On the other hand, what assures us of those laws of nature, in the violation of which the notion of a miracle consists, is, in like manner, experience. But this is an experience that has never been interrupted. A miracle, it has been said, is an event which, from

from its nature, is inconsistent with all the experience we ever had, and in the highest degree incredible and extraordinary. In the falshood of testimony, on the contrary, there is no such inconsistency, nor any such incredibility, scarcely any thing being more common. No regard, therefore, can be due to the latter, when it is applied as a proof of the former. According to this reasoning, applied to the case of miracles, we are to consider which is most likely, that such events should happen, or that men should either deceive or be deceived. And as there is nothing more unlikely than the former, or much more common than the latter, particularly where religion is concerned, it will be right to form a "general resolution, never to lend any attention to accounts of miracles, with whatever specious pretexts they may be covered." "It is," says Mr. Hume in his "Essay on Miracles," "a maxim worthy of our attention, that no testimony is sufficient to establish a miracle, unless the testimony be of such a kind, that its falshood would be more miraculous than the fact which it endeavours to establish. And even in that case, there is a marked distinction of arguments, and the superior only gives us an assurance suitable to that degree of force, which remains after deducting the inferior. When any one tells me that he saw a dead man restored to life, I immediately consider with myself, whether it be more probable that the person should either deceive or be deceived, or that the fact he relates should really have happened. I weigh the one miracle against the other, and according to the superiority which I discover, I pronounce my decision, and always reject the greater miracle. If the falshood of his testimony would be more miraculous than the event which he relates, then, and not till then, can he pretend to command my belief or opinion." For such reasons as these Mr. Hume asserts, "that the evidence of testimony, when applied to a miracle, carries falshood on the very face of it, and is more properly a subject of derision than of argument;" and that whoever believes the truth of the Christian religion "is conscious of a continued miracle in his own person, which subverts all the principles of his understanding, and gives him a determination to believe what is most contrary to custom and experience." The principles on which this objection is founded, says an excellent writer, Dr. Price, are chiefly, "that the credit we give to testimony is derived *solely* from experience:" "that a miracle is a fact *contrary* to experience:" "that the previous improbability of a fact is a proof against it, diminishing, in proportion to the degree of it, the proof from testimony for it;" and "that no testimony should ever gain credit to an event, unless it is more extraordinary that it should be false, than that the event should have happened." Our author, in his examination of these opinions, begins with considering the nature and foundation of that assurance which experience gives us of the laws of nature. After a variety of ingenious observations on the nature and degree of the assurance with regard to future events, which we derive from past experience of the course of nature, this writer states the result of the whole in the following manner. "Upon observing, that any natural event has happened often or invariably, we have only reason to expect that it will happen again, with an assurance proportioned to the frequency of our observations. But we have no *absolute proof* that it will happen again in any future trial; nor the least reason to believe that it will always happen. For aught we know, there may be occasions on which it will fail, and secret causes in the frame of things which *sometimes* may counteract those by which it is produced." In examining the ground of the regard we pay to human testimony, our author concludes, that it is not experience only, or that kind of experience to which we owe our expectation of natural events, the causes of which are unknown to us. We feel in ourselves, that a regard to truth is one principle in human nature; and we know, that there must be such a principle in every reasonable being; and to this chiefly is owing the credit we give to human testimony. It is plain and capable of the most satisfactory proof, that there is a great difference between the conviction produced by testimony, and the conviction produced by experience, and the one is capable of being carried much higher than the other. Besides, the greatest part of what is commonly called experience is merely the report of testimony. "Our own experience," says Dr. Adams, "reaches around, and goes back but a little way; but the experience of others, on which we chiefly depend, is derived to us wholly from testimony." In proportion, therefore, as we weaken the evidence of testimony, we weaken also that of experience; and in comparing them we ought in reason to oppose to the former, only what remains of the latter after that part of it which is derived from the former, that is, after much the greatest part of it, is deducted. From this reasoning it follows, that there is no absurdity in using *testimony* for proving a *miracle*. This is not using a *feebler* experience to overthrow another of the same kind, which is *stronger*; but using an argument to establish an event, which yields a direct and positive proof, and is capable of producing the strongest conviction, to overthrow another founded on different principles, and which, at best, can prove no more than that, previously to the event, there would have appeared to us a presumption against its happening.

Moreover, a miracle cannot, with propriety, be styled an event *contrary* to experience; as Mr. Hume asserts. A miracle, says our author, is more properly an event *different* from experience than *contrary* to it; nor can it be proper to assert, as Mr. Hume does, that in every case of a miracle supported by testimony, there is a contest of two opposite experiences, the strongest of which ought always to determine our judgments. In Mr. Hume's argument there is, as Dr. Price intimates, a fundamental error: it is where he declares, that, "if, previously to an event, there was a greater probability *against* its happening, than there is *for* the truth of the testimony endeavouring to establish it, the former destroys the latter, and renders the event unlikely to have happened in proportion to its superiority." This is evidently a fundamental point in Mr. Hume's objection; or, in other words, in the principle, that no testimony should engage our belief, except the improbability in the falshood of it is greater, than that in the event which it attests. In order to evince the erroneousness of this principle, what our author wishes to be considered is, the degree of improbability which lies against almost all the common facts, independently of the evidence of testimony for them. In many cases of particular histories, which are immediately believed on the slightest testimony, there would have appeared to us, previously to this testimony, an improbability of almost infinity to one against their reality, as any one must perceive, who will think how sure he is of the falshood of all facts, that have *no* evidence to support them, or which he has only *imagined* to himself. It is then very common for the slightest testimony to overcome an almost infinite improbability. That this is the case our author has rendered evident by a train of satisfactory reasoning, which we have not room to introduce. For further particulars we must refer to the author himself, *ubi infra*.

Archdeacon Paley has, with his usual perspicuity, examined the objection of Mr. Hume against the credibility of miracles,

miracles, which we have above ftated. Having premifed that there is no antecedent improbability of a revelation from God, but that the contrary is the cafe; and that there is no way in which fuch a revelation can be made but by miracle, it is not improbable that miracles fhould be wrought. The improbability which arifes from the miraculous nature of the things related is not greater than the original improbability that fuch a revelation fhould be imparted by God. Admitting then, that a revelation is not improbable, and that if there be a revelation, there muft be miracles, the objection that no human teftimony can render miracles credible muft appear to be unfounded. Mr. Hume's principle, concifely ftated, is this; that the truth of a miracle is contrary to experience, but it is not contrary to experience that teftimony fhould be falfe. Our author obferves that the term "experience," and the phrafes "contrary to experience," or "contradicting experience," are ambiguous, and require explanation. Strictly fpeaking, the narrative of a fact is *then* only contrary to experience, when the fact is related to have exifted at a time and place, at which time and place, we, being prefent, did not perceive it to exift. In this cafe the affertion is contrary to experience, properly fo called; nor is it of any confequence, whether the fact be of a miraculous nature or not. This is a contrariety which no evidence can furmount. But this is not the experience, nor contrariety, which Mr. Hume meant to exprefs in his objection; fhort of this, no intelligible fignification can be affixed to the term "contrary to experience," but one, *viz.* that of not having experienced any thing fimilar to the thing related, or fuch things not being generally experienced by others. Now the improbability which arifes from the want of experience, not contradiction to it, is only equal to the probability there is, that if the thing were true, we fhould experience things fimilar to it, or that fuch things would be generally experienced. Suppofing then that miracles were wrought upon the firft promulgation of Chriftianity, when nothing but miracles could decide its authority, is it certain that fuch miracles would be repeated fo often, and in fo many places, as to become objects of general experience? Is it a probability approaching to certainty? Is it a probability of any great ftrength or force? Is it fuch as no evidence can encounter? And yet this probability is the exact *converfe*, and therefore the exact meafure of the improbability which arifes from the want of experience, and which Mr. Hume reprefents as invincible by human teftimony. The force of experience, continues our author, is founded in the prefumption, either that the courfe of nature is invariable, or that, if it be ever varied, variations will be frequent and general. Has the neceffity of this alternative been demonftrated? Calling the courfe of nature the agency of an intelligent Being, is there any good reafon for judging this ftate of the cafe to be probable? Ought we not rather to expect, that fuch a Being, upon occafions of peculiar importance, may interrupt the order which he had appointed, yet that fuch occafions fhould return feldom; that thefe interruptions confequently fhould be confined to the experience of a few; that the want of it, therefore, in many, fhould be matter neither of furprife nor objection? But it is faid, that in our account of miracles, we affign effects without caufes, or we attribute effects to caufes inadequate to the purpofe, or to caufes of the operation of which we have no experience. Of what caufes, we may afk, and of what effects, does the objection fpeak? If it be anfwered that, when we afcribe the cure of the palfy to a touch, of blindnefs to the anointing of the eyes with clay, or the raifing of the dead to a word, we lay ourfelves open to this imputation; we reply, that we afcribe no fuch effects to fuch caufes. We perceive no virtue or energy in thefe things more than in other things of the fame kind. They are merely figns to connect the miracle with its end. The effect we afcribe fimply to the volition of the Deity; of whofe exiftence and power, not to fay of whofe prefence and agency, we have previous and independent proof. We have therefore all we feek for in the works of rational agents, a fufficient power and an adequate motive. In a word, once believe that there is a God, and miracles are not incredible. Mr. Hume, as our author proceeds, ftates the cafe of miracles to be a conteft of oppofite improbabilities, that is to fay, a queftion whether it be more improbable that the miracle fhould be true, or the teftimony falfe. In this ftatement, however, there is a want of argumentative juftice; becaufe, in defcribing the improbability of miracles, he fuppreffes all thofe circumftances of extenuation, which refult from our knowledge of the exiftence, power, and difpofition of the Deity, his concern in the creation, the end anfwered by the miracle, the importance of that end, and its fubferviency to the plan purfued in the works of nature. As Mr. Hume has reprefented the queftion, miracles are alike incredible to him who is previoufly affured of the conftant agency of a divine Being, and to him who believes that no fuch being exifts in the univerfe. They are equally incredible, whether related to have been wrought upon occafions the moft deferving, and for purpofes the moft beneficial, or for no affignable end whatever, or for an end confeffedly trifling or pernicious. This furely cannot be a correct ftatement. In adjufting alfo the other fide of the balance, the ftrength and weight of teftimony, the author has provided an anfwer to every poffible accumulation of hiftorical proof, by telling us, that we are not obliged to explain how the ftory or the evidence arofe. The archdeacon thinks that we are obliged to do this. The exiftence of the teftimony is a phenomenon: the truth of the fact folves the phenomenon. If we reject this folution, we ought to be able to recur to fome other; and none even by our adverfaries can be admitted, which is not confiftent with the principles that regulate human affairs and human conduct at prefent, or which makes men *then* to have been a different kind of beings from what they are now. Our author adds; the fhort confideration, which, independently of every other, convinces me, that there is no folid foundation in Mr. Hume's conclufion, is the following: when a theorem is propofed to a mathematician, the firft thing he does with it is to try it upon a fimple cafe; and if it produce a falfe refult, he is fure that there muft be fome miftake in the demonftration. Let us proceed in this way with what may be called Mr. Hume's theorem. "If 12 men, whofe probity and good fenfe I had long known, fhould ferioufly and circumftantially relate to me an account of a miracle wrought before their eyes, and in which it was impoffible that they fhould be deceived; if the governor of the country, hearing a rumour of this account, fhould call thefe men into his prefence, and offer them a fhort propofal, either to confefs the impofture, or fubmit to be tied up to a gibbet; if they fhould refufe with one voice to acknowledge that there exifted any falfhood or impofture in the cafe; if this threat were communicated to them feparately, yet with no different effect; if it was at laft executed; if I myfelf faw them, one after another, confenting to be racked, burnt, or ftrangled, rather than give up the truth of this account; ftill, if Mr. Hume's rule be my guide, I am not to believe them. Now I undertake to fay, that there exifts not a fceptic in the world who would not believe them; or who would defend fuch incredulity."

Having explained the nature and evinced the credibility of miracles in general, we might take occafion to illuftrate the evidence which the miracles, that are recorded by the founders and advocates of Chriftianity, afford in atteftation of its truth and

and divine origin. Admitting the credibility of miracles in general, and of the Christian miracles in particular, we might allege many direct, collateral, and presumptive arguments in proof of their reality. The miracles which the New Testament records, are in their own nature and design worthy of the wisdom, power, and benevolence to which they are ascribed. If we consider these miracles in themselves, in their number and variety as well as their nature, in the state and circumstances of those who were the objects of them, in the unostentatious and yet public manner of their being wrought, in the multitude and also the disposition and character of those who witnessed them, in the extent and permanence of their effects, and in their connection with the reception and prevalence of the religion which they were intended to introduce and establish, we cannot question their reality: we cannot discover any traces of collusion and deceit: we cannot hesitate in allowing them to be such as the evangelical historians have described and recorded. As for the historians themselves, their character and conduct, their labours and sufferings undergone and endured in attestation to the truth of the facts which they relate, and the death which they preferred to the infamy of renouncing their belief of them, evince, in the most satisfactory manner, their integrity, and preclude every suspicion of fraud and imposture. This testimony, transmitted to us with every attendant circumstance of credibility, claims our confidence, and whilst we believe the reality of the miracles which they record, we cannot demur in tracing the religion which, by their writings and teaching, they have communicated to the world, to a divine origin. But we must desist from enlarging, and refer our readers to Price's Four Dissertations, Diss. 4. Paley's View of the Evidences of Christianity, vol. i. Adams's Ess. on Miracles. Bishop Douglas's Criterion. Campbell's Dissertation on Miracles. See CHRISTIAN *Religion*, REVELATION, *New* TESTAMENT, and other similar articles in the Cyclopædia.

The Romans attribute miracles to their emperors Adrian and Vespasian. The church of Rome abounds in miracles: if we believe their writers, some of their monks have wrought more miracles than all the apostles; and this without any visible necessity for them.

Mr. Hume has confronted the miracle of Vespasian related by Tacitus, that performed in a Spanish church, and related by cardinal de Retz, and the cures said to be performed at the tomb of the abbé Paris, in the early part of the last century, with those of the New Testament. With respect to the latter miracles, we observe, that the patients who frequented the abbé's tomb were so affected with their devotion, their expectation of relief, the place, the solemnity, and above all, by the sympathy of the surrounding multitude, that many of them were thrown into violent convulsions, which convulsions, in certain instances, produced a removal of disorders, depending upon obstruction. The above account may now be admitted with less difficulty, because the same or similar effects have been experienced in the operations of *animal magnetism*. See on the subject of these miracles, Douglas's Criterion.

As full as the Romish church has pretended to be of saints, it has been a rule with them, that none should be ever canonized till there be a good proof of their having wrought miracles. So that were all those allowed to be good miracles, and to have happened out of the common order of nature, they are so numerous, that one would be tempted to think there was no order or law of nature at all.

Some Protestant writers have maintained, that the power of working miracles was exercised in the Christian church during the three or four first centuries; in proof of which they allege that of the thundering legion, &c. But Dr. Middleton, in his Free Inquiry into the miraculous Powers, which are said to have subsisted in the Christian church, &c. has maintained a very different opinion. And it must be acknowledged, that the evidence of the facts is, to say the least of it, very doubtful.

The many and stupendous miracles which are said to have been wrought by the Christian missionaries, who were sent to convert the barbarous nations, in the eighth century, have lost, in our times, the credit they obtained in former ages.

St. Augustine is a strong advocate for miracles. He mentions several, of which he was an eye-witness; and others, of which he was informed by those that were. In the single city of Hippo, he tells us there were seventy miracles wrought in the space of two years, on the building of a chapel in honour of St. Stephen. There are those, however, who set aside the authority of all miracles; thinking it unbecoming the wisdom of God to establish such laws, as that he should find it frequently necessary to supersede. And as the former, from the avowed authority of some miracles, fetch an argument for the truth of all, pleading those which are allowed as well as those which are questioned; so these allege the false ones very unfairly, as conclusions against all.

MIRADOUX, in *Geography*, a town of France, in the department of the Gers, and chief place of a canton, in the district of Lectoure; 7 miles N.E. of Lectoure. The place contains 1655, and the canton 6343 inhabitants, on a territory of $157\frac{1}{2}$ kiliometres, in 12 communes. N. lat. 44°. E. long. 0° 50'.

MIRAFLORES, a town of South America, in the province of Tucuman, on the Salado; 80 miles N.N.E. of St. Miguel de Tucuman.—Also, a town of Peru, in the audience of Lima; 8 miles S. of Lima.

MIRAGE, the name given by the French sailors to an optical phenomenon, on which M. Monge read a memoir to the institute at Cairo, during the French invasion of Egypt. It often happens at sea, that a ship seen at a distance appears as if painted in the sky, and not to be supported by the water. A similar effect was observed by the French in the course of their march through the desert: the villages seen at a distance seemed to be built on an island in the middle of a lake. In proportion as they approached, the apparent surface of the water became narrower; when they were only at a small distance, it disappeared, and the same illusion began, in regard to the next village. M. Monge ascribes this effect to a diminution of the density of the lower stratum of the atmosphere. This diminution in the desert is produced by the increase of heat, arising from that communicated by the rays of the sun to the sand, with which this stratum is in immediate contact. At sea it takes place when, by particular circumstances, such as the action of the wind, the lower stratum of the atmosphere holds in solution a greater quantity of water than the other strata. In this state of things the rays of light, which come from the lower parts of the heavens, having arrived at the surface that separates the less dense stratum from those above it, do not pass through that stratum, but are reflected, and paint in the eye of the observer an image of the heavens, which appearing to him to be below the horizon, he takes it for water, when the phenomenon occurs at land. If he is at sea, he thinks he sees in the heavens all the objects which float on that part of the surface occupied by the image of the heavens. This phenomenon has been considered and explained by several English philosophers. See *Horizontal* REFRACTION.

MIRAGOANE, in *Geography*, a town on the north side of the south peninsula of the island of St. Domingo, and south side of the bight of Leogane, at the head of a bay of its name; 15 miles W. of Petit Goave.

MIRALETUS, in *Ichthyology*, a name given to the species of ray, commonly called by others *raja oculata*. See Raja *Miraletus*.—Also, a name given by Bellonius and others to the Raja *Oxyrinchus*; which see.

MIRAMACHI, or Mirachi, in *Geography*, a port, bay, and river, on the north coast of New Brunswick. The port is at the entrance of the bay. In the river there is a salmon fishery.

MIRAMBEAU, a town of France, in the department of the Lower Charente, and chief place of the district of Jonsac; 12 miles S. of Pons. The place contains 2170, and the canton 15,117 inhabitants, on a territory of 242½ kiliometres, in 19 communes.

MIRANA, a small island in the North Pacific ocean. N. lat. 62° 35′. E. long. 190° 34′.

MIRANDA, a town of Spain, in Navarre; 13 miles S.E. of Estalla.—Also, a town of Naples, in the country of Molise; 11 miles W. of Molise.

Miranda *de Corvo*, a town of Portugal, in the province of Beira, containining about 2700 inhabitants; 15 miles S.E. of Coimbra.

Miranda *de Duero*, a town of Portugal, in the province of Tras-los-Montes, situated in a barren mountainous country on the Duero, on the frontiers of Spain; the see of a bishop. It is but a poor mean town; 28 miles S.E. of Braganza. N. lat. 41° 24′. W. long. 5° 56′.

Miranda *d'Ebro*, a small town of Spain, in Old Castile, beautifully situated on the Ebro, over which is a noble bridge of eight arches. It contains a large square, embellished with fountains. It is environed by mountaine, on whose brow are the remains of a castle, and the ruins of several towers, which formerly guarded access to it. A copious stream flows from the mountain, which serves to work several mills in its vicinity. The town was erected into an earldom, in the 14th century, by Henry IV., in favour of Don Diego de Zuniga, and is now governed by its alcade; 32 miles N.E. of Burgos.

MIRANDE, a town of France, and principal place of a district, in the department of the Gers. The place contains 1558, and the canton 10,316 inhabitants, on a territory of 292½ kiliometres, in 49 communes. N. lat. 43° 31′. E. long. 0° 28′.

MIRANDELA, a town of Portugal, in the province of Tras-los-Montes; 30 miles S.W. of Braganza. N. lat. 41° 25′. W. long. 6° 58′.

MIRANDOLA, *Duchy of*, a small principality of Italy, almost surrounded by the duchy of Mantua. This principality shared the fate of Modena, and became a part of the Cisalpine republic, now the kingdom of Italy.—Also, a city of Italy, in the department of Panaro; lately capital of a duchy united with Modena, strong, and defended by a citadel; the see of a bishop. It contains, besides the cathedral, 15 churches; 14 miles N.N.E. of Modena. N. lat. 44° 50′. E. long. 11° 5′.

MIRANO, a town of Italy, in the Paduan, on the river Musan, containing about 3120 inhabitants; 12 miles N.E. of Padua.

MIRAPORVOS, a rocky islet among the Bahamas, near the south-west coast of Crooked island. N. lat. 21° 55′. W. long. 74° 46′.

MIRAPOUR, a town of Bengal; 30 miles E. of Burdwan.—Also, a town of Hindoostan, in the circar of Schaurunpour; 15 miles N. of Merat.

MIRASOLE, a town of Italy, in the department of the Mincio; 9 miles S.S.E. of Mantua.

MIRAVALLES, a town of Spain, in the province of Biscay; 9 miles S. of Bilboa.

MIRAVEL, a town of Spain, in New Castile, on the side of a hill, defended by a strongly fortified castle; 12 miles S.S.W. of Placencia.

MIRAW, or Merow, a town of Moravia, in the circle of Olmutz; 22 miles N.W. of Olmutz.

MIRAY Bay, a bay on the coast of the island of Cape Breton. Large vessels may go up six leagues, have good anchorage, and lie secure from all winds. N. lat. 46° 5′. W. long. 59° 49′.

MIRBELIA, in *Botany*, named by the writer of this article, in honour of Mons. Mirbel, Superintendant of the botanic garden at Malmaison, member of various learned academies, and author of several excellent works on the anatomy and physiology of vegetables. His elucidations of their reticulated structure having excited much attention, the present plant, remarkable for the reticulated aspect of its leaves, was judged more particularly suited to perpetuate his name. Smith in Sims and Konig's Annals of Botany, v. 1. 511. Brown in Ait. Hort. Kew. ed. 2. v. 3. 21.—Class and order, *Decandria Monogynia*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminosæ*, sect. 4. Juss.

Gen. Ch. *Cal.* Perianth inferior, bell-shaped, two-lipped, without appendages; somewhat angular at the base: upper lip of two abrupt, oblique, parallel segments; lower of three lanceolate, acute, equal ones, dilated at the base, rather shorter than the upper: permanent. *Cor.* papilionaceous, of five petals, about twice the length of the calyx; standard inversely heart-shaped, recurved, with a short, broad, linear claw; wings lanceolate-oblong, rather shorter than the standard, with a tooth at the upper edge; keel shorter than the wings, of two cohering, half-ovate petals, with linear claws. *Stam.* Filaments ten, awl-shaped, equal, contained within the keel, inserted into the receptacle; anthers roundish, incumbent. *Pist.* Germen superior, ovate-oblong; style thick and short, bent upwards; stigma capitate. *Peric.* Legume heart-shaped, pointed, tumid, with a groove at each side, of two cells, at length separating from each other; the partition double, from both the inflexed margins of each valve. *Seeds* solitary, attached to the lower edge of each valve, oval, compressed, with a circular bordered scar.

Eff. Ch. Calyx five-cleft, two-lipped. Corolla papilionaceous. Style reflexed. Stigma capitate. Legume of two cells, tumid, with two seeds; the partition double.

1. M. *reticulata*. Reticulated Mirbelia. Sm. as above. Tr. of Linn. Soc. v. 9. 265. Venten. Malmais. t. 119. (Pultenæa rubiæfolia; Andr. Repos. t. 351.)—Leaves linear-lanceolate, veiny.—Native of the neighbourhood of Port Jackson, New South Wales. *Dr. White*. It was very early raised from seeds in this country, and is kept in the green-house, in light sandy peat earth, with little water in winter, but as much air as possible; flowering from May to August, the second year after being sown. The *stem* is shrubby, much branched, and very bushy, smoothish, leafy, angular; the branches mostly ternate, straight, and spreading. *Leaves* almost always three in a whorl, rarely opposite only, on very short broad footstalks, spreading, an inch long, linear-lanceolate, sometimes elliptical and shortened, smooth, revolute, slightly crenate or wavy, tipped with a spine, furnished with one rib and many transverse veins; paler and most opaque beneath. *Flowers* in little axillary and terminal tufts, on short *stalks*; with a pair of linear *bracteas* in the middle of each stalk. *Corolla* light purple, with a radiating reddish stain at the base of the standard. *Legume* a quarter of an inch long, grey, smooth, transversely veined. It is curious that this shrub should ever have been mistaken

mistaken for a *Rubia*, which was actually the case before it flowered.

2. M. *dilatata*. Lobed-leaved Mirbelia. Brown in Ait. Hort. Kew. n. 2.—Leaves wedge-shaped, dilated and three-cleft at the extremity.—Found by Mr. Brown on the south-west coast of New Holland. This species was sent to Kew, in 1803, by Mr. Peter Good, and flowers in the green-house in May and June. The *stem* is shrubby. We have seen no specimen, nor is any account given of the colour of the *flowers*.

MIRCHOUR, in *Geography*, a town of Hindoostan, in Golconda; 20 miles S.S.E. of Canoul.

MIREBALAIS, an interior town in the French part of the island of St. Domingo; 30 miles N. of Port au Prince.

MIREBEAU, a town of France, in the department of the Coté d'Or, and chief place of a canton, in the district of Dijon; 13 miles N.E. of Dijon. The place contains 1100, and the canton 8578 inhabitants, on a territory of 257½ kiliometres, in 22 communes.—Also, a town of France, in the department of the Vienne, and chief place of a canton, in the district of Poitiers; 12 miles N.N.E. of Poitiers. The place contains 2021, and the canton 7096 inhabitants, on a territory of 192½ kiliometres, in 14 communes. N. lat. 46° 47'. E. long. 0° 16'.

MIRECOURT, a town of France, and principal place of a district, in the department of the Vosges; 13 miles N.W. of Epinal. The place contains 5084, and the canton 11,757 inhabitants, on a territory of 175 kiliometres, in 28 communes. N. lat. 43° 18'. E. long. 6° 13'.

MIREMONT, a town of France, in the department of the Dordogne; 10 miles S.W. of Montignac.—Also, a town of France, in the department of the Upper Garonne; 7 miles S.E. of Muret.

MIRENI, a town of Walachia, on the Ardgis, near its confluence with the Danube; 30 miles S. of Bucharest.

MIREPOIX, a town of France, and principal place of a district, in the department of the Arriege; 18 miles N.E. of Tarascon. The place contains 2819, and the canton 13,589 inhabitants, on a territory of 335 kiliometres, in 37 communes. N. lat. 43° 5'. E. long. 1° 56'.

MIREVELT, Michael Janson, in *Biography*, a portrait painter, born at Delft in 1568. The extreme resemblance of his pictures, the freshness of their colour, and the neatness of their execution, procured Mirevelt a most extraordinary influx of professional occupation; so much, that he is reported by Houbraken to have painted 5000 portraits: for the smallest of which, merely a head, he was paid about 15*l.* sterling; and those of larger sizes in proportion.

He certainly was a very ingenious artist, and, where the talents of Rubens were unknown, must have appeared a luminary of his day; but the superior taste and freedom exhibited in the works of the latter, and afterwards in those of his extraordinary pupil Vandyke, render the works of Mirevelt tame and insipid. He died in 1641.

Mirevelt, Peter, son of the former, and a painter of the same taste, style, and study. By many he is thought fully equal to his father.

MIRGONDA, in *Geography*, a town of Hindoostan, in Dowlatabad; 25 miles S.W. of Beder.

MIRGOROD, a town of Russia, in the government of Kiev; 100 miles E.S.E. of Kiev. N. lat. 50°. E. long. 32° 54'.

MIRIAM, in *Sacred History*, the sister of Aaron, and a prophetess. When Moses had finished his pious effusions in the first hymn on record, after the safe passage of the Red sea, at the head of the whole people of Israel, just escaped from bondage, he was seconded on this occasion by Miriam, "who took a timbrel in her hand, and all the women went out after her with timbrels and with dances, and Miriam answered them, Sing ye to the Lord," &c.

Here is an early instance of women being permitted to bear a part in the performance of religious rites, as well as of vocal music being accompanied by instrumental, and by what was called *dancing*, which was probably nothing more than moving or marching in regulated steps and gesture.

MIRJANAGORE, in *Geography*, a town of Bengal; 15 miles S. of Moorley.

MIRICK, Cape, a cape on the west coast of Africa. N. lat. 19°. W. long. 6° 5'.

MIRIOSITO, a town of European Turkey, in Romania; 24 miles N.E. of Gallipoli.

MIROBRIGA, in *Ancient Geography*, a town of Spain, the scite of which is now occupied by Cividad *Rodrigo*; which see. This town of Leon was built in the reign of Ferdinand II, about the 13th century, and was made a rampart against Portugal. It is situated in a flat and tolerably beautiful country, producing abundance of the necessaries of subsistence. Its plains extend five leagues to the north, and are terminated by a chain of mountains, which are branches of those of Bejar, Pena de Francia, and Geta. The town is fortified, and is the see of a bishop. It has seven gates, and its streets are tolerably regular. Its population amounts to about 10,000 inhabitants. It has a cathedral, a collegiate church, six parish churches, five convents of monks, four of nuns, one seminary, and two hospitals. The river Ague passes close to the town. The ancient Roman aqueduct is destroyed; but the inhabitants have constructed another, which conveys the water requisite for the town and watering of the trees, through the space of three leagues. There are also some fountains out of the walls; and in the extent of the diocese are some medicinal waters, copper, lead, iron, and even gold mines.

MIROPEL, in *Geography*, a town of the duchy of Warsaw; 40 miles W.N.W. of Berdiczow.

MIROPOLBE, a town of Russia, in the government of Cherkov; 88 miles N.N.W. of Charkov. N. lat. 51° 22'. E. long. 34° 34'.

MIROUETTE, in the *Manege*, is used for a dapple-bay.

MIROW, in *Geography*, a town of the duchy of Mecklenburg; 44 miles N. of Spandau.

MIROWITZ, a town of Bohemia, in the circle of Prachatitz; 18 miles N.N.E. of Strakonitz.

MIRROR, a *speculum*, or body, which exhibits the images of objects presented to it by reflection.

The use of mirrors is very ancient. Mention is made of brazen mirrors, or looking-glasses, in Exodus, xxxviii. 8. where Moses is said to have made a "brazen laver, or *bason*, of the looking-glasses of the women continually assembled at the door of the tabernacle." It is true some modern commentators will not allow the mirrors themselves to have been brass; but of glass, only set or framed in brass. But the most learned among the rabbins do all allow, that in those times the mirrors made use of by the Hebrew women in dressing their heads were of metal; and that the devout women, mentioned in this passage, made presents to Moses of all their mirrors, to make the brazen laver. See the Jesuit Bonfrerius's comment on this text. See Glass.

It might likewise be proved, that the ancient Greeks made use of brazen mirrors, from divers passages among the ancient poets.

Mirror, in the more confined sense of the word, is peculiarly used to signify a smooth surface of glass, tinned and quick-

quickfilvered on the back-fide; which exhibits the images of objects oppofed to it. See LOOKING-GLASS.

MIRROR, in *Catoptrics*, denotes any polifhed body impervious to the rays of light, and which of confequence reflects them equally.

Thus water in a deep well or river, and fmooth polifhed metals, are ranked among the number of mirrors.

In this fenfe, the doctrine of mirrors makes the fubject of catoptrics.

Mirrors are made either of glafs, coated with an amalgam of mercury and tin, or of metal, as of platina, of filver, or of an alloy of copper and tin, to which a little arfenic and filver are fometimes added. Mirrors of metal are more perfect than thofe of glafs, becaufe they are free from the inconvenience of a double reflection; but they are more expenfive, and are liable to tarnifh. Where a large mirror is required, with only a weak reflection, we may employ a fingle furface of glafs, the back of the piece being covered with a black coating of fome fubftance differing little from glafs in its refractive denfity, by means of which the fecond reflection is avoided. See SPECULUM.

The doctrine of mirrors is founded on the following general principles.—1. Light reflected from any mirror, or fpeculum, makes the angle of incidence equal to that of reflection; which fee demonftrated under the word REFLECTION.

Hence, a ray of light, as H B, (*Plate* XIII., *Optics*, *fig.* 1.) falling perpendicularly on the furface of a fpeculum D E, will be reflected back upon itfelf: as we find by experience it actually is.

From the fame point of a mirror, therefore, B, there cannot be feveral rays reflected on the fame point; fince, in that cafe, all the angles of incidence muft be equal to the fame angle of reflection C B G, and therefore to each other; which is abfurd. Nor can the ray A B be reflected to two or more points; fince, in that cafe, all the angles of reflection would be equal to the fame angle of incidence A B F; which is likewife abfurd.

2. From every point of a mirror, are reflected rays thrown on it from every point of a radiant object. Since then rays coming from different parts of the fame object, and ftriking on the fame point of the mirror, cannot be reflected back to the fame point; the rays which flow from different points of the fame radiating object are again feparated after reflection: fo that each point fhews whence it came.

Hence it is, that the rays reflected from mirrors exhibit the objects to view. Hence alfo, it appears, that rough uneven bodies muft reflect the light in fuch a manner as that rays coming from different points will be blended or thrown confufedly together.

Mirrors may be divided into *plane*, *concave*, *convex*, *cylindrical*, *conical*, *parabolical*, and *elliptical*.

MIRRORS, *Plane*, are thofe which have a plane or flat furface.

Thefe, by a popular name, we call *looking-glaffes*.

For the manner of making plane mirrors, or fpecula, fee LOOKING-GLASS.

MIRRORS, *Laws and Phenomena of Plane*. 1. In a plane mirror, every point of an object, as A, (*Plate* XIII. *Optics*, *fig.* 2.) is feen in the interfection B, of the cathetus of incidence A B, with the reflected ray C B.

Let C D and F E be two reflected rays, correfponding to the incident rays A D, A E: then, fince the vertical angle C D G = E D B; and the angle of reflection C D H = A D G the angle of incidence, A D H will be = C D G = E D B. And H E F = D E B, and H E F = A E G, therefore D E B = A E G. But A E G + A D E, as well as B E D + B D E, are lefs than two right angles; confequently the reflected rays F E and C D meet in B, and in the equiangular triangles A D E and D E B, having D E common, D B = D A. Wherefore, fince the angle B D G = C D H = A D G, the angles at G will be equal, and confequently A B perpendicular to H G: *i. e.* A B is the cathetus of incidence: and, therefore, the reflected rays F E and C D meet with the cathetus of incidence A B in the fame point B: and the radiant point A is feen in B.

Hence, 1. As all the reflected rays meet with the cathetus of incidence in B; by whatever reflected ray the radiant point A be feen, it will ftill appear in the fame place. Confequently, any number of perfons, viewing the fame object in the fame mirror, will all fee it in the fame place behind the mirror. And hence it is, that the fame object has only one image, and that we do not fee it double with both eyes.

Hence, alfo, the diftance of the image B, from the eye C, is compounded of the ray of incidence A D, and the reflected ray C D: and the object A radiates reflectedly in the fame manner as it would do directly, were it removed into the place of the image.

2. The image of a radiant point, B, appears juft fo far behind a plane mirror, as the radiant point is before it: becaufe A G = B G.

Hence, if the mirror H G be placed horizontally, the point A will feem fo much below the horizon, as it is really elevated above it; confequently, erect objects will appear as if inverted; and therefore men ftanding on their feet, as if on their heads. Or, if the mirror be faftened to the ceiling of a room, parallel to the horizon, objects on the floor will appear above the ceiling as much as they really are below it; and inverted.

3. In a plane mirror the images are perfectly fimilar, and equal to the objects; for every point of the object is feen in the cathetus of incidence, and the mirror bifects that part of it which is intercepted between the radiant point and its image. And hence the ufe of mirrors as looking-glaffes.

4. In a plane mirror, things on the right hand appear as on the left; and *vice verfâ*.

Hence, alfo, we have a method of meafuring any inacceffible altitude, by means of a plane mirror. Thus, the mirror being placed horizontally in C (*fig.* 3.), retire from it till fuch time as the top of the tree be feen in it. Meafure the height of the eye D E, the diftance of the ftation from the point of reflection E C, and the diftance of the foot of the tree from the fame: then to E C, C B, and E D, find a fourth proportional A B. This is the altitude fought.

5. If a plane mirror A E (*fig.* 4.) be inclined to the horizon E H, in an angle of 45 degrees, an object C B perpendicular to it will appear parallel, I K, and the horizontal object L B perpendicular in M K.

For produce B C till it meets the mirror in A; then as H is a right angle, and E = 45°, A will be = 45°: therefore, if from B be drawn B G perpendicular to the mirror A E, A B G will be = 45°; and A G = G B. Let G K be = G B, and the image of B will be in K; draw K A, and becaufe K G = G A and G a right angle, K will be = 45°, and therefore K A parallel to E H. In the fame manner it may be fhewn, that the point C would appear in I, and confequently the image I K will be parallel to the horizon E H; and *vice verfâ*. Hence, the eye being placed beneath the mirror, the earth will appear perpendicularly over it: or if placed over the earth will appear

appear perpendicularly under it. Hence, alſo, a globe deſcending down a plane a little inclined, may, by means of a mirror, be exhibited as mounting up a vertical plane, to the great ſurprize of ſuch as are unacquainted with catoptrics. And hence we have a method of repreſenting ourſelves as if flying: for a mirror inclined to the horizon under an angle of 45°, we have obſerved, will repreſent vertical objects as if horizontal; conſequently, a large mirror being ſo diſpoſed, as you advance towards it, you will ſeem to move horizontally; and nothing will be wanting to the appearance of flying, but to ſtrike out the arms and legs. It muſt be added, however, that as the floor is elevated along with you, your feet will ſtill be ſeen to walk as along a vertical plane. To deceive the eye entirely, therefore, it muſt be kept from the feet.

6. If the object A B (*fig.* 5.) be parallel to the ſpeculum C D, and equally diſtant from it, with the eye; the reflecting line C D will be half the length of the object A B.

Let the eye O be in the object A B, or let the ſpectator view himſelf in a glaſs. Since A B is parallel to C D, the image G H will be parallel to it likewiſe. From O let fall O L perpendicular to C D, which, continued to I, will be alſo perpendicular to G H; therefore, O L and O I will be the reſpective altitudes of the triangles O C D and O G H, which triangles, having the angles $x = o$ and $u = y$, are ſimilar: conſequently C D : G H :: O L : O I; and as O L $= \frac{1}{2}$ O I, by art. 2. above, C D will be $= \frac{1}{2}$ G H $= \frac{1}{2}$ A B.

And hence, to be able to ſee the whole body in a plane mirror, its height and breadth muſt be half your height and breadth. Conſequently the height and breadth of any object to be ſeen in a mirror being given, we have alſo the height and breadth of the mirror in which the whole object will appear, at the ſame diſtance with the eye.

Hence, alſo, as the length and breadth of the reflecting part of the ſpeculum are ſubduple of thoſe of the object to be reflected; the reflecting part of the mirror is to the ſurface reflected in a ſubquadruple ratio. Conſequently, the reflecting portion being a conſtant quantity, if in any place you ſee the whole body in a mirror, you will ſee it in every other place, whether you approach nearer or recede farther from it.

7. If an object A B (*fig.* 6.) be parallel to the mirror I F; the length of the reflected line A B is to the reflecting part of the ſpeculum C D as the ſum of the incident and reflected rays B D + D O to the reflected ray O D; or as the ſum of the diſtances of the eye and of the object from the ſpeculum, *viz.* O I + B F to the diſtance of the eye O I. For G E : C D :: O E : O D; *i. e.* becauſe G E = A B, and D E = D B, A B : C D :: O D + D B : O D. Moreover, O E : O D :: O K : O I, therefore G E : C D :: O K : O I; conſequently, ſince I K = F E = B F, and G E = A B, we ſhall have A B : C D :: O I + B F : O I.

8. A ſpectator will ſee his own image as far beyond the ſpeculum as he is before it; and as he moves to or from the ſpeculum, his image will, at the ſame time, move towards or from him on the other ſide, but apparently with a double velocity, becauſe the two motions are equal and contrary. In like manner, if while the ſpectator is at reſt, an object be in motion, its image behind the ſpeculum will be ſeen to move at the ſame rate. And if the ſpectator moves, the images of objects that are at reſt will appear to approach or recede from him, after the ſame manner as when he moves towards real objects.

9. If ſeveral mirrors, or ſeveral fragments or pieces of a mirror, be all diſpoſed in the ſame place, they will only exhibit an object once.

10. If two plane mirrors, or ſpecula, meet in any angle, the eye, placed within that angle, will ſee the image of an object placed within the ſame, as often repeated as there may be catheti drawn determining the places of the images, and terminated without the angle.

Hence, as the more catheti, terminated without the angle, may be drawn as the angle is more acute; the acuter the angle, the more numerous the images. Thus Z. Traber found, at an angle of one-third of a circle, the image was repreſented twice, at $\frac{1}{4}$ thrice, at $\frac{1}{6}$ five times, and at $\frac{1}{12}$ eleven times.

Farther, if the mirrors be placed upright, and ſo contracted; or if you retire from them, or approach to them, till the images reflected by them coaleſce, or run into one, they will appear monſtrouſly diſtorted: thus, if they be at an angle ſomewhat greater than a right one, the image of your face will appear with only one eye; if the angle be leſs than a right one, you will ſee three eyes, two noſes, two mouths, &c. At an angle ſtill leſs, the body will have two heads. At an angle ſomewhat greater than a right one, at the diſtance of four feet, the body will be headleſs, &c. Again, if the mirrors be placed, the one parallel to the horizon, the other inclined to it, or declined from it, it is eaſy to perceive that the images will be ſtill more romantic. Thus, one being declined from the horizon to an angle of 144 degrees, and the other inclined to it, a man ſees himſelf ſtanding with his head to another's feet.

Hence it appears, how mirrors may be managed in gardens, &c. ſo as to convert the images of thoſe near them into monſters of various kinds; and ſince glaſs mirrors will reflect the image of a lucid object twice or thrice, if a candle, &c. be placed in the angle between two mirrors, it will be multiplied an infinite number of times. On theſe principles are founded various catoptric machines, ſome of which repreſent objects infinitely multiplied and diſtorted; others infinitely magnified, and ſet at vaſt diſtances.

MIRRORS, *Burning*. See BURNING-*Glaſs*.

MIRRORS, *Convex*, are thoſe whoſe ſurface is convex.

Note, by *convex* ſurfaces, authors generally mean ſuch as are *ſpherically convex*.

Manner of preparing or making convex Specula, or *Mirrors.* —There are various methods uſed by divers artiſts; particularly as to the matter or compoſition for the ſilvering. One of the beſt that is known is given us by Wolfius, thus:

Melt one part of tin, another of biſmuth, together; and to the melted maſs add two parts of mercury: as ſoon as the mercury begins to evaporate into ſmoke (which it preſently does), the whole compoſt is to be thrown into cold water, and when well cooled the water decanted off. The mixture is then to be ſtrained through a linen cloth two or threefold; and what is thus ſeparated, poured into the cavity of a glaſs ſphere: this ſphere is to be turned gently round its axis till the whole ſurface is covered, the reſt being reſerved for future uſe.

If the ſphere were of coloured glaſs, the mirror will be ſo too. And in the ſame manner may conic, elliptic, cylindric, and other mirrors, be made.

How they may he made of metal, ſee under *Concave* MIRROR. See alſo SPECULUM.

MIRRORS, *Laws or Phenomena of Convex.* 1. In a ſpherical convex mirror H C I (*fig.* 7.), the reflected ray E M concurs

concurs with the cathetus of incidence D L, and the incident ray D N with the cathetus of reflection E L, between the tangent A B, and the centre L. For the perpendiculars, or catheti of incidence, obliquation, and reflection, are in the plane of reflection, and, therefore, in the plane which touches the speculum in the point of incidence C; the tangent A C makes a right angle with the cathetus of obliquation F C; but the reflected ray E C, or C M, makes with it an acute angle *u*, and, therefore, falls between the tangent A C, and the cathetus of obliquation C L. Wherefore, since C L and D L meet in the centre L, the reflected ray E M ought to intersect the cathetus of incidence D L between the tangent and the centre. In the same manner it is shewn, that the incident ray D N ought to meet with the cathetus of reflection between the tangent and the centre. Hence, the image of a radiant point appears between the centre and the tangent, because it appears in the concourse of the reflected ray and cathetus of incidence.

2. In a spherical convex mirror, the cathetus of incidence D L (*fig.* 7.) is to D B, the distance of the object from the tangent at the point of reflection C, as L M, the distance of the image from the centre, is to M P, the distance of the image from the tangent. Since $o = x$, and $x = m$, o will be equal to m, and, therefore, the right line C P bisecting the angle D C M, cuts the base D M into two parts, which are in the same proportion with the sides; consequently, D P : P M :: D C : C M; and if D F be drawn parallel to C M, u will be $= p$, and, as $u = y$, $p = y$, and D F = D C. Therefore, since D F (D C) : M C :: D L : M L, D L will be to M L :: D P : P M; and, therefore, D L : D P :: M L : P M. Hence, because D L > D P, and M L > P M; and, therefore, M L much greater than R M, the distance of the image from the centre is greater, but from the tangent less than half the semidiameter; and the image is nearer to the tangent than the centre.

Hence, also, the distance of the object from the tangent is greater than that of the image, and, consequently, the object is farther distant from the speculum than the image.

3. If the arc B D (*fig.* 8.) intercepted between the point of incidence D, and the cathetus A B; or the angle C, formed in the centre of the mirror by the cathetus of incidence A C, and that of obliquation F C, be double the angle of incidence, the image B will appear on the surface of the speculum.

4. If the arc intercepted between the point of incidence and the cathetus; or the angle C, formed in the centre of the mirror by the cathetus of incidence, and the cathetus of obliquation, be more than double the angle of incidence, the image will be without the mirror.

5. If the arc intercepted between the point of incidence, and the cathetus; or the angle, formed in the centre of the mirror by the cathetus of incidence, and that of obliquation, be less than double the angle of incidence, the image will appear within the speculum.

6. In a convex mirror, a remoter point A (*fig.* 9.) is reflected from a point F, nearer the eye O, than any nearer point B in the same cathetus of incidence.

Hence, if the point of the object A be reflected from the point of the mirror F, and the point of the object B from the point of the mirror E; all the intermediate points between A and B will be reflected from the intermediate points of the speculum between F and E; and, consequently, F E will be the line that reflects A B.

Hence, also, a point of the cathetus B seems at a greater distance C*b* from the centre C, than a more remote one, A.

7. A nearer point B (*fig.* 10.) not in the same cathetus with a remoter H, is reflected to the eye O, from a nearer point of the speculum, than the remoter H.

Hence, if the point of an object A be reflected from the point of a mirror C, and the point of the object B, from the point of the speculum D, all upon the same point O; all the intermediate points between A and B will be reflected from all the intermediate points between C and D. Consequently, the image F G of the object B A is contained between the cathetus B E and A E.

8. In a spherical convex mirror the image is less than the object.

And hence the use of such mirrors in the art of painting, where objects are to be represented less than the life.

9. In a convex mirror, the more remote the object the less its image; and, again, the smaller the mirror the less the image.

10. In a convex mirror, the right hand is turned to the left, and the left to the right; and magnitudes perpendicular to the mirror appear inverted.

11. The image of a right line, perpendicular to the mirror, is a right line; but that of a right line either oblique to the mirror, or parallel to it, is convex.

12. Rays reflected from a convex mirror diverge more than if reflected from a plane mirror.

Hence light, by being reflected from a spherical mirror, is weakened; and, consequently, the effects of reflected light are weaker than those of direct. Hence, also, myopes see remote objects more distinctly in a convex mirror, than they do directly.

Rays reflected from a convex mirror of a smaller sphere diverge more than those reflected from a larger. Consequently, the sight is more weakened, and its effects are less considerable in the former case than in the latter.

Mirrors, *Concave*, are those whose surface is concave. These are generally made of a mixed metal.

Note, by *concave*, authors commonly mean *spherically concave*.

Mirrors, *Manner of preparing or making Concave*. First, a mould is to be provided for casting them. In order to this, take clay well dried, pulverize and sift it; mix it up with water, and then strain or filter it; with this work up horse-dung, and hair shred small, till the mass be sufficiently tough; to which, on occasion, may be added charcoal-dust, or brick-dust, well sifted.

Two coarse moulds are then prepared of a gritty stone, the one concave the other convex; which are to be ground by one another with wet sand between, till such time as the one perfectly fits the other. By this means, a perfect spherical figure is acquired.

The mass, prepared before, is now to be extended on a table, by means of a wooden roller, till it be of a thickness proper for the mirror; and then being strewed with brick-dust to prevent its sticking, it is laid over the convex mould, and so gets the figure of the mirror. When this is dry, it is covered with another lay of the same mass; which once dried, both the covers, or segments of the clay, are taken off. The innermost of the two being laid aside, the stone mould is anointed with a pigment prepared of chalk and milk, and the outer cover again put over it.

Lastly, the joining being covered over with the same clay of which the cover is formed, the whole mould is bound together with an iron wire, and two holes are cut through the cover, the one for the melted matter of the mirror to be poured through, the other for the air to escape at, to prevent the mirror's being spoiled with bubbles.

The mould being thus prepared, eight parts of copper, one

one of English tin, and five of bismuth, are melted together; a little of the mixture is taken out with a ladle, and if it be too red, when cold, more tin is put in; if too white, more copper; the mass is then poured into the mould before prepared, and so assumes the figure of a mirror.

Some with ten parts of copper mix four of English tin, and a little antimony and sal ammoniac, stirring the mass about as long as any fumes arise in it: others have other compositions, many of which are described by Schottus and Zahnius.

The mirror, being thus cast, is cemented to a wooden frame, and thus worked to and fro over the convex stone mould, first with water and sand, and, lastly, without sand till it be fit for polishing; the stone mould is then covered with paper, and that is smeared over with tripoli dust, and calx of tin, over which the mirror is worked to and fro till it has got a perfect polish. And in the same manner are glass mirrors polished, excepting that the convex surface is there worked in the concave mould When the mirrors are very large, they are fixed on a table, and first ground with a gritty stone, then with pumice, then with fine sand, by means of a glass cemented to a wooden frame; and, lastly, they are rubbed with calx of tin, and tripoli dust, on a wet leather.

For concave mirrors of glass, the mould is usually made of alabaster; the rest is as in metal mirrors. See SPECULUM, GRINDING, and POLISHING.

MIRRORS, *Laws and Phenomena of Concave*. 1. If a ray, as K I (*fig.* 11.), fall on a concave mirror E I, under an inclination of 60 degrees, and parallel to the axis A B, the reflected ray I B will concur with the axis A B, in the pole of the glass B. Since $m = 60°$, n also will be $= 60°$, and because K I is parallel to the axis A B, $i = 60°$, and $u = 60°$; therefore C B = C I, the radius. Consequently the point B, in which the reflected ray I B concurs with the axis, is in the surface of the speculum. If the inclination of the incident ray be less than 60 degrees, as that of E H, the reflected ray E F will concur with the axis at the distance B F, which is less than a fourth part of the diameter. Since $o = x$, and, on account of the parallels H E and A B, $o = y$, we shall have $x = y$, and, therefore, E F = F C; but C F + E F > E C, and C E = C B; therefore C F + E F > C B: consequently C F > F B; *i. e.* F B is less than half the radius C B, or a fourth part of the diameter. And, universally, the distance of the point F, in which the ray H E concurs with the axis, from the centre C, is to half the radius C D in the ratio of the whole sine, to the cosine of inclination. For by the last demonstration it appears, that F E is = F C; therefore if from F a perpendicular F D be let fall on E C, L C will be $= \frac{1}{2}$ C E; but if C F be taken for the whole sine, C D will be the sine of the angle D F C, or the cosine of the angle D C F; *i. e.* of the inclination D E H; and, therefore, C F is to C D as the whole sine is to the cosine of the inclination.

Hence it is inferred, by calculation, that in a concave spherical mirror, whose breadth subtends an angle of six degrees, parallel rays meet, after reflection, in a part of the axis less than the one thousand four hundred fifty-seventh part of the radius; if the breadth of the concave mirror be 12, 18, 24, 30, 36 degrees; the part of the axis in which the parallel rays meet, after reflection, is less than $\frac{1}{363}$, $\frac{1}{162}$, $\frac{1}{59}$, $\frac{1}{58}$, $\frac{1}{38}$, the radius.

And on this principle it is, that burning glasses are formed.

For since the rays diffused through the whole surface of the concave mirror, after reflection, are contracted into a very small compass, the light and heat of the parallel rays must be prodigiously increased thereby; *viz.* in a duplicate ratio of the breadth of the mirror, and the diameter of the circle in which all the rays are collected; and since the sun's rays are, as to any purposes on earth, parallel, it is no wonder that concave mirrors should burn with so much violence.

From this same principle is likewise deduced a method of representing the images of objects in a dark room; which see under CAMERA *obscura*.

2. A lucid body being placed in the focus F, of a concave mirror E I (*fig.* 12.), the rays, after reflection, become parallel. For parallel rays are by reflection united in a focus; but if the luminous body be in the focus F, that which was before the reflected ray E F will be now the incident ray, and *vice versâ*; therefore the reflected ray E H will now become parallel to the axis A B, and all the reflected rays parallel to one another.

Hence an intense light may be projected to a vast distance, by a lighted candle, &c. placed in the focus of a concave mirror.

Hence also, if the parallel rays be received by another concave mirror, they will again concur in its focus, and burn.

Zahnius mentions an experiment of this kind made at Vienna, where two concave mirrors, the one six, the other three feet diameter, being placed about twenty-four feet apart, with a live coal in the focus of the one, and a match and tinder in the other, the rays of the coal lighted the tinder.

3. If a lucid body be placed between the focus F (*fig.* 13.) and the mirror H B C, the rays, after reflection, will diverge from the axis B A. If the lucid body were in F, the reflected ray C E would be parallel to the axis A B, and, therefore, it would constantly preserve the same distance from the axis. But since D C G > F C G, K C G will be > E C G; and, therefore, C K will fall beyond C E, and cannot be parallel to the axis, but must continually diverge from the axis, the distance from it increasing: whence it follows, that light is weakened by reflection.

4. If a lucid body be placed between the focus F, and the centre G, as in I, the rays, after reflection, will meet in the axis beyond the centre. In this case I H G < F H G, and, therefore, G H A < G H L; consequently, the reflected ray H A recedes from the parallel towards the axis, and its distance from the axis will be continually diminished, till at length it concurs with the axis. But if the lucid body be placed in A, that which was before the reflected ray A H will now become the incident ray, and *vice versâ*. If, therefore, the lucid body be placed beyond the centre G, the rays after reflection will concur with the axis between the focus F and centre G.

Hence, if a candle be placed in I, the image will appear in A; if it be placed in A, its image will be in I: in the intermediate points between I and A, the section of light will be a circle; and that so much the greater, as it is nearer the point of concourse.

5. If a luminous body be placed in the centre of the mirror, all the rays will be reflected back upon themselves; for as they fall perpendicularly on the speculum, they will be reflected into themselves.

Hence, if the eye be placed in the centre of a concave mirror, it will see nothing but itself, and that confusedly, through the whole mirror.

6 If a ray falling from the point of the cathetus *b* (*fig.* 14.) on the convex mirror *b* F, be, together with its reflex I F, continued within the concavity of the mirror, F H will be the incident ray from the point of the cathetus H, and F O its reflex. For *b* F E = I F M; but *b* F E = M

= M F O, and I F M = E F H; therefore M F O = E F H; and, consequently, if H F be taken for the incident ray from the point H, F O will be the reflected ray.

Hence, since the point of the cathetus H is the image of the point *b* in the convex mirror, but the point *b* the image of H in the concave; if the image of an object, reflected by a convex speculum, be seen by a reflection made in its concavity, it will appear like the object itself.

And since the image of an infinite cathetus is less in a convex glass than one-fourth of its diameter; a portion of the cathetus, less than a fourth part of the diameter, may appear of any magnitude required in a concave one. A point, therefore, distant from a concave speculum less than one-fourth of the diameter, must appear behind the mirror at any distance, how great soever.

Since the image of any object, how broad soever, is contained in a convex speculum, between the two lines of incidence of its extreme points; if an object be placed between the two lines, at a distance less than one-fourth of its diameter, the breadth of the image, how great soever, may all appear.

Since then the image of an object included between two lines, at a distance less than one-fourth of the diameter, may exceed the just height and breadth of the object; nay, may be made of any magnitude, how big soever; objects placed between the focus and mirror must appear of enormous magnitudes in concave mirrors; the image being so much the greater in the concave mirror, as it is less in the convex.

In a convex mirror, the image of a remote object appears nearer the centre than that of a nearer object: therefore, in a concave mirror, the image of an object remote from the mirror appears at a greater distance than that of a nearer object, provided the distance of the object from the centre be less than a fourth part of the diameter.

In a convex speculum, the image of a remote object is less than that of a near one: therefore, in a concave one, the image of an object placed between the focus and the mirror, is nearer the focus than the speculum.

The image, therefore, of an object receding continually from a concave speculum, becomes continually greater, provided it do not recede beyond the focus, where it becomes confused; and as it approaches, it grows continually less. In a convex speculum, if the sphere, of which it is a segment, be smaller, the image is smaller than in another of a larger sphere: therefore in a concave, if the sphere, of which it is a segment, be smaller, the image will be larger than in another whose sphere is larger: whence concave mirrors, if they be segments of very small spheres, will do the office of microscopes.

7. If an object A B (*fig.* 15.) be placed between a concave mirror and its focus, its image will appear behind the mirror in an inverted situation. Let A B be the length of the object: since the point A is seen in the cathetus C *a*, and the point B in the cathetus C *b*, the higher point is seen in the higher place *a*, and the lower in the lower *b*; or the object appears behind the mirror in an erect situation. But if A B represent the breadth of the object, it appears in the same manner that the part to the right corresponds with the right, and the left to the left, both of the object and image. However, in direct vision the right hand part of an object corresponds to the left of the spectator, and the left to the right; and, therefore, in a concave speculum, the parts to the left hand of an object between the focus and speculum appear to the right, and the right to the left.

8. If an object A B (*fig* 16.) be placed between the focus and the centre, its image E F will appear inverted, and in the open air, beyond the centre, the eye being placed beyond the centre. For the rays, by which the point A is reflected, concur in the cathetus G F, beyond the centre C in F, and those by which the point B is reflected, concur in the cathetus D F, beyond the centre C in E; therefore the point B radiates on the eye placed beyond E F as from E, and the point A as from F; consequently B is seen in E, and A in F, and the image of the object is seen beyond the centre in an inverted position. 9. If an object E F be placed beyond the centre C, and the eye likewise beyond the centre, the image will appear inverted in the open air, between the centre and the focus. Hence, the inverted images of objects placed beyond the centre, are reflected by a concave mirror, erect; and may be received on a paper applied between the centre and the focus, especially if the room be dark; if the object E F be farther distant from the centre than the focus, the image will be less than the object; because A C is less than E C, and, therefore, A B < E F.

On this principle, concave mirrors, especially those which are segments of large spheres, and are capable of reflecting entire objects, exhibit many pleasing phenomena. Thus, if a man flourish his sword against the mirror, another comes out of it, and meets him with the same motions; and the image of his head coming out of the mirror, if he strike with his real sword, the imaginary sword will strike his real head. If he stretch out his hand, another hand will be stretched out of the mirror, and meet it at a great distance in the open air, &c. And on the same principle are constructed catoptric cistulæ, which, when looked into, exhibit images much bigger than the chest. See CATOPTRIC *cistula*.

10. The image of a right line, perpendicular to a concave mirror, is a right line; but all oblique or parallel lines are concave. For since every point of a line perpendicular to the speculum is in the cathetus of incidence, its image will of course be a right line. But if A B (*fig.* 15.) be parallel, or oblique to the speculum, and C F be drawn from the centre C perpendicular to A B, C A will be greater than C D; and, therefore, as C F = C E, F D > A E; consequently the point D will appear farther behind the speculum than A. Therefore, since *c* is farther distant from D, than *a* from A, and *b* from B, the image *a c b* will appear concave.

MIRRORS, *Cylindrical, Conical, Parabolical,* and *Elliptical,* or specula, are those terminated by a surface respectively cylindrical, conical, parabolical, and sphercidical.

To prepare, or make, cylindrical, conical, parabolical, elliptical, and hyperbolical Mirrors.—For the *cylindrical* and *conical* sort, if they are to be of glass, the method of preparing them is the same as that already laid down for convex mirrors.

If of metal, they are to be made after the manner of concave mirrors, only that the clay moulds there described require other wooden ones of the figure of the mirror.

For *elliptical, parabolical,* and *hyperbolical* mirrors, the mould is to be thus prepared. On a wooden or brazen plane or table, describe the figure of an ellipsis, A B (*fig.* 17.) a parabola, or an hyperbola, C D (*fig.* 18.) after the manner taught under those heads; which done, cut out the figure from the plane with all the accuracy imaginable.

To the elliptic figure fit an axis, as E F, with two fulcra to sustain it, &c. and a handle to move it; lay a quantity of the clay, above described, under it; and turn about the axis by the handle, till the plane A B hath turned, or impressed the elliptical figure exactly upon it.

The axis of the parabolical or hyperbolical figure C D, is to be fixed at the vertex E in such a manner as that it may

may always remain erect; this is to be turned about as above, till it hath given its own figure to the clay applied about it. The part of the mould, thus formed, is to be dried, and either smeared over with fat, or sprinkled with brickdust; then a convex mould is to be made, by putting a quantity of the same clay into the cavity thus formed. This latter is called the *male*, as the former the *female* mould. The male mould, being well dried, is to be applied within the female, in such a manner, as only to leave the intended thickness of the mirror between them. The rest as for concave mirrors.

These mirrors are not made without the utmost difficulty; because, if the moulds be ever so just, the figure of the mirror is apt to be damaged in the grinding. See SPECULUM.

MIRRORS. *Phenomena, or Properties of Cylindrical.* 1. The dimensions of objects corresponding lengthwise to the mirror are not much changed; but those corresponding breadthwise have their figures altered, and their dimensions lessened so much the more, as they are farther from the mirror; whence arises a very great distortion.

2. If the plane of reflection cut the cylindric mirror through the axis, the reflection is performed in the same manner as in a plane mirror; if it cut it parallel to the base, the reflection happens in the same manner as in a spherical mirror; if, lastly, it cut it obliquely, or be oblique to its base, the reflection is the same as in an elliptical mirror. Hence, as the plane of reflection never passes through the axis of the mirror, except when the eye and objective line are in the same plane; nor parallel to the base, except when the radiant point and the eye are at the same height, the reflection, in a cylindrical mirror, is usually the same as in an elliptical one.

3. If a hollow cylindrical mirror be opposed directly to the sun, instead of a focus of a point, the rays will be reflected into a lucid line, parallel to its axis, at a distance somewhat less than a fourth part of its diameter.

Hence arises a method of drawing anamorphoses, *i.e.* wild, deformed figures, on a plane, which appear beautiful and well proportioned, when viewed in a cylindrical mirror.

MIRRORS, *as for Elliptic, Parabolic, Conic*, and *Pyramidal*, we are not much acquainted with their properties: only that in the first, if a ray strike on it from one of its focuses, it is reflected into the other; so that a lighted candle being placed in one, its light will be collected in the other. That the second, inasmuch as all the rays they reflect meet in one point, make the best burning-glasses of all others.

And, lastly, that wild, irregular figures, may be so drawn on a plane, as that, the eye being placed over the axis of the two last, they shall appear beautiful, and well proportioned. (See ANAMORPHOSIS.) For further particulars respecting the theory, materials, construction, and use of mirrors, see GLASS, GRINDING, LENS, MICROSCOPE, SPECULUM, and TELESCOPE.

MIRSERAI, in *Geography*, a town of Persia, in Khorasan; 12 miles W. of Sebsvar.

MIRZAGUNGE, a town of Hindoostan, in Bengal; 27 miles S.S.E. of Mahmudpour.

MIRZAPOUR, a town of Hindoostan, in Bengal; 75 miles S.S.E. of Mahmudpour.—Also, a town of Hindoostan, in Bengal; 12 miles S.W. of Kishenagur.—Also, a town of Hindoostan, in Oude; 33 miles N.E. of Kairabad.—Also, a town of Hindoostan, in Allahabad; 41 miles S.E. of Allahabad. N. lat. 25° 10′. E. long. 82° 49′.

MIRZIN, or WOLCIN, a town of Moravia, in the circle of Iglau; 12 miles E. of Iglau.

MIS, a particle prefixed to divers words, particularly law-terms; denoting some default or defect. As, in *misprision; misdicere, to scandalize one; misdocere, to teach amiss*, &c.

MISA, in *Geography*, a river of Naples, which runs into the Adriatic, N. lat. 43° 43′. E. long. 13° 12′.

MISAGNO, a town of Naples, in the province of Otranto; seven miles S.W. of Brindisi.

MISANDRA, in *Botany*, Juss. 405, one of Commerson's fanciful names, the application of which is not very clear to us. It seems to imply that he was displeased at meeting every where with a superabundance of the male plants of this kind, in the straits of Magellan, and only once with the females, so that he was long unable to judge of the genus; at least this appears to be the conjecture of Jussieu. See GUNNERA.

MISANI, in *Geography*, a town in the island of Corsica; six miles W. of Cervione.

MISANTHROPY, μισανθρωπια, formed of μισος, *hatred*, and ανθρωπος, *a man*, a general dislike or aversion to man, and mankind. In which sense it stands opposed to *philanthropy*, or the love of mankind.

MISAPA, in *Geography*, a river of Mexico, which runs into the gulf of Mexico, N. lat. 18° 12′.

MISARA, a town of Egypt, on the left bank of the Nile; 12 miles S. of Melaui.

MISAVENTURE, or MISADVENTURE, *Homicide by*, in *Law*. See HOMICIDE.

In the case of misadventure, the law presumes negligence, or at least a want of sufficient caution in him who was so unfortunate as to commit it; who, therefore, is not altogether faultless. The penalty inflicted by our laws is said by sir Edward Coke to have been anciently no less than death; though others affirm, with greater reason, that it consisted in a forfeiture, as some say, of all the goods and chattels; according to others, of only part of them, by way of fine or weregild; which was probably disposed of, as in France, for pious uses, or for the benefit of the soul of the deceased. However, the delinquent has now, and has had as early as our records will reach, a pardon, and writ of restitution of his goods as a matter of course and right, only paying for suing out the same; and, to prevent this expence, in cases where the death has notoriously happened by misadventure, or in self-defence, the judges will usually permit, if not direct, a general verdict of acquittal. See HOMICIDE.

Staundford distinguishes between *aventure* and *misaventure*. The first he makes to be mere chance: as if a man, being upon or near the water, be taken with some sudden sickness, and so fall in, and be drowned; or into the fire, and be burnt.

Misaventure, according to him, is when a man comes to his death by some outward violence; as the fall of a tree, the running of a cart-wheel, the stroke of a horse, or the like.

MISCANELLO, in *Geography*, a town of Naples, in Basilicata; 26 miles S.E. of Potenza.

MISCARRIAGE, in *Midwifery*, the birth, or exclusion of a fœtus from the womb before it has attained its maturity.

By some writers, the word miscarriage is confined to deliveries, or births happening before the end of the sixth or seventh month, or before the child has acquired so much strength as to give it a chance of living. Children born in the eighth or early in the ninth month, are only said to have come before their time. (See ABORTION, and CONCEPTION.) The failure in an attempt to perform any thing is also called a miscarriage.

MISCELLANEÆ, in *Botany*, a name given by Linnæus to the 54th of his Natural Orders, and which well expreffes the heterogeneous nature of that order, as it ftands at the end of his *Genera Plantarum*, where fuch various genera are brought together, that his leading idea in this affemblage can hardly be traced. They ftand under eight heads, as follows.

1. *Refeda, Datifca.*
2. *Poterium, Sanguiforba.*
3. *Piftia, Lemna.*
4. *Coriaria;* and *Empetrum* with a mark of doubt.
5. *Achyranthes, Celofia, Amaranthus, Irefine, Gomphrena, Phytolacca*
6. *Nymphæa, Sarracenia.*
7. *Cedrela, Swietenia.*
8. *Telephium.*

In the *Prælectiones in Ord. Nat. Plantarum*, publifhed from the notes of Gifeke and Fabricius, p. 594, this catalogue is much diminifhed, and the 54th order confifts of only the firft four of the above fections, without any remark or explanation.

The manufcript notes of Linnæus, to his own *Genera Plantarum*, here afford us fome affiftance. He has there referred the fecond fection of the above lift, very juftly, to his 35th order, *Senticofæ*, before *Agrimonia*.

The third fection he removes to ord. 15, *Inundatæ*, which is but a flight improvement.

The fifth goes with great propriety to his *Holeraceæ*, ord. 12th.

The fixth to his *Rhoeadeæ*, ord. 27th, with a queftion whether the genera here mentioned be not more akin to *Afarum* and his 11th order, *Sarmentaceæ ;* under which laft however he has expreffed a fufpicion that *Ariftolochia, Afarum* and *Cytinus* may rather belong, with *Nymphæa*, to the 27th.

The feventh fection he reduces to his *Trihilatæ*, ord. 23d, and *Telephium*, which alone makes the eighth, is removed to the *Holeraceæ*.

MISCELLANEÆ is alfo the name of an order of the *Cryptogamia*, according to Schreber, in his Gen. Pl. 753. Under it he comprehends *Equifetum, Lycopodium, Porella, Salvinia, Marfilea, Pilularia,* and *Ifoetes*. Thefe have little affinity, and the order can be confidered merely as a receptacle for what could not well be placed elfewhere, as its name feems to imply.

MISCHARON, in *Geography*, a town of Perfia, in the province of Irak ; 111 miles S.E. of Hamadan.

MISCHIEF, *Malicious*, or *Damage*, in *Law*, is a fpecies of injury to private property, which the law confiders as a public crime. This is fuch as is done, not *animo furandi*, or with an intent of gaining by another's lofs ; but either out of a fpirit of wanton cruelty, or diabolical revenge. Any damage arifing from this mifchievous difpofition, though only a trefpafs at common law, is now by a multitude of ftatutes made penal in the higheft degree. 22 Hen. VIII. c. 11. 43 Eliz. c. 13. 22 & 23 Car. II. c. 7. 4 & 5 W. & M. c. 23. 1 Ann. ftat. 2. c. 9. and 4 Geo. I. c. 12. 12 Ann. ftat. 2. c. 18. 1 Geo. I. c. 48. 6 Geo. I. c. 23. 9 Geo. I. c. 22. (See BLACK *Act*.) 6 Geo. II. c. 37. 10 Geo. II. c. 32. 28 Geo. II. c. 19. 6 Geo. III. c. 36. and 48. and 13 Geo. III. c. 33. 9 Geo. III. c. 29. 13 Geo. III. c. 38. See FELONY.

MISCHKA, in *Geography*, a river of Ruffia, in the country of the Coffacks, which runs into the Don, near Verchnei Tchirkovfkaia.

MISCHKIN, a town of Ruffia, in the government of Jaroflavl ; 60 miles W. of Jaroflavl. N. lat. 58° 42′. E. long. 40° 22′.

MISCHNA, or MISHNA, from שנה, *iteravit*, a part of the Jewifh Talmud.

The Mifchna contains the text ; and the Gemara, which is the fecond part of the Talmud, contains the commentaries ; fo that the Gemara is, as it were, a gloffary on the Mifchna.

The Mifchna confifts of various traditions of the Jews, and of explanations of feveral paffages of fcripture : thefe traditions, ferving as an explication of the written law, and fupplement to it, are faid to have been delivered to Mofes during the time of his abode on the Mount ; which he afterwards communicated to Aaron, Eleazer, and his fervant Jofhua. By thefe they were tranfmitted to the feventy elders, by them to the prophets, who communicated them to the men of the great fanhedrim, from whom the wife men of Jerufalem and Babylon received them. According to Prideaux's account, they paffed from Jeremiah to Baruch, from him to Ezra, and from Ezra to the men of the great fynagogue, the laft of whom was Simon the Juft ; who delivered them to Antigonus of Socho ; and from him they came down in regular fucceffion to Simeon, who took our Saviour in his arms ; Gamaliel, at whofe feet Paul was educated, and laft of all to Rabbi Judah the Holy, who committed them to writing in the Mifchna. But Dr. Prideaux rejecting this Jewifh fiction, obferves, that after the death of Simon the Juft, about two hundred and ninety-two years before Chrift, the Mifchnial doctors arofe, who, by their comments and conclufions, added to the number of thofe traditions, which had been received and allowed by Ezra, and the men of the great fynagogue ; fo that towards the middle of the fecond century, after Chrift, under the empire of Antoninus Pius, it was found neceffary to commit thefe traditions to writing ; more efpecially as their country had confiderably fuffered under Adrian, and many of their fchools had been diffolved, and their learned men cut off ; and, therefore, the ufual method of preferving their traditions had failed. Rabbi Judah, on this occafion, being rector of the fchool of Tiberias, and prefident of the fanhedrim in that place, undertook the work, and compiled it in fix books, each confifting of feveral tracts, which altogether make up the number of fixty-three. (Prid. Connect. vol. ii. p. 468, &c. ed. 9.) This learned author computes that the Mifchna was compofed about the 150th year of our Lord ; but Dr. Lightfoot fays, that Rabbi Judah compiled the Mifchna about the year of Chrift 190, in the latter end of the reign of Commodus ; or, as fome compute, in the year of Chrift 220. Dr. Lardner is of opinion that this work could not have been finifhed before the year 190, or later, and he thinks that it is placed foon enough at the year 180. (Collect. of Jewifh and Heathen Teftimonies, &c. vol. i. p. 178.) Others, however, apprehend, that the Mifchna was not committed to writing till near the middle of the fifth century, alleging that St. Auftin, who died in the year 430, fays exprefsly (Cont. Adverf. Leg. and Proph. lib. ii. c. 1.) that the Jewifh traditions were not in writing. And yet that it was written before 500 feems evident, becaufe in 548 Juftinian interdicted the ufe of it in the fynagogues. Kennicott's State of the Hebrew Text, vol. ii. p. 443.

Thus the book called the Mifchna was formed ; a book which the Jews have generally received with the greateft veneration. The original has been publifhed, with a Latin tranflation, by Surenhufius, with notes of his own, and others from the learned Maimonides, &c. in 6 vols. folio, Amfterd. A.D. 1698—1703. See TALMUD.

It is written in a much purer ftyle, and is not near fo full of dreams and vifions, as the Gemara.

MISCIANO, in *Geography*, a town of Naples, in the province of Otranto; 8 miles W.S.W. of Brindisi.

MISCO, or MISKO. See MIXCO.

MISCONTINUANCE, in *Law*, the same with discontinuance.

MISCOTHINS, in *Geography*, a small tribe of Indians who inhabit between lake Michigan and the Mississippi.

MISDEMEANOUR, or MISDEMESNOR, in *Law*, an offence, or fault, particularly when in the execution of an office. See CRIME.

High crimes and misdemeanours denote offences of a heinous nature, next to high treason.

MISE, a French term, literally denoting expence, or disbursement: it is used in our law-books in divers acceptations. Sometimes for the profits of lands; sometimes for taxes, or taillages; and sometimes for expences, or costs: as *pro misis & custagiis*, for costs and charges in the entries of judgments, &c.

Mise more peculiarly denotes an honorary gift, or customary present, with which the people of Wales used to salute every new king and prince of Wales, at their entrance upon the principality.

Anciently, the mise was given in cattle, wine, corn, &c. for the support of the prince's family; but when that dominion was annexed to the English crown, the gift was changed into money. The county of Flint paid two thousand marks, &c. for the mise.

The county of Chester also paid a mise or tribute of five thousand marks at the change of every owner of the said earldom, for enjoying the privilege of that palatinate. At Chester they have a mise-book, in which every town and village in the county is rated what to pay towards the mise.

Mise is also used in speaking of a writ of right. What in other actions is called an *issue*, in a writ of right is called a *mise* or *me*: so that *to join the mise upon the mere*, is as much as to say, to join issue on the mere right, *i. e.* to join upon this point, whether the tenant or demandant has the more right.

Yet even in a writ of right, if a collateral point be tried, it is there called an *issue*, not a *mise*. See ISSUE.

Mise is also sometimes used corruptly for *mease*, a messuage or tenement.

In some manors, a *mise* or *mease* place is taken for such a messuage or tenement as yields the lord an heriot at the death of the tenant.

MISELAR, in *Geography*, an island in the East Indian sea, of an irregular form, 18 miles long and five broad, near the W. coast of Sumatra. N. lat. 1° 28′. E. long. 97° 56′.

MISEN, MISSEN, or MIZEN, in a *Ship*, denotes either the mast, or sail of that name; but at sea, they always mean the sail when the word *mizen* is used.

This is the hindmost of the fixed sails of a ship, extended sometimes by a gaff, and sometimes by a yard, which crosses the mast obliquely; the fore-end reaching always down to the deck, and the after-end being peeked up as high above the middle of the yard, where it is attached to the mast. The figure of the misen is a trapezium, or parallelogram, one of whose corners is cut off by a diagonal, extended from one of its sides to the opposite corner, which becomes the peek of the misen. Some great ships require two misens; in which case that next the main-mast is called the *main-misen*, and that next the poop the *benaventure misen*.

The use of the misen is, to keep the ship close to a wind; wherefore if a ship is apt to gripe too much, they use no misen. But it is often used when a ship rides at anchor, to back her a-stern; so that she may not foul her anchor, on the turning of the tide; and sometimes a ship lies a-try with her misen only.

MISEN-*mast* is the mast upon which the misen and its top-sail and stay-sails are supported, besides other sails, which are set occasionally, as the driver, ring-tail, &c. See MAST.

MISEN, *Change the*, is an order to bring the misen-yard over to the other side of the mast. *Peek the misen, i. e.* put the misen right up and down the mast.

MISEN, *Set the*, at *Sea*, the word of command to fit the misen-sail right as it should stand. *Spell the misen, i. e.* let go the sheet, and peek it up.

MISEN-*Stay*, in a *Ship*. See STAY.

MISEN-*Yard*. See YARD.

MISENO, CAPE, in *Geography*, a cape on the N. side of the gulf of Naples. N. lat. 40° 48′. E. long. 13° 52′.

MISERE, a river of America, which runs into lake Superior, N. lat. 46° 14′. W. long. 89° 3′.

MISERERE, *have mercy*, the name, and first word of one of the penitential psalms; being that commonly given by the ordinary to such condemned malefactors as are allowed the benefit of the clergy: whence it is also called the *psalm of mercy*.

It is also the first word in the Latin translation of the 51st psalm, and has been elaborately set to music by all the great composers of the Romish church, from Palestrina to Jomelli and Haydn: but no miserere has been so celebrated as that composed by Gregorio Allegri, for the pontifical chapel at Rome, in 1629; which has continued to be solemnly and exquisitely performed there on Wednesday in Passion week, and on Good Friday. See ALLEGRI, JOMELLI, and Burney's Present State of Music in France and Italy.

MISERERE *Mei*, denotes a kind of colic, or disorder of the intestines, in which the excrements, instead of passing off the common way, are often thrown up by the mouth. The *miserere mei* is the same with what we otherwise call *volvulus*, and *iliac passion*.

MISERICORDE, CULTELLUM, in *Ancient Armour*, the name of the dagger, which was the constant companion of the sword, at least from the days of Edward I., and is mentioned in the statute of Winchester. Its appellation of misericorde is derived by Fauchet, the French antiquary, either from its being used to put persons out of their pain, who were irrecoverably wounded, or, from the sight of it causing those knights who were overthrown to cry out for quarter or mercy. After the invention of fire-arms, daggers were screwed into the muzzles of the muskets, to answer the present purpose of the bayonet.

MISERICORDIA, MERCY, in *Law*, an arbitrary amerciament, or punishment imposed on any person for an offence.

Where the plaintiff or defendant in any action is amerced, the entry is always *ideo in misericordia*.

It is thus called, according to Fitzherbert, because it ought to be but small, and less than the offence, according to the tenor of Magna Charta.

"Mulcta lenior sic dicta, quod lenissima imponitur misericordia; graviores enim mulctas fines vocant; atrocissimas, redemptiones." See FINE and REDEMPTION.

Hence, if a man be unreasonably amerced in a court not of record, as a court baron, &c. there is a writ called *moderata misericordia*, directed to the lord, or his bailiff, commanding them to take moderate amerciaments.

MISERICORDIA *communis*, is when a fine is set on the whole county, or hundred.

MISERICORDIA *in cibis & potu*, in our *Old Writers*, is used for any gratuitous portion of meat and drink, given to the religious

ligious in convents beyond their ordinary allowance. (Matt. Paris.) And in fome convents they had a ftated allowance of thefe over-commons upon extraordinary days, which were called *mifericordiæ regulares*.

MISERREPOUR, in *Geography*, a town of Hindooftan. in Dooab; 15 miles N.W. of Etayah.

MISERY, an ifle between Salem and Cape Ann, in Maffachufetts.

MISFEASANCE, in *Law*, a mifdeed or trefpafs. Whence alfo *misfeafor*, a trefpaffer.

MISFORTUNE. See CHANCE.

MISGUM, in *Ichthyology*, the name of a fifh of the anguilliform kind, but broader and flatter than the eel, and of much the fame fize from the head to the tail; it has five black lines, one on the back, two, which are fomewhat broader, in the middle of the fides, and two others, which are narrower lower down; thefe are all extended from the head to the tail; the intermediate fpaces, and the belly, are of a fomewhat blueifh-white, dotted with black fpots; the fins are alfo fpotted in the fame manner; the mouth is fmall and round like that of the lamprey, and is furrounded with beards, fix on the upper jaw, and four on the under; and there are two other very flender ones near the noftrils; the eyes are fmall; the gills four on a fide; and befide the back fin there are four, two near the gills, and two lower on the body. This is a common fifh about the German fhores, and is efteemed a very delicate one at the table; it lays its fpawn in March, and is in beft feafon for eating in January and February. It is caught principally in ftanding and muddy waters; and it is faid, that when out of water, it makes a fort of hiffing noife.

MISHNA. See MISCHNA.

MISIANO, in *Geography*, a town of Naples, in Calabria Ultra; 7 miles N. of Reggio.

MISILMARI, a town of Sicily, in the valley of Mazara; 6 miles S.S.E. of Palermo.

MISITRA, the ancient *Sparta*, a town of European Turkey, in the Morea, defended by a caftle on a rock, which is faid to be impregnable. The Chriftians have feveral churches, one of which is reckoned the moft beautiful in the world. The Jews have three fynagogues, and the Turks have a fuperb mofque and hofpital. This town is the fee of an archbifhop, and the refidence of a bey, an aga, and a waywode; and it contains 12,000 inhabitants. In 1770 it was taken by the Ruffians; 40 miles S.S.W. of Argos. N. lat. 37° 10′. E. long. 22° 25′.

MISKERING, MISKERRING. See ABISHERING.

MISKOTZ, in *Geography*, a town of Hungary; 30 miles W. of Tokay.

MISLAVA, a town of Hungary; 10 miles E. of Libetau.

MISLETOE. See MISTLETOE.

MISLIWECZEK, JOSEPH, in *Biography*, fon of a miller in Bohemia, not far from Prague, a twin, born in 1737: the brothers refembled each other fo much, that their father was frequently uncertain to which of them he was fpeaking. They were both brought up to the father's trade; but Jofeph in learning mufic at the common reading and writing fchool, as all Bohemian children do, difcovered uncommon genius and love for the art. And his father was fcarcely dead before he quitted the miller's trade, and went to Prague, where he ftudied mufic under the celebrated organift Segert with fuch fuccefs, that he fhortly compofed fix fymphonies, one each month, from January to June. Then, in 1763, he went to Venice, where he had leffons from Pifcette, and afterwards to Parma, where he compofed his firft opera, which fucceeded fo much, as to procure him a call to Naples, where the opera of "Belerofonte" fo eftablifhed his reputation in Italy, that in the next ten years he brought nine operas on the ftage; among which "Olimpiade," in 1778, was particularly admired, efpecially the air, "Si circa fi dice." Soon after the performance of Belerofonte, he went to Venice as a mafter, where he had been before only a fcholar, and now was as well received as elfewhere. Then he removed to Pavia, and thence to Munich in 1779, and returned to Naples a fecond time. About 1780, Fortune turned her back upon him: the opera of "Armida," which he fet for Milan, was performed but once, in which almoft every thing, except a bravura air for Marchefi, was *fifchiata* (hiffed). Thence he went to Rome, where he had been unfortunate before, and where he met with new difgrace in 1781; in which city, after compofing for different theatres of Italy 30 operas, befides oratorios, and inftrumental mufic of all kinds, he died, in 1782, in mortification and indigent circumftances.

MISLOWITZ, in *Geography*, a town of Silefia, in the lordfhip of Plefz, on the borders of Poland; 32 miles W. of Cracow. N. lat. 50° 13′. E. long. 19° 5′.

MISNIA. See MEISSEN.

MISNOMER, compounded of *mis*, which in compofition fignifies *amifs*, and *nomer*, *to name*, in *Law*, a wrong name, or the ufing of one name for another.

A mifnomer furnifhes one of the principal pleas in abatement.

MISOLOGIO, in *Geography*, a town of the Morea, in the pafhawite of Carnia, containing about 5000 inhabitants. It is fituated on a fwampy flat, fcarcely above the level of the fea. An extenfive fhallow reaches along the coaft for many miles, and is paled in for a meir, and kept in repair by the farmers of the fifhery. This fifhery was farmed in 1811 by forty perfons, who pay to the vizier Ali Pafhaw upwards of 3500*l.* fterling. In Mifologio one of the priefts teaches Greek, and the children, as in other parts of Greece, are taught writing, &c. by the parochial clergy. The inhabitants wear the Albanian drefs, and though they grievoufly complain of the taxes, they admit the juftice and vigour of Ali Pafhaw's government. The town has a fmall fortification about two miles diftant from the fhore. The articles exported from Mifologio are fimilar to thofe which are ufually fent from Patras and Lepanto. It has lately begun to fend wool to Sicily, which wool is low priced, but not fo inferior in quality as might be fuppofed from the rates at which it is fold.

MISPACH, a town of Bavaria, in the lordfhip of Upper Waldeck; 27 miles S.S.E. of Munich.

MISPRISION, derived from the old French *mefpris*, a *neglect* or *contempt*, in *Law*, fignifies a neglect or overfight, and is generally ufed to denote all fuch high offences as are under the degree of capital, but nearly bordering upon them.

Mifprifions are generally divided into two forts: negative, which confift in the concealment of fomething which ought to be revealed; and pofitive, which confift in the commiffion of fomething which ought not to be done.

MISPRISION *of Clerks*, is a neglect of clerks, in writing, or keeping records.

By the mifprifion of clerks, no procefs fhall be annulled, or difcontinued. And juftices of affize fhall amend the defaults of clerks mif-fpelling a fyllable, or letter, in writing.

MISPRISION *of Felony*, which is the concealment of a felony which a man knows, but never affented to, is punifhable, in a public officer, by ftat. Weftm. 1. 3 Ed. 1. c. 9. with imprifonment for a year and a day; in a common perfon ſon with impriſonment for a leſs diſcretionary time; and in both with fine and ranſom at the king's pleaſure, declared by the judges in his courts of juſtice. Juſtices of the Common Pleas have a power to aſſeſs any amerciaments upon perſons offending by miſpriſions, contempts, or neglects, for not doing, or miſdoing, any thing, in or concerning fines.

MISPRISION *of Treaſon*, is a negligence in not revealing treaſon, where a perſon knows it to be committed.

It is enacted by ſtat. 1 & 2 Ph. & Mar. c. 10 that a bare concealment of treaſon ſhall be only held a miſpriſion; which concealment becomes criminal, if the party appriſed of the treaſon does not, as ſoon as conveniently may be, reveal it to ſome judge of aſſize, or juſtice of the peace. (1 Hal. P. C. 372.) Beſides, the ſtatute 13 Eliz. c. 2. enacts, that thoſe who forge foreign coin, not current in this kingdom, their aiders, abettors, and procurers, ſhall all be guilty of miſpriſion of treaſon. The puniſhment of miſpriſion of treaſon is loſs of the profits of lands during life, forfeiture of goods, and impriſonment during life. 1 Hal. P. C. 374.

The miſpriſions already recited belong to the claſs of thoſe that are denominated negative. Miſpriſions, which are merely poſitive, are generally termed *contempts* or *high miſdemeſnors*. See CONTEMPT.

MISQUE POCONA, in *Geography*, a town of South America, in the viceroyalty of Buenos Ayres, and province of Santa Cruz de la Sierra; 100 miles S.S.W. of Santa Cruz.

MISQUI, a town of Peru; 60 miles N. of La Paz.

MISR *el Attiké*, a town of Egypt, on the Nile, S. of Cairo, to which it is a kind of ſuburb.

MISS, a river of Carinthia, which runs into the Drave; five miles E. of Lavamand.

MISSA. See MASS.

MISSA *Papæ Marcelli*, is the title of a celebrated maſs in *Muſic*, compoſed by Paleſtrina, and ſaid to have prevented muſic from being baniſhed the church. Concerning this production, it has been related by Antimo Liberati, in his famous letter to Ovidio Perſapegi, and after him, by Adami, Bernardi, and other muſical writers, that the pope and conclave having been offended and ſcandalized at the light and injudicious manner in which the maſs had been long ſet and performed, determined to baniſh muſic in parts entirely from the church; but that Paleſtrina, at the age of twenty-ſix, during the ſhort pontificate of Marcellus Cervinus, intreated his holineſs to ſuſpend the execution of his deſign till he had heard a maſs, compoſed in what, according to his ideas, was the true eccleſiaſtical ſtyle. His requeſt being granted, the compoſition, in ſix parts, was performed at Eaſter, 1555, before the pope and college of cardinals; who found it ſo grave, noble, elegant, learned, and pleaſing, that muſic was reſtored to favour, and again eſtabliſhed in the celebration of ſacred rites. This maſs was afterwards printed, and dedicated to the ſucceſſor of Marcellus, pope Paul IV., by whom Paleſtrina was appointed maeſtro di capella to the pontifical chapel.

The friends of choral muſic will doubtleſs be curious to have a faithful and minute account of a compoſition which had ſufficient power to preſerve their favourite art from diſgrace and excommunication; and having before us an accurate ſcore of it, which Signor Santarelli, the pope's maeſtro di capella, himſelf procured out of the archives of the Siſtine chapel, where it is ſtill performed, we can venture to aſſert, that it is the moſt ſimple of all Paleſtrina's works: no canon, inverted fugue, or complicated meaſures, have been attempted throughout the compoſition; the ſtyle is grave, the harmony pure, and by its facility the performer and hearer are equally exempted from trouble.

MISSAL, MISSALE, a maſs-book, containing the ſeveral maſſes to be uſed on the ſeveral days, feaſts, &c.

The Roman miſſal was firſt compiled by pope Gelaſius, and afterwards reduced into better order by pope Gregory the Great; who called it the *book of ſacraments*.

Each dioceſe, and each order of religious, have their particular miſſal, accommodated to the feſtivals of the province, or of the order.

MISSALAND, in *Geography*, a river of Africa, which riſes in Dar Fur, and after a courſe of nearly 500 miles loſes itſelf in the lake of Fittré.

MISSASSAGA ISLAND, an iſland that lies oppoſite to the mouth of the river Trent in Upper Canada, and at the ſame diſtance from the portage at the head of the bay of Quito.

MISSASSAGA *River*, a river of Upper Canada, which runs into lake Huron, between le Serpent and Theſſalon rivers, on the N. ſhore. See MESSASAGUES.

MISSEL BIRD, in *Ornithology*, the common Engliſh name of the larger ſpecies of thruſh, called alſo the *ſkrite*, and by authors the TURDUS *viſcivorus major*; which ſee. It is much larger than any other of the thruſh kind; its legs and feet are yellow; its head of a browniſh lead colour, and its back, tail, and rump of the ſame colour, with an admixture of yellow; but in the ſummer months it a little changes its colour, and becomes more grey, or of the colour of unripe pickled olives; its throat, breaſt, and belly, are all variegated with black ſpots; the middle of its belly whitiſh, and the upper part of its breaſt, and part of its ſides, and the under feathers of its tail, yellowiſh; its bill is ſhorter and thicker than that of other thruſhes, and of a duſky colour, except the baſe of the lower mandible, which is yellow. It uſually is ſeen on the top branches of tall oaks, elms, and other high trees, and ſings very ſweetly, and is the largeſt bird that has any melody in its note. It begins its ſong, ſitting on the ſummit of a high tree, very early in the ſpring; often with the new year, in blowing ſhowery weather, whence it is called in Hampſhire the ſtorm-cock; the note of anger or fear is very harſh, between a chatter and ſhriek. It remains the whole year with us, flies ſingly, except with its female, and drives all the leſſer ſpecies of thruſhes from it. It is the beſt of all the kinds for the table.

MISSELTOE. See MISTLETOE.

MISSEN-MAST, or MIZZEN-*Maſt*. See MISEN.

MISSEN-*Sail*. See MISEN.

MISSIGUINIPPI RIVER, in *Geography*, a river of Canada, which runs into the Saguenay, N. lat. 48° 22′. W. long. 71° 10′.

MISSILIA, among the Romans, a name given to largeſſes, thrown among the people on occaſion of games and ſhows, ſuch as ſmall gold or ſilver coins, ſweetmeats, and ſometimes animals, as ſheep, oxen, deer, &c. which were let looſe to be carried off by the people.

The word comes from *mittere*, *to throw*, or *let looſe*.

MISSIMA, in *Geography*, a town of Japan, in the iſland of Niphon.

MISSINABE LAKE, a lake of America, in Canada. N. lat. 48° 39′ 42″. W. long. 84° 2′ 42″.

MISSINABE *Houſe*, a ſtation belonging to the Hudſon's bay Company, ſituated on the E. ſide of Mooſe river, and eight miles from Miſſinabe lake.

MISSING WOOD, a phraſe uſed among *Bowlers*. See BOWLING.

MISSION, MISSIO, among the Romans, a term uſed to ſignify the emperor's ſending to reſcue a wounded gladiator from his antagoniſt. The *munerarii*, or perſons who exhibited

4 N 2

bited the games, and likewife the people, ufed to refcue a favourite gladiator. The manner of their fignifying this favour, was *pollice preffo*, or with the thumb hid in the palm of the hand. However the gladiator was only faved for that time; whereas by the *rudis* he had a free difcharge.

MISSION. See EMISSION, MANUMISSION, REMISSION, and TRANSMISSION.

MISSION, in *Theology*, denotes a power or commiffion to preach the gofpel. Jefus Chrift gave his difciples their miffion in thefe words, "Go, and teach all nations, &c."

The Romanifts reproach the Proteftants, that their minifters have no miffion; as not being authorifed in the exercife of their miniftry, either by an uninterrupted fucceffion from the apoftles, or by miracles, or by any extraordinary proof of a vocation.

Many among us deny any other miffion neceffary for the miniftry, than the talents neceffary to difcharge it.

MISSION is alfo ufed for an eftablifhment of people zealous for the glory of God, and the falvation of fouls; who go and preach the gofpel in remote countries and among infidels.

There are miffions in the Eaft as well as in the Weft Indies. Among the Romanifts, the religious orders of St. Dominic, St. Francis, St. Auguftine, and the Jefuits, have miffions in the Levant, America, &c.

The Jefuits have alfo miffions in China and all other parts of the globe, where they have been able to penetrate. The Mendicants abound in miffions.

There have been alfo feveral Proteftant miffions, for diffufing the light of Chriftianity through the benighted regions of Afia and America. Of this kind has been the Danifh miffion, planned by Frederic IV., in 1706. And the liberality of private benefactors in our own country has been alfo extended to the fupport of miffionaries among the Indians in America, &c.

MISSION is alfo the name of a congregation of priefts and laymen, inftituted by Vincent de Paul, and confirmed, in 1632, by pope Urban VIII., under the title of "Priefts of the Congregation of the Miffion."

Thefe profefs to make it their whole bufinefs to affift the poor people in the country; and to this purpofe they oblige themfelves never to preach, or adminifter any of the facraments, in any town where there is an archbifhop, bifhop, or provincial refiding.

The priefts of the miffion were alfo intrufted with the direction and government of a female order, called "Virgins of Love, or Daughters of Charity," whofe office it was to adminifter affiftance and relief to indigent perfons, who were confined to their beds by ficknefs and infirmity. This order was founded by a noble virgin, whofe name was Louifa le Gras, and received, in the year 1660, the approbation of pope Clement IX.

They are fettled in moft provinces of France, Italy, Germany, and in Poland. At Paris they have a feminary, which they call the *Foreign Miffion*, where youth are bred up, and qualified for miffions abroad.

MISSIONARY, an ecclefiaftic who devotes himfelf and his labours to fome miffion, either for the inftruction of the orthodox, the conviction of heretics, or the converfion of infidels.

MISSIQUASH RIVER, in *Geography*, a river which by its various windings, from its confluence with Beau-bafin at the head of Chignut channel, to its main fource, and from thence by a line due E. to the bay of Verte, in the ftraits of Northumberland, feparates the provinces of Nova Scotia and New Brunfwick.

MISSISIPPI, a large river of America, which, together with its eaftern branches, waters $\frac{5}{8}$ths of the United States, forms their weftern boundary, and feparates them from Louifiana. It rifes in White Bear lake, N. lat. 48° 15'. W. long. 98° 30', and in its courfe receives feveral ftreams both from the E. and W., the largeft of which are the Miffouri from the W., and the Illinois, Ohio, and Tenneffee from the E. The foil on both fides of this river, and in the vicinity of its tributary ftreams, is not inferior to any in North America. This river is navigable to St. Anthony's Falls, and, as fome fay, beyond them. Salt of excellent quality is produced from the falt-fprings or licks that are contiguous to it, and on its upper branches are great quantities of coal. An ifland of confiderable fize is formed by its mouths in the gulf of Mexico, between 29° and 30° N. lat. and 89° and 90° W. long.

MISSISIPPI *Territory*, a diftrict formed of the weftern part of the ftate of, and bounded N. by Tenneffee, W. by the Miffifippi river, S. to W. by Florida, E. by the Appalachicola and Flint rivers. The principal part of this country is inhabited by the Creek, Chactaw, Chickafaw, and Cherokee nations of Indians. It was erected into a territorial government in 1800, and divided into three counties, *viz.* Wafhington, including 1250 inhabitants, Pickering with 2940, and Adams with 4660. The total number is 8850, of which 3489 are flaves. Natches is the capital. It is watered by many fine rivers, and contains large tracts of the beft land in the United States.

MISSISSAGUIS, a tribe of Indians who inhabit the fhores of lake Ontario, and one of the moft numerous in this part of the country. The men are in general ftout, and moft excellent hunters and fifhers; but lefs warlike than any of the neighbouring nations. They are of a darker complexion than other Indians; fome of them being nearly as black as negroes. Both men and women, particularly the latter, are very dirty and flovenly in their appearance: the rancid greafe and fifh oil, with which the women daub their hair, necks, and faces, render them in a fummer's day extremely offenfive. Thefe Indians fupply the inhabitants of Kingfton, of Niagara, and of the different towns on the lake, with fifh and game, the value of which is eftimated by bottles of brandy and loaves of bread.

MISSIVE, fomething fent to another, from the Latin word *mitto*, *I fend*.

We fay miffive letters, or letters miffive, meaning letters fent from one to another.

In propriety letters miffive are letters of bufinefs, but not bufinefs of great concern; in contradiftinction from letters of gallantry, letters on points of learning, difpatches, &c. See LETTERS.

MISSON, MAXIMILIAN, in *Biography*, a well known French writer, was a counfellor of Paris at the time of the revocation of Nantes, which circumftance obliged him to quit his country and come over to England. In 1687, and the following year, he travelled to Italy with an Englifh gentleman, in the character of governor, and foon after his return he publifhed the fruits of his obfervations, in a work entitled "Nouveau Voyage d'Italie," in 3 vols. 12mo. Thefe travels were looked upon as a faithful and lively picture of the countries defcribed, but the Catholics were offended at the reprefentations given of the ceremonies and popular fuperftitions prevalent among them, which they charge with unfaithfulnefs and exaggeration. Miffon wrote likewife "Memoires d'un Voyageur en Angleterre;" and "Le Theatre facrè des Cevennes, ou Recit des Prodiges arrivès dans cette Partie du Languedoc, et des petits Prophètes." He died, at an advanced age, in London, in the year 1721. Moreri.

MISSOURI,

MISSOURI, in *Geography*, a river of North America, in Louisiana, which falls into the Mississippi from the westward, 18 miles below the mouth of the Illinois, and about 1160 miles from the Balize, or mouths of the Mississippi, in the gulf of Mexico. Hutchins says that it is navigable 1300 miles, and larger than the Mississippi.

MISSOURIS, the Indians who inhabit the banks of the above river, and who are said to have 1500 warriors.

MIST, a meteor, called also fog. See Fog and Meteorology.

The blueish mist which we sometimes see on our fields and pastures in a morning, though often innocent, yet has been in some places found to be the actual cause of murrain, and other fatal diseases among the horned cattle. Dr. Winklar gives, in the Philosophical Transactions, an account of a murrain affecting the cattle in Italy and other places, which was evidently seen to spread itself over the countries in form of a blue mist. Wherever this was perceived, the cattle were sure to come home sick: they appeared dull and heavy, and refused their food; and many of them would die in four-and-twenty hours. Upon dissection there were found large and corrupted spleens, sphacelous and corroded tongues; and in some places those people who were not careful of themselves in the management of their cattle, were infected and died as fast themselves. The principal cause of this disease seems to be the exhalation of some unwholesome steams from the earth; and it was observable, that there had been three earthquakes in Italy the year before it happened.

The method of cure which succeeded best, was this: as soon as any beast appeared to be sick, they examined the tongue, and if aphthæ or little blisters were found on it, they scraped it with a silver instrument made with sharp teeth at the sides, till it bled in all those parts where the aphthæ were; the blood was then wiped away with a cloth, and the whole tongue washed several times with vinegar and salt. After this the following medicine was given internally: take of soot, brimstone, gunpowder, and salt, of each equal parts: mix these in as much water as will make a mixture thin enough to be swallowed, and let a spoonful be given for a dose three or four times a day. The cattle which were in health had this medicine given them, as well as the sick; and the consequence was, that very few died in Swisserland, while almost all died in other places.

It was very remarkable that this contagion, on this occasion, seemed to travel slowly but regularly on: it came at the rate of about two German miles in twenty-four hours; this it kept regularly to during the whole time of its raging, and never appeared in very distant places at the same time.

The whole surface of the earth emitting these effluvia, no cattle escaped them in the course of their way, but those which were kept within doors at rack and manger, fell ill at the same time, and in the same manner with those in the open fields.

Dr. Slare was of opinion, that it was owing to certain insects, which could not fly faster than at the rate of two German miles a day; and that they travelled regularly, and spread the mischief where they passed; but there wanted some judicious persons, versed in these observations, to have examined both the state of the air and the beasts, on this occasion. Phil. Transf. N° 145.

MISTAKE Bay, in *Geography*, a large bay on the west side of the entrance of Davis's straits, and N. of Hudson's straits; from which it is separated by a peninsula of the N. main on the W. and Resolution island on the S.

MISTAKEN Bay, a bay on the N.W. coast of Tavai Poenammoo, so called by Capt. Cook in 1769; 25 miles S.W. of Cascade Point.

Mistaken, *Cape*, the S. point of the easternmost of the Hermit's islands, about three leagues E.N.E. from Cape Horn, at the extremity of South America.

MISTEK, a town of Moravia, in the circle of Prerau; 7 miles E.N.E. of Freyburg.

MISTELPACH, a town of Austria; 18 miles N. of Vienna.

MISTIC, or Mystic, a short river which falls into the N. side of Boston harbour, by a broad mouth on the E. side of the peninsula of Charlestown. It is navigable for sloops four miles to the town of Medford, and is crossed by two bridges, one at its mouth, and another a mile above it. The Middlesex canal connects this river with the Merrimack.

MISTISSINY, a lake of Canada. N. lat. 50° 40′. W. long 74°.

MISTLETOE, Misletoe, or *Misseltoe*, in *Botany*. See Viscum.

MISTRETTA, in *Geography*, a town of Sicily, in the valley of Demona; the see of a bishop; 64 miles W. of Messina. N. lat. 38° 55′. E. long. 14° 22′.

MISTY, a town of Asiatic Turkey, in Caramania; 50 miles S. of Yurcup.

MISUSER, in our *Old Writers*, an abuse of any liberty or benefit: as he shall make fine for his misuser. Old. Nat. Br. 149.

By misuser, a charter of a corporation may be forfeited; so also an office, &c.

MISWALDE, in *Geography*, a town of Prussia, in the province of Oberland; 18 miles S. of Elbing.

MISY, in *Natural History*, the name of a fossile substance, used very frequently by the ancients in medicine, and supposed to be one of their now lost medicines, but erroneously; it being still very common in the Turkish dominions, and not unfrequently found in the mines of Cremnitz in Hungary. It is a considerably firm substance, though of an irregular and seemingly not compact texture, and much resembles some of our gaudy marcasites; but that it wants their hardness and their weight, and is not inflammable.

It is at present no where put to any use. The ancients esteemed it of the same nature with the chalcitis, but that it possessed those virtues in a more remiss degree; they had it from Ægypt and Cyprus, and used it externally in hæmorrhages, and some cutaneous eruptions.

Misy, in *Botany*, a name given by Theophrastus, and all the old Greek writers, to a kind of truffle or subterranean mushroom, of a very delicate flavour. The truffles of Numidia, and some other parts of Africa, were always esteemed superior to those of any other part of the world. They are called *terfez*, *camaha*, or *kema*, by some later writers, and were brought to Rome, and so greatly esteemed, that no dish was ranked above them. These were called Lybian truffles by the Romans, and they seem to have been the same with the Cyrenean misy of the Greeks. It is to be observed, that the Greeks in general, in early times, were very little acquainted with the affairs of Africa; and all that they had from this part of the world, was said to come from Cyrene, some old cities of their forefathers being there, and keeping up a friendship and traffic with them. The *thyon*, a tree growing plentifully in almost all parts of Africa, and which is the same with the citrus of the Romans, was in this manner attributed to Cyrene, by the same Theophrastus. And thus, when speaking of truffles, he adds, that the Cyrenean misy surpassed all the other kinds in flavour; his words stand at large in Athenæus; and thence Pliny has taken his account,

account, which he closes in this manner: "The thing which they call misy, in the province of Cyrene, is of this kind; but it is more fleshy and of a finer taste and smell." This is the sense of Pliny, as the text stands in our copies; but it is probable that he translated Theophrastus better than they, at least as we know that what he says is not his own but taken from that author, we have a right to understand it in his way, and that is, that the roots of this Cyrenean misy have a delicate smell resembling that of meat, or flesh newly cut. Pliny, lib. xix. cap. 3.

It is very certain, that this Cyrenean misy of the old Greeks is the same thing with the delicate African truffle or terfez of Leo Africanus, and the moderns: and Pliny had read some of the ancients who were sensible of this, and had taken from them an account that the African truffles are the finest in the world; and yet did not perceive, that these African truffles were the same with the Cyrenean misy, which he immediately after mentions from Theophrastus.

MITCHEL DEAN, in *Geography*. See DEAN, *Michel.*

MITCHELLA, in *Botany*, named by Linnæus in honour of his friend and correspondent Dr. John Mitchell, a physician at Virginia, whose paper, describing thirty new genera of plants, is published in the *Ephemerides Naturæ Curiosorum*, v. 8, 187, preceded by a dissertation on the principles of systematic botany and zoology. This treatise was afterwards published separately at Nuremberg in 1769, about a year after its author's death. Linn. Gen. 55. Schreb. 73. Willd. Sp. Pl. v. 1. 617. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 1. 246. Michaux Boreali-Amer. v. 1. 86. Juss. 208. Lamarck Illustr. t. 63. (Chamædaphne; Mitch. n. 27.)—Class and order, *Tetrandria Monogynia.* Nat. Ord. *Aggregatæ*, Linn. *Rubiaceæ*, Juss.

Gen. Ch. *Cal.* Perianth superior, erect, four-toothed, permanent. *Cor.* of one petal, funnel-shaped; tube cylindrical; limb four-cleft, spreading, hairy within. *Stam.* Filaments four, thread-shaped, erect, between the segments of the corolla; anthers oblong, acute. *Pist.* Germen twin, inferior, orbiculate, common to two flowers; style thread-shaped, the length of the corolla; stigmas four, oblong. *Peric.* Berry divisible into two parts, globose, with two distinct crowns. *Seeds* four, compressed, callous.

Ess. Ch. Corolla of one petal, superior; two flowers on each germen. Stigmas four. Berry in two parts, with four seeds.

1. M. *repens.* Linn. Sp. Pl. 161. (Syringa baccifera; Pluk. Amalth. 198. t. 444. f. 2.)—Native of North America, and introduced at Kew in 1761, by Mr. John Bartram, where it flowers in June. *Stem* decumbent and creeping, slender. *Leaves* in pairs, on short stalks, ovate, pointed. *Flowers* terminal, two on each germen, as in several of the genus *Lonicera.*

MITCHELS, among *Builders*, are Purbeck stones, from fifteen inches square to two feet, squared and hewed ready for paving.

MITCHELSTOWN, in *Geography*, a post-town of the county of Cork, Ireland, situated on the river Funcheon. In it is a college, founded by a former earl of Kingston, for the support of twelve decayed gentlemen and twelve decayed gentlewomen, who have each 40*l. per annum*, and comfortable apartments; and a chaplain with 100*l. per annum*, with a house. A fine seat of the Kingston family adjoins the town. Near this town, at the foot of one of the Gattee mountains, is the cave of Skeheenrinky, which is described by Arthur Young in his Irish Tour, and preferred by him to the famous cave in the Peak of Derbyshire, as it was by lord Kingsborough to the Grot d'Aucel in Burgundy. Mitchelstown is 102 miles S.W. from Dublin, and about 24 from Cork, on the road from that city to Cashel. Carlisle. Young.

MITCHIGAMAS, a nation of Indians, who with the Piorias, inhabit near the settlements in the Illinois country.

MITE, in *Natural History*, the name of a small animal very well known, and found in old cheese, and in many other bodies, both recent and perishing. See ACARUS.

To the naked eye the mites in cheese appear like moving particles of dust, but the microscope discovers them to be perfect animals, having as regular a figure, and performing all the functions of life as perfectly as creatures that exceed them many times in bulk.

They are crustaceous animals, and are usually transparent; the principal parts of them are the head, the neck, and the body; the head is small in proportion to the body, and has a sharp snout, and a mouth that opens and shuts like a mole's; they have two small eyes, and are extremely quick-sighted; and when you have once touched them with a pin, you will easily perceive how cunningly they avoid a second touch.

They are of different sorts; for some of them have six legs, and others have eight: each leg has six joints surrounded with hairs, and two little claws at the extremity, with which it very nicely takes hold of any thing; the hinder part of the body is plump and bulky, and ends in an oval form, from which there issue out a few exceeding long hairs; other parts of the body and head are also beset with thin and long hairs.

The males and females are easily distinguished in these little animals. The females are oviparous, as the louse and spider, and from their eggs the young ones are hatched in their proper form, without having any change to undergo afterwards. They are, however, when first hatched, extremely minute; and, in their growing to their full size, they cast their skins several times.

These little creatures may be kept alive many months between two concave glasses, and applied to the microscope at pleasure. They are thus often seen *in coitu*, conjoined tail to tail; and this is performed by an incredible swift motion.

Their eggs, in warm weather, hatch in twelve or fourteen days; but, in winter, they are much longer; these eggs are so small, that a regular computation shews, that ninety millions of them are not so large as a common pigeon's egg. Baker's Microscope, p. 18.

Mites are very voracious animals; they not only prey upon cheese, but upon all sorts of dry flesh, fish, fruits, and seeds; and almost on all things which have some degree of moisture, without ever being wet; and they have often been seen to eat one another. Their manner of eating is by thrusting alternately one jaw forward and the other backward; and in this manner grinding their food; and after they have done feeding, they seem to chew the cud.

There are several lesser distinctions observable in the mites, which are found among different substances. Those in malt-dust and oat-meal are much nimbler than the cheese-mites, and have more and longer hairs. The mites among figs resemble beetles, and have two feelers at the snout, and two very long horns over them; these have only six legs, and are more sluggish than those in malt-dust. Those found among figs have also very long hairs, and those beset at certain distances with other smaller hairs; whence M. Leeuwenhoek conjectures that these longer and larger hairs are jointed at those places where the short ones are found.

There is a sort of wandering mites found wherever there is any thing that they can feed on; these are often found in form of a white dust, and are not suspected to be living creatures.

The

The mite is an animal very tenacious of life; it will live months without food; and M. Leeuwenhoek had one which lived eleven weeks on the point of a pin, on which he had fixed it for examining it by his microscope. Leeuwenhoek's Arcan. Nat. tom. iv. p. 368.

Mite, a small coin, formerly current; equal to about one-third part of a farthing.

Mite also denotes a small weight used by the moniers. It is equal to the twentieth part of a grain troy, and is divided into twenty-four droits, the droit into twenty periots, and the periot into twenty-four blanks.

MITELLA, in *Botany*, received its name from Tournefort, in allusion to the shape of the ripe seed-vessel, which, with its two pointed lobes, resembles a little mitre.—Linn. Gen. 223. Schreb. 301. Willd. Sp. Pl. v. 2. 659. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 3. 73. Juss. 309. Tourn. t. 126. Michaux Boreali-Amer. v. 1. 270. Lamarck Illustr. t. 373. Gærtn. t. 44.—Class and order, *Decandria Digynia*. Nat. Ord. *Succulentæ*, Linn. *Saxifragæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, cut half way down into five segments, bell-shaped, permanent. *Cor.* Petals five, in many capillary segments, inserted into the calyx, twice exceeding it in length. *Stam* Filaments ten, awl-shaped, inserted into the calyx, shorter than the corolla; anthers roundish. *Pist.* Germen superior, roundish, cloven; styles scarcely any; stigmas obtuse. *Peric.* Capsule ovate, of one cell, divided half way down into two flat, equal valves, recurved at their points. *Seeds* numerous.

Eff. Ch. Calyx five-cleft, inferior. Petals five, pinnatifid, inserted into the calyx. Capsule of one cell, with two equal valves.

1. M. *diphylla.* Two-leaved Mitella. Linn. Sp. Pl. 580. Lamarck, fig. 1. (Cortusa americana altera, floribus minutis fimbriatis; Menz. Pugill. t. 10.)—Leaves heart-shaped, slightly three-lobed, toothed. Stalk with two opposite leaves.—Native of North America. Easily cultivated in bog earth, in the shade, flowering in April and May. A delicate little perennial *herb*, about a span high, pale green, somewhat hairy. *Leaves* heart-shaped, acute, slightly lobed and toothed; the radical ones several, on longish footstalks. *Flower-stalk* solitary, erect, bearing a pair of sessile, opposite horizontal leaves about the middle, and terminating in a slender, upright, downy, rather viscid cluster, of minute white *flowers*, remarkable for their elegantly fringed feather-like petals. *Capsule* sometimes with three valves.

2. M. *cordifolia.* Heart-leaved Mitella. Willd. n. 2. Lamarck, fig. 3.—Leaves heart-shaped, with bristly teeth. Stalk nearly naked.—Supposed by Willdenow, we know not on what foundation, to be a native of the north of Asia. Michaux found it in Canada. This appears to differ from the former in having sharper bristle-pointed teeth to the *leaves*, and only one very small leaf, with a few scales, on the stalk. *Petals* in capillary segments. We have seen no specimen.

3. M. *nuda.* Naked-stalked Mitella. Linn. Sp. Pl. 580. Lamarck, fig. 2. (M. scapo nudo, petalis fimbriatis; Gmel. Sib. v. 4. 175. t. 63.)—Leaves kidney-shaped, wavy, fringed. Stalk naked.—Native of Siberia and North America, in woods. Miller is said to have cultivated this species in 1758, but we have never seen it in the gardens of the present day. It is smaller than the first species, with rounder, strongly bristly, *leaves*. *Stalk* three or four inches high, quite naked, bearing four or five *flowers*, the segments of whose petals are quite capillary.

4. M. *prostrata.* Prostrate Mitella. Michaux. n. 3.—"Root creeping. Stems prostrate. Leaves alternate, roundish-heart-shaped, sharpish, with slight obtuse lobes."—Native of the southern limits of Canada. *Michaux*

MITELLA, in *Surgery*, a scarf for suspending the arm.

MITGAING, in *Geography*, a town of Hindoostan, in the circar of Surgooja; 40 miles N. of Surgooja.

MITHRA, *Feasts of*, in *Antiquity*, were feasts celebrated among the Romans in honour of Mithra, Mithras, or the sun.

Mithras was an ancient god of the Persians, whom they worshipped, as Plutarch says, according to the laws of Zoroaster, invoking him as the mediator between Oromazes and Arimanius. Mithras was the sun, which was invoked as a divinity; to him they offered sacrifices, and addressed their prayers, and they had priests set apart for service; and they also worshipped fire as an emblem of the sun; but they had neither temples, statues, nor altars. This Mithras was not well known in Europe, until his worship was brought to Rome, which happened, according to Plutarch, in the time of the Piratic war, A. U. C. 687. It is from this epoch, and more especially from the time of the second and third century of the Christian era, that the worship and mysteries of this divinity were celebrated at Rome. That the Romans worshipped Mithras as the sun, is evident from an inscription dated in the third consulate of Trajan, or about the year of Christ 101. This is the dedication of an altar to the sun, under the name of *Mithra, deo Soli invicto Mithræ.* This epithet, invincible, is frequently given to the sun upon other monuments, and it denotes that luminary to be the first and lord of all the rest. But the worship of Mithras was not known in Egypt and Syria in the time of Origen, who died about the year of Christ 263: though it was common at Rome for more than a century before this time. The mysteries of Mithras were both impious and abominable, since human victims were offered on this occasion. The barbarous custom of sacrificing men was abolished by Adrian, but restored again by Commodus, as Lampridius informs us. This worship made great progress in succeeding ages. It was not only spread through Italy and Greece; but it appears from Socrates and Sozomen, that the Egyptians, and particularly the people of Alexandria, worshipped the same divinity. Mithras was also known in the island of Crete. He was also worshipped by the Gauls, as appears by a figure of this god found at Lyons. The worship of this divinity was not only extensive, but of long duration; for it was not destroyed when the emperors embraced Christianity. At length, this worship was proscribed at Rome in the year 378, by order of Gracchus, prefect of the prætorium. According to M. Freret, the feasts of Mithras were derived from Chaldea, where they had been instituted for celebrating the entrance of the sun into the sign Taurus.

Mithra is also a name of the sun in the mythology of the Hindoos. See Surya.

MITHRAX, in *Natural History*, the name given by Pliny and the ancients, to a gem found in Persia, which, when held up to the sun, shewed many colours. It was probably no other than the opal. Hence the barbarous writers of the middle ages seem to have taken their account of the mithridates.

MITHRIDATE, Mithridatium, in *Pharmacy*, an antidote or composition, in form of an electuary; serving either as a remedy, or a preservative against poisons. Mithridate was formerly one of the capital medicines in the apothecaries' shops, being composed of a vast number of drugs; among which are opium, myrrh, agaric, saffron, ginger, cinnamon, spikenard, frankincense, castor, pepper, gentian, &c.

It

It is accounted a cordial, opiate, sudorific, and alexipharmic. Matthiolus says, it is more effectual against poisons than Venice treacle, and much easier to be made.

It takes its name from its inventor, Mithridates, king of Pontus, who is reported to have so fortified his body against poisons, with antidotes and preservatives, that when he had a mind to dispatch himself, he could not find any poison that would take effect.

The receipt of it was found in his cabinet, written with his own hand, and was carried to Rome by Pompey. It was translated into verse by Damocrates, a famous physician, and hence called *Confectio Damocratis;* and was afterwards translated by Galen, from whom we have it. It has undergone considerable alterations since the time of its royal prescriber.

MITHRIDATE *Mustard.* See TREACLE *Mustard.*

MITHRIDATE, *Mustard Bastard,* is a species of *iberis.*

MITHRIDATEA, in *Botany,* received its name from Commerson, we presume in memory of Mithridates, who, from the celebrated hodge-podge, which he is reported to have invented, as a counter-poison, must have been conversant with herbs and their reputed properties at least. We can trace no reason for the application of the name to this particular plant.—Schreb 783. Willd. Sp. Pl. v. 1. 27. (Tambourissa; Sonnerat Ind. Or. v. 2. 237. Ambora; Juss. 401. Lamarck Illustr. t. 784.)—Class and order, *Monandria Monogynia.* Nat. Ord. *Scabridæ,* Linn. *Urticæ,* Juss.

Gen. Ch. *Common Receptacle* of one leaf, fleshy, bell-shaped, in four large, ovate, spreading segments; the upper surface covered with innumerable, minute, imbedded florets. *Perianth* scarcely any. *Cor.* none. *Stam.* Filament one, very short, erect; anther erect, channelled, embracing the style. *Pist.* Germen oval; style shorter than the stamen; stigma simple. *Peric* none. *Common Receptacle* enlarged, pulpy, turbinate, concave, its segments folded inward, lodging the seeds in its fleshy substance. *Seeds* solitary to each floret, oval.

Obs. Jussieu thinks the flowers are monoecious, the receptacles of the males being most deeply cut, and expanded, those of the females slightly perforated, by a cruciform incision, at the top. This seems to agree with our specimens from Commerson, but by no means with Sonnerat's description. Possibly the flowers may become monoecious occasionally, by the casual imperfection of their respective organs.

Ess. Ch. Common receptacle many-flowered, four-cleft. Calyx none. Corolla none. Seeds solitary, imbedded in the fleshy receptacle.

1. M. *quadrifida.* Ambora, Drum-tree, or Monkey-apple.—Gathered by Sonnerat in Madagascar, as well as in the isles of Bourbon and Mauritius. Commerson found it in the latter. The *wood* of this tree is light, white and pithy, as in *Ficus,* to which the genus is most nearly allied. *Leaves* on the young smooth branches, nearly opposite, stalked, elliptical, obtuse, entire, evergreen, very smooth, with a strong mid-rib, sending off numerous transverse veins; their size on young *trees* is a span in length, and above two inches in breadth; on old ones about one-third as much. *Flowers* in smooth clusters, from the older branches, or the trunk; their partial stalks about an inch long. *Receptacles,* before they expand, ovate, about the size of a filbert, somewhat roughish or scaly at the outside; when open the *male* ones, as they seem to us, spread about an inch and a half, displaying abundance of thick-set *stamens,* among which we can discern nothing else. The ripe *fruit* is two or three inches wide, of a depressed, roundish, unequal form, hollow, its pulpy substance, in which the *seeds* are vertically imbedded, as in *Dorstenia,* being about one-third of an inch thick. The pulpy coat, which envelopes the *seeds,* is said to be orange-coloured, and to be used for a dye, like the American Arnotto, *Bixa Orellana. Ambora* is the Madagascar name of this tree. The affinity of the genus to FICUS and DORSTENIA, (see those articles,) cannot be overlooked. The *foliage* however is smooth; but that is the case with some others of this natural order, though indeed with but very few. Jussieu says the tree discharges a milky fluid, which confirms its relationship to *Ficus;* and if monkies eat the fruit, as one of its names implies, it would certainly not prove poisonous to mankind, though, like many species of *Ficus,* it may be either tasteless or of a disagreeable flavour.

MITHRIDATES, in *Biography,* king of Pontus, surnamed "Eupator," and "The Great," was the son of Mithridates VI., the first king of that country who entered into an alliance with the Romans. At the death of his father, 123 B. C., he succeeded to the crown when he was only about 12 years of age. He was from a very early period of life accustomed to martial exercises, and the sports of the chase, by which he was enured to fatigues. In his mind were imprinted the characters of turbulence, ferocity, and suspicion, by which, particularly the latter, his life was preserved from several attempts made on him by those appointed to be his guardians. His mother had been appointed joint heir of the crown, but he very soon deprived her of power, and kept her in close confinement, in which she ended her days. When arrived at the age of manhood he took his own sister, Laodice, for a wife, which was the common practice of the eastern monarchs of that period. After the birth of a son he made a progress through all the neighbouring Asiatic states, with the view of observing their strength and policy. In this journey he spent three years, during which his queen attached herself to one of the lords of the court, and on his return she made an attempt to poison him. He drank the potion, but his constitution was proof against its baneful contents, and the discovery of her infidelity and wicked intentions was the occasion of her death, with that of all her accomplices.

Mithridates now entered upon his career of ambition: he overran the neighbouring kingdom of Paphlagonia, which he at length divided with his ally Nicomedes, the king of Bithynia, totally regardless of the remonstrances of the Romans, who had declared it a free state. He next reduced Galatia, though under the protection of Rome: after this he anxiously wished to make himself master of Cappadocia, then possessed by his brother-in-law, and friend Ariarathes, whom he caused to be privately assassinated, upon which the kingdom was seized by Nicomedes, who married the widow. Mithridates, however, under the pretence of securing the crown for his nephew, drove out Nicomedes, and seated the young prince upon the throne, whom he afterwards stabbed by the most scandalous treachery. The Cappadocian army, who were witnesses of the abominable deed, threw down their weapons, and suffered Mithridates to take possession of all the fortresses in the kingdom. He now placed on the throne a minor son of his own, under the guardianship of Gordius, who had been his wicked instrument in assassinating his brother-in-law. The jealousy of Nicomedes induced him to bring forward a pretended son of Ariarathes, who was sent to Rome to lay his complaints before the senate, and implore its assistance to seat him on the throne of his fathers. Mithridates, apprized of the fact, sent deputies to state to the senate the imposture, and in the conclusion both kings were commanded to relinquish their claims, and the crown of Cappadocia was conferred

ferred upon Ariobarzanes. This was but the commencement of the dispute, and the Roman commanders, according to their usual practice, endeavoured to excite hostilities among the Asiatic kings, that they might have a pretence to interfere in their contests. From the year 90 B. C. open war may be considered as prevailing between the Roman republic and Mithridates, which was extinguished only by the death of the latter. The early successes of Mithridates led him to aspire to the honour of being the instrument of freeing all Asia from the Roman yoke, and at first he seemed to overrun, in an uninterrupted career, all the countries in their alliance and possession, being every where received by the people as their deliverer. His great object now was to ingratiate himself with people of all classes and countries by several popular acts, such as restoring, without ransom, all the Asiatic prisoners, who had fallen into his hands. The free cities of Asia, won over by these specious acts of generosity, opened their gates to him, and took pleasure in demolishing all the monuments erected by the Romans. Mithridates, determined upon irreconcileable enmity to that people, and wishing to involve the Asiatics in the same principles, sent to the magistrates throughout the cities in which any Roman citizens had established themselves, directing, that on a certain day a general massacre should be perpetrated on all of Italian birth or origin, not excepting women and the youngest children. In this horrid massacre it was imagined, that at least 80,000 Roman citizens lost their lives; some accounts have indeed reckoned them at nearly double that number.

By this master stroke of bloody policy, for which his name must for ever be transmitted with infamy, Mithridates made himself master of the whole of Lesser Asia, and proceeded, without remorse or delay, to the conquest of the neighbouring islands, several of which he quickly reduced. At Cos he took possession of a large sum of money, which had been deposited there by the Asiatic Jews, and intended for the temple of Jerusalem. He next made an attempt upon Rhodes but was defeated, and incurred so much personal risque, that he ever afterwards felt an abhorrence of the sea. Archelaus, one of his generals, crossing over to Greece, made himself master of Athens, while his own son Ariarathes conquered Macedonia and Thrace. He was now at the summit of power, and is said to have received the homage of twenty-five different nations. His memory and talent for the acquisition of languages were so great that he could converse with the natives of all of them without the aid of an interpreter.

From this period we may date his decline; Sylla procured of his countrymen the chief command against Mithridates, and sailing to Greece recovered Athens, in the year 86 B. C. He afterwards defeated with great slaughter the troops of Archelaus at Chæronea, and by two other decisive victories he put an end to the war in Greece. Mithridates was pursued from place to place, till at length he was obliged to submit to conditions, at which the greatness of his mind revolted: these conditions were, that he should resign all his conquests, and confine himself within his paternal dominions of Pontus; that he should release all his captives without ransom; pay down a large sum of money; deliver up the greatest part of his fleet; and practise no hostilities against those who had revolted from him and taken part with the Romans. Although the king had acquiesced in these terms, yet it was with the secret determination to break them as soon as he should be sufficiently powerful for the purpose. A new war kindled about the year B. C. 74, in which the success of Mithridates was so great that he recovered the best part of Pontus, which had, in the early part of the contest, been wrested from him, Bithynia, Cappadocia, and Armenia Minor. At length Pompey, invested with great powers, was sent by the Romans to put an end to this long continued war, which he accomplished by destroying, or dispersing all the king's troops, except a body of cavalry with which he forced a passage. Mithridates fled into Armenia, whence he withdrew to Colchis, and thence to Scythia, between the Euxine and Caspian seas. Here he was so completely concealed that it was supposed he was dead, till he emerged from his retreat at the head of a considerable army, and made himself master of several important places. His success was but short-lived, and those even who were willing to submit to his power, had no confidence in his cause, but chose rather to join what they thought was the strongest party. He now adopted the design of marching into Europe, and exciting the Gauls in his cause, which created such discontents in the army, as to lead them to choose Pharnaces, the favourite son of Mithridates, as their king. Having in vain attempted to recal his son to the principles of duty, he attempted to destroy himself first by poison, and then by the sword, but in both he failed, and was at last dispatched, at his own request, by a Gallic mercenary. This was in the year B. C. 64, when the king had attained to the 71st year of his age. He was one of the most formidable enemies of the Roman republic, and the news of his death was received with the greatest joy and exultation. His body was delivered to Pompey, who, with the magnanimity of a generous enemy, bestowed upon it a most magnificent funeral. Mithridates was learned, and a patron of learning; he was particularly attached to medicine, and an electuary still bears his name. Plutarch. Univer. Hist.

MITHRIDATES, in *Natural History*, the name of a stone found in some parts of Persia, seeming to be the same as the mithridax or mithrax.

MITHRIDAX, the name of a gem described by Solinus, to which he ascribes qualities the same with those given by Pliny to the mithrax; and therefore probably the same stone with it.

MITIUSCHOV, in *Geography*, an island in the Frozen ocean, near the western coast of Nova Zembla, at the entrance of the Metochik Schau. N. lat. 75° 20'. E. long. 55° 38'.

MITOC, a lake of Thibet, about 36 miles in circumference. N. lat. 31° 50'. E. long. 93° 24'.

MITOMBA, a kingdom of Africa, in the country of Sierra Leona, situated on the banks of the river Sierra Leona, called also Mitomba.

MITRA, in *Botany*. See HELVELLA, MITREOLA, and OPHIORRHIZA.

MITRALIS VALVULA, in *Anatomy*, the valve placed at the opening, by which the left auricle and ventricle communicate. See HEART.

MITRARIA, in *Botany*, so denominated from a slight resemblance to a mitre, in the form of the outer calyx.— Cavan. Ic. v. 6. 57.—Class and order, *Didynamia Angiospermia*. Nat. Ord. *Personatæ*, Linn. *Scrophulariæ*, Juss.

Gen. Ch. *Cal.* Perianth double, inferior, permanent, each of one leaf: the outer divided on one side nearly to the bottom, on the other but half way down; the segments ovate, concave, of equal lengths: inner about the same length, in five, deep, lanceolate, nearly equal segments. *Cor.* of one petal, ringent; tubes many times longer than the calyx, round, inflated upward, contracted at the mouth, pervious; limb short, spreading, in two lips; the upper in two parallel lobes; lower in three very deep ones; all ovate and obtuse. *Stam.* Filaments four, awl-shaped, two rather the longest, all longer than the corolla, inserted into the

bottom

bottom of its tube, with the rudiment of a fifth; anthers ovate, two-lobed. *Piſt.* Germen ſuperior, ovate; ſtyle awl-ſhaped, rather longer than the ſtamens; ſtigma ſlightly ſwelling, obtuſe. *Peric.* Berry ſucculent, of one cell. *Seeds* numerous, oblong, poliſhed, imbedded in pulp.

Obſ. It is to be preſumed that the germen has two cells, though they are obliterated in the ripe fruit. The double calyx diſtinguiſhes this genus from *Beſleria.*

Eſſ. Ch. Calyx double; the outer in two lobes; the inner in five. Corolla two-lipped; the lower lip in three equal entire ſegments: tube inflated. Berry ſuperior, of one cell, with many ſeeds.

1. M. *coccinea.* Cavan. Ic. t. 579.—The only known ſpecies. Gathered by Lewis Née at St. Carlos, in Chili, flowering in February. *Stem* ſhrubby, climbing; with weak oppoſite, ſquariſh, ſlightly downy, jointed, leafy *branches.* *Leaves* oppoſite, ſometimes three together, (as often happens to the ſhrubs of that country, witneſs *Fuchſia, Verbena,* and others,) on ſhort ſtalks, ovate, acute, ſtrongly ſerrated, about an inch long; green and ſlightly hairy above; glaucous beneath. *Flowers* on ſimple axillary ſtalks about the length of the leaves, uſually ſolitary, ſometimes two or three together, drooping, ſwelling and roughiſh towards the top. *Calyx* green; the outer one hairy. *Corolla* an inch and half long, of a rich ſcarlet. *Stamens* and *ſtyle* ſcarlet, with yellow anthers. *Berry* globoſe, the ſize of a currant, tipped with the permanent ſtyle.

MITRASACME, from μίτρα, *a biſhop's mitre,* and ακμη, *the ſummit;* Labillardiere ſays "ακμη, *the flower,*" probably by an accidental miſtake, or miſconception. He invented this name for the plants in queſtion, becauſe the acute ſummit of the germen ſeparates, as it advances to maturity, into two points, each crowned with half the divided ſtyle, and reſembles the cloven termination of a mitre. Mr. Brown, though he adopts the name without alteration, obſerves, that *Mitragyne* would have been better. Labillard. Nov. Holl. v. 1. 36. Brown Prodr. Nov. Holl. v. 1. 452.—Claſs and order, *Tetrandria Monogynia.* Nat. Ord. *Rotaceæ,* Linn. *Gentianæ,* Juſſ. Brown. Labillardiere refers it to the *Scrophulariæ* of Juſſieu, but certainly erroneouſly.

Gen. Ch. *Cal.* Perianth inferior, angular, in four, rarely but two, deep, acute, ſlightly ſpreading, permanent ſegments. *Cor.* of one petal, deciduous; tube angular, ſhort; limb ſlightly ſpreading, in four deep, equal ſegments. *Stam.* Filaments four, awl-ſhaped, inſerted into the tube, equal, uſually ſhorter than the corolla; anthers heart-ſhaped, incumbent. *Piſt.* Germen ſuperior, ovate, acute, ſhorter than the calyx, cloven at the point; ſtyle terminal, thread-ſhaped, the length of the corolla, ſoon ſplitting lengthwiſe at the baſe, and finally all the way up; ſtigma capitate, two-lobed, finally divided. *Peric.* Capſule ovate, pointed, of two valves and two cells, the partitions from the inflexed margins of the valves, its apex ſplitting into two parts, each crowned with half the ſtyle, but ſtill cloſed by the reſpective partitions. *Seeds* numerous, ſmall, roundiſh, affixed to the central receptacles.

Eſſ. Ch. Calyx angular, four-cleft. Corolla deciduous, four-cleft, regular; its tube angular. Capſule ſuperior, with two cells and many ſeeds, divided at the top. Style divided at the baſe. Stigma capitate.

This genus is moſt akin to Exacum, (ſee that article,) but ſufficiently diſtinct. Labillardiere deſcribes but one ſpecies, Brown nineteen, of which the firſt ſixteen anſwer moſt perfectly to the generic characters. We ſhall deſcribe Mr. Brown's firſt and fourth ſpecies, as well as M. Labillardiere's.

M. *polymorpha.* Br. n. 1.—Umbel partly compound. Flower-ſtalk elongated, ſmooth like the calyx, whoſe ſegments are naked at the ſummit. Leaves linear, ſomewhat fringed. Stem erect, hairy.—Gathered by Dr. White, as well as Mr. Brown, near Port Jackſon, New South Wales. The *root* ſeems to be annual. *Stems* ſeveral, erect, from three to ſix inches high, ſimple, or ſlightly branched, leafy, round, hairy. *Leaves* oppoſite, in pairs croſſing each other, ſeſſile, three quarters of an inch long, pale, linear, keeled, revolute, entire, obtuſe with a ſmall point; more or leſs fringed towards the baſe; ſmooth above; ſometimes hairy beneath. *Flower-ſtalks* terminal, longer than the ſtem, round, very ſmooth, ſimple or divided, terminating in an *umbel* of two, three, or four flowers, on long ſlender ſmooth ſtalks, one of which ſtalks often bears a lateral flower alſo, ſo that the umbel is then rather a *cyme.* A pair of ſhort leaves accompanies the baſe of the *umbel.* The *calyx* is entirely ſmooth, pale, with green angles. *Corolla* white or purpliſh, bearded within, twice as long as the calyx. The *flowers* and *infloreſcence* are not unlike *Androſace lactea,* Curt. Mag. t. 868, 981, in their general aſpect.

M. *caneſcens.* Br. n. 4.—Umbel about three-flowered, ſeſſile; its ſtalks ſmooth. Segments of the calyx bearded at the tips. Leaves linear, obtuſe, hairy on both ſides. Stem procumbent, hairy all over; with aſcending branches.—Native likewiſe of Port Jackſon. *Root* perennial. *Herb* much like the laſt but very hairy, and of a darker hue. The *umbels,* which have at moſt but three flowers, are accompanied at the baſe by a pair of ſhort ovate hairy *leaves,* and ſtand each at the top of an elongated hairy branch. *Calyx* ſmooth, except a little briſtly tuft at the point of each ſegment. *Corolla* pale blue or purpliſh, with ſomewhat broader rounder ſegments than the foregoing.

M. *piloſa.* Labill. Nov. Holl. v. 1. 36. t. 49. Br. n. 15.—Creeping, hairy. Leaves ſtalked, ovate, fringed. Flower-ſtalks axillary, ſolitary, about the length of the leaves. Calyx hiſpid.—Native of moiſt places in Van Diemen's land. *Labillardiere.* *Root* perennial, branched. *Herb* hairy, procumbent, branched. *Stem* round, hollow. *Leaves* oppoſite, rather fleſhy, ovate, entire, about half an inch long, tapering at the baſe into a ſhort *footſtalk.* *Flower-ſtalks* ſometimes ſhorter, ſometimes longer than the leaves, round, ſimple, ſingle-flowered. *Calyx* hairy all over. *Corolla* finely downy within; its limb ſhort, in four ſhallow lobes.

All the ſpecies are herbaceous, ſome ſmooth, ſome hairy. *Leaves* ſometimes all crowded about the root; always ſimple, undivided and entire.

None of theſe plants have been raiſed in Europe.

MITRAVINDA, in *Hindoo Mythology,* one of the eight wives aſſigned to Kriſhna.

MITRE, Mitra, from Μιτρα, which ſignifies the ſame; a pontifical ornament, worn on the head by biſhops, and certain abbots, on ſolemn occaſions.

The mitre is a round cap pointed, and cleft at top, with pendants hanging down on the ſhoulders, and fringed at both ends. The biſhop's is only ſurrounded with a fillet of gold, ſet with precious ſtones; the archbiſhop's iſſues out of a ducal coronet. Theſe are never uſed otherwiſe than on their coats of arms. Abbots wear the mitre turned in profile, and bear the croſier inwards, to ſhew that they have no ſpiritual juriſdiction without their own cloiſters.

The pope has alſo granted to ſome canons of cathedrals the privilege of wearing the mitre. The counts of Lyons are alſo ſaid to have aſſiſted at church in mitres.

In Germany, ſeveral great families bear the mitre for their creſt; to ſhew that they are advocates, or feudatories, of ancient abbeys, or officers of biſhops, &c.

The

The pope has four mitres, which are more or less rich, according to the solemnity of the feast-days they are to be worn on. The mitre was originally the women's head-dress, as the hat was that of the men. This appears from Remulus in Virgil, who reproaches the Trojans, that they were dressed like women, and wore mitres,

"Et tunicæ manicas & habent redimicula mitræ."

The cardinals anciently wore mitres, before the hat, which was first granted them by the council of Lyons, in 1243. Authors make no mention of the mitre as an episcopal ornament, before the year 1000.

Mitre, in *Architecture*, is the workmen's term for an angle that is just 45 degrees, or half a right one.

If the angle be a quarter of a right angle, they call it a half-mitre.

To describe such angles, they have an instrument called the mitre-square; with this they strike mitre-lines on their quarters, or battens; and for dispatch, they have a mitre-box, as they call it, which is made of two pieces of wood, each about an inch thick, one nailed upright on the edge of the other; the upper piece hath the mitre-lines struck upon it, on both sides, and a kerf, to direct the saw in cutting the mitre-joints readily, by only applying the piece into this box.

Mitre is used by the writers of the Irish history for a sort of base money, which was very common there about the year 1270, and for thirty years before, and as many after. There were, besides the mitre, several other pieces called according to the figures impressed upon them, rosaries, lionades, eagles, and by the like names. They were imported from France, and other countries, and were so much below the proper currency of the kingdom, that they were not worth so much as a halfpenny each. They were at length decryed in the year 1300, and good coins struck in their place. These were the first Irish coins in which the sceptre was left out. They were struck in the reign of Edward, the son of our Henry III., and are still found among the other antiquities of that country. They have the king's head in a triangle full-faced. The penny, when well preserved, weighs twenty-two grains; the halfpenny ten grains and a half.

Mitre-*Sils*, in *Canals*, are the angular sils of lock-gates.

MITRED Abbots. See Abbot.

MITREKE, in *Geography*, a town of Arabia, in the province of Oman; 44 miles W. of Hassek.

MITREOLA, in *Botany*, a name given by Linnæus, in the first edition of his *Genera Plantarum*, to the *Mitra* of Houstoun, engraved in the nineteenth unpublished plate of that botanist, both names alluding to the resemblance of the minute capsule to a mitre. See Ophiorrhiza.

MITROVATZ, in *Geography*, a town of Sclavonia; 32 miles E.N.E. of Gradisca.

MITTA, in our *Old Writers*, is an ancient Saxon measure. Its quantity is not certainly known; but it is said to be *mensura decem modiorum*, a measure of ten bushels. Doomsday.

Mitta, or *mitcha*, being besides a measure for salt and corn, is used for the place where the cauldrons were put to boil salt. "Chalderias quoque ad sal conficiendum cum propriis sedibus mitchæ vocantur."

MITTAMPOUR, in *Geography*, a town of Hindoostan, in Rohilcund; 20 miles S.W. of Bissowla.

MITTAW, the capital of the duchy of Courland, the residence of the duke and of the regency of the country, situated on the river Aa, in that part of the duchy called "Semigallia." The town is extensive, containing within its circuit many gardens and vacant spaces. The walls and moats are decayed, and the houses are destitute of elegance; nevertheless it is tolerably well inhabited. It has two Lutheran churches, a beautiful Calvinistic church, and a Popish church. The town school, though the principal in the country, is not flourishing. The palace, built by the late duke, is a pile of buildings, in which are spacious and handsome apartments almost wholly unfurnished. The academy, constituted at a great expence, contained, in May 1785, almost as many professors as students, the former being eight, and the latter twenty; 56 miles W. of Riga. N. lat. 56° 38'. E. long. 23° 10'.

MITTELWALD, or Miedzibor, a town of Silesia, in the principality of Oels; 16 miles N.E. of Oels. N. lat. 51° 23'. E. long. 17° 40.—Also, a town of Silesia, in the county of Glatz, on the Neisse, near its source, and on the borders of Bohemia; 27 miles S. of Glatz. N. lat. 50° 2'. E. long. 16° 29'.

MITTENDARII, among the Romans, commissioners sent into the provinces by order of the *præfectus prætorii*, or captain of the guards, upon some public account, as to inspect the behaviour and management of provincial governors, and observe whatever was amiss; all which they were to lay before the prefect, who had authority to remedy such abuses.

MITTENDIS *Recordo & Processu*. See Recordo.

MITTENDO *Manuscriptum Pedis Finis*, in *Law*, a writ judicial, directed to the treasurer and chamberlains of the exchequer, to search for and transmit the foot of a fine, acknowledged before justices in eyre, into the common pleas, &c.

MITTENWALD, in *Geography*, a town of Bavaria, in the bishopric of Freysing; 10 miles N.N.W. of Innspruck.

MITTENWALDE, a town of Brandenburg, in the Middle Mark; 22 miles S.E. of Potzdam. N. lat. 52° 15'. E. long. 13° 32'.

MITTER l'Estate, and *Mitter le droit*. See Release.

MITTERBURG, in *Geography*, a town of Istria, and capital of a county, containing several churches and a convent; defended by a castle, which is situated on a rock; 30 miles S.E. of Trieste. N. lat. 45° 23'. E. long. 14° 7'.

MITTERSILL, a town of Salzburg, on the Salzbach; 36 miles S.S.W. of Salzburg.

MITTIMUS, in *Law*, a writ by which records are ordered to be transferred from one court to another; sometimes immediately, as out of the king's bench into the exchequer; and sometimes by a certiorari into the chancery; and from thence, by a mittimus, into another court.

Mittimus is also used for a precept in writing, directed by a justice of peace to a gaoler, for the receiving and safe-keeping a felon, or other offender, by him committed to the gaol.

This is a warrant under the hand and seal of the justice, containing the cause of the commitment of the offender.

MITTWEYDA, in *Geography*, a town of Saxony, in the circle of Leipsic; 30 miles W. of Dresden. N. lat. 50° 58'. E. long. 12° 52'.

MITU, or Mitu-porangu, in *Ornithology*, the name of a Brasilian bird of the pheasant kind, according to Margrave, and the generality of those who speak of it; but supposed by Mr. Ray rather to approach to the nature of the peacock or turkey-cock: and in the Linnæan system a species of the *crax*; the Crax *Alector*, which see.

MITYLENE, or Metelin, the ancient *Lesbos*, one of the

the moft confiderable iflands of the Grecian Archipelago, is fituated in the vicinity of the coaft of Natolia, which it feems to command, and it is placed at an equal diftance from the gulf of Smyrna and the channel of Conftantinople, not far from the principal iflands of the Archipelago. By this pofition the poffeffion of it is extremely important, more efpecially as its interior refources render it fufceptible of the moft flourifhing ftate. But being in the hands of the Turks, the advantages of its fituation are loft, and its population, agriculture, and induftry are from day to day diminifhing and falling into decay. In fome parts of the ifland, faid to be 36 miles long and 14 broad, are volcanic mountains and others compofed of marble, that extend almoft through the ifland: its mountains are covered with wood, particularly with pines that yield excellent pitch for the ufe of the dock-yard eftablifhed near the fouth harbour, and for the careening of the veffels and boats whch come to Mitylene for that purpofe. On thefe mountains are alfo found oaks, the arbutus, the andrachne, the lentifk, the turpentine tree, the myrtle, the agnus caftus, a few leguminous fhrubs, and feveral rock-rofes, among which is that which yields the ladanum. The "velana" oak is more common on the rifing grounds and in the plains than on the mountains. The elm grows in the low and watered places, and the plane tree is chiefly found on the brinks of the rivulets and torrents. The mountains alfo afford a variety of fprings, of which fome are medicinal. The vallies of the ifland are extremely fertile, well watered, and in fome degree cultivated, though in this refpect they admit of much improvement. The principal towns of this ifland are Mitylene and Molivo, which fee; and its harbours are port Caloni and port Olivier. At the head of port Caloni is a plain two leagues in extent, the principal culture of which confifts in corn, cotton, and olive trees; figs, mufk and water melons, pumpkins, and various legumes are alfo gathered here. Here are feveral villages; but the population is not proportioned to the fertility and extent of the foil adapted to culture. The air in this quarter is infalubrious, and often fatal; fo that thefe villages are inhabited only by poor Greek cultivators: the Turks, who are proprietors of lands, preferring a refidence at Mitylene, Molivo, and the other places that are beft fituated in the ifland.

Port Caloni lies in the middle of the fouthern part of the ifland; it is very extenfive and very fafe, but little frequented; none but veffels thwarted by the wind, or buffeted by a ftorm, anchoring here, and not one entering it to take in a cargo, or to unload. The other port, called port Yero or port Olivier, derives its name from the great number of olive trees which are planted in the adjoining plain, and on the declivity of the mountains and hills that furround it. In the eaftern part of the harbour, there are a few calcareous hills, which have not been attacked by the fire of volcanoes. Here is found near the fea a copious fpring of hot mineral water, much valued by the inhabitants of Mitylene. The captain-pacha has built here a bafin capable of containing 10 or 12 perfons; he has alfo repaired the building, which is occupied by the Turk charged to receive all thofe who wifh to make ufe of thefe waters; which are nearly two leagues from Mitylene. Port Olivier is one of the fafeft and moft fpacious harbours of the Archipelago; it lies at the eaftern and fouthern extremity of the ifland, and is faid to abound with fifhes and conchylia, among which are excellent oyfters, which are carried to Scio and Smyrna. It is frequented, during the whole year, by boats and veffels that come hither to load with the oil which is made in the environs. Although this ifland is expofed in winter to fudden gales of wind from the N.E. and the E., which come from the mountains of Afia, as well as to the N. wind, which reigns over the whole Archipelago, the climate is neverthelefs tolerably fine, and the temperature of the air fomewhat mild. It feldom freezes in that feafon; but in fummer the heat is rather powerful on the S. coaft, and the air is, in general, more unwholefome there than in the other parts of the ifland. This ifland is divided into lordfhips; but as the aga of other countries is obliged to join the land-forces when required at Mitylene, he is fubject to a maritime duty, from which he contrives to exempt himfelf by fome pecuniary facrifices. In Mitylene are reckoned 8000 Greeks paying the karatch, (capitation tax,) from the age of feven to their death; fo that the population may be eftimated at near 20,000, including the women and children above that age. It is thought that there are nearly as many Turks as Greeks in the ifland. which contains in all 40,000 inhabitants. The Jews are not fufficiently numerous to be taken into the calculation. According to an ancient cuftom in this ifland, the eldeft daughter alone inherits the property of the father and mother to the exclufion of the fons and other daughters. This cuftom has been long refpected and religioufly followed; but of late the patriarch of Conftantinople, the archbifhop, and all the clergy of Mitylene have fomewhat modified this law, by admitting all the daughters to a partition in a certain proportion. The quantity of oil which is exported from this ifland in ordinary feafons is eftimated at upwards of 50,000 quintals; almoft the whole of which is fent to Conftantinople. The oil is, in general, but of an indifferent quality, becaufe the inhabitants, not having a fufficient number of mills, are obliged to gather their olives flowly. Italy draws from Mitylene 8000 quintals of "Velanida," a part of which comes from the coaft of Afia. Dried figs are an article of exportation of little importance, as well as wool. Cotton, fefamum, filk, ivory, wax, and different fpecies of grain are gathered in a fmall quantity; but the laft are not fufficient for the fupply of the inhabitants, who draw a great quantity of wheat and barley from the coaft of Afia. They alfo import oxen, horfes, and mules for agriculture and draught, as well as part of the fheep that are killed at the flaughter-houfe. Wine is now fcarce, becaufe a great part of the grapes is employed by the Turks in making confection, and becaufe the Turks are accuftomed to convert the other into brandy. The wine of ancient Lefbos has loft its reputation, being fweet and ill-flavoured, as are, in general, all the wines of the Archipelago. Although there are no rivers in this ifland, a few torrents, fupplied by rain waters and fprings, ferve to furnifh fufficient water for confumption and for watering part of the plains, fo as to procure for the inhabitants legumes, herbage, and fruits.

In the channel formed by the ifland of Mitylene and the coaft, at the entrance of the Adramyttian gulf, are fome fmall iflands, which the Greeks call "Mufconifi," and navigators "Myconiffes," but formerly they bore the name of "Hecatones." They are faid to be fertile in wines and oil. For the ancient ftate of this ifland, fee Lesbos.

Mitylene, fometimes called "Caftro," or "Metelin," is the chief town of the ifland above defcribed. It contains 2 or 3000 Greeks, 3 or 4000 Turks, and 30 or 40 Jewifh families. The citadel is fpacious, provided with cannon in tolerably good condition, and defended by 5 or 600 janizaries, almoft all married and fettled. Within it are two mofques and a great number of houfes occupied by this militia. The modern town extends in a femicircle along the north harbours, on a part of the ground occupied by the ancient city; of the former grandeur of which fome remains are ftill vifible. Cicero de Leg. Agr. and Vitruvius, lib. i. c. 6. expatiate on its magnificence. Such was the flourifhing

flourifhing ftate of the fine arts in the city of Mitylene, called by Strabo η μεγαλη πολις, when Marcellus, after the battle of Pharfalia, returned to end his days there in literary eafe, that a modern traveller, after the lapfe of 17 centuries, could behold nothing but proofs of the fplendour to which they had attained. Tournef. Voy. du Lev. tom. ii. p. 81. See Lesbos.

The two harbours of Mitylene are feparated by a tongue of land, on which was conftructed by the Genoefe a citadel, which the Turks have preferved. The upper or north harbour is fecured from the N.E. wind by a jetty, the origin of which is carried back to ancient Greece. The fouth harbour is open and faces the S.E.; it is a little lefs extenfive and lefs deep than the other; none but the boats of the country can anchor in it, while the north harbour can admit fmall merchant veffels. Men of war and European fhips, which commerce attracts to Mitylene, anchor in fummer off the fouth harbour; but they fcarcely expofe themfelves there in winter, becaufe there happen fometimes in that feafon very impetuous gales from the N.E., which might occafion their deftruction, or oblige them to cut their cables, and get under fail with all expedition. There was formerly a canal of communication between thefe two harbours, which feparated the tongue of land juft mentioned, and formed of it an ifland, on which was built part of the town. Time has choked up the canal, but it has not deftroyed the jetty, which ran from the little ifland, and fheltered the north harbour from the worft weather. N. lat. 39° 20′. E. long. 26° 14′. Olivier's and Sonnini's Travels. Clarke's Travels, vol. ii.

MITZLER, Lorenz Christoph, of Kolof, in *Biography*, born in 1711, a fingular character and voluminous publifher on mufical fubjects. But before he meddled with mufic, his pretenfions were various. He fet off a doctor of phyfic, then got ordained a minifter of the Lutheran church, and next affumed the character of a counfellor learned in the law. After trying his hand at thefe profeffions, in mufic he appeared at firft a theorift and critic more than a practical mufician. In 1740, however, he compofed odes, which were mathematical, dry, and dull. Thefe were ridiculed throughout Germany. Matthefon is very jocular on his works; but Mitzler took all for ferious panegyric. Among his numerous productions fpecified by Gerber, (in his continuation of Walther's Mufical Lexicon,) many of which have, perhaps, never been read, there is no one which feems to have merited that honour. He died in 1778. If his life was of little ufe to the world, it muft be owned that he diligently tried to render the world ufeful to himfelf.

MITZUZ, in *Geography*, a town of Japan, in the ifland of Niphon; 110 miles W.N.W. of Jedo.

MIXCO, a town of Mexico, in the province of Guatimala; 25 miles E. of Guatimala.

MIXEN, in *Agriculture*, a term applied to a compoft dunghill. See Compost and Manure.

MIXING *of Mortar*. See Mortar.

MIXIS, Μιξις, *Mixture*, in the *Ancient Mufic*, was one of the parts of Greek melopœia, by which the compofer was inftructed how to combine intervals properly, and diftribute them in different genera and modes, according to the character of the melody propofed. See Melopœia.

MIXO-LYDIAN, the name of one of the modes of ancient mufic, called alfo *Hyper-Dorian;* which fee. The mixo-lydian mode was the moft acute of the feven modes to which Ptolemy had reduced all the modes of the Greek mufic. (See Mode.) This mode was faid to be affecting and paffionate, exciting great emotions, and therefore applicable to tragedy. Ariftoxenus affures us, that it was invented by Sappho; but Plutarch avers, that ancient fables afcribe it to Pythoclides. He alfo fays that the Argians fined muficians who firft adopted it, and who had introduced into mufic the ufe of feven ftrings; that is, making the feventh ftring a key-note.

MIXT, or Mixed *Body*, in *Philofophy*, is that which is compounded of divers elements or principles.

By which *mixt* ftands contradiftinguifhed from *fimple*, or *elementary*, which is applied to bodies confifting of one principle only.

The fchoolmen define a mixt body to be a whole refulting from feveral ingredients, altered, or new modified, by the mixture. On which principle the feveral ingredients do not actually exift in the mixt; but they are all changed, fo as to confpire to a new body, of a different form from that of any of the ingredients. But the modern philofophers rarely conceive the term in fo much ftrictnefs. The bufinefs of chemiftry, we fay, is to refolve mixt bodies into their principles, or component parts.

The fchool philofophers diftinguifh mixt bodies into perfect and imperfect.

Mixts, *Perfect*, are the clafs of organized and animated bodies, where the elements, or ingredients of which they are compofed, are changed, or transformed, by a perfect mixture. Such are plants, beafts, and men.

Mixts, *Imperfect*, are unorganized and inanimate bodies, the forms of which remain ftill the fame as of the ingredients that conftitute them. Such are meteors, minerals, metals, &c.

Mixt, in *Chemiftry*. See Aggregate.

Mixt, or *Mixed Action*, in *Law*. See Action.

Mixt *Angle, Fable*. See Angle, and Fable.

Mixt *Figure*, in *Geometry*, is that which confifts partly of right lines, and partly of curve lines.

Mixt *Force, Hiftory, Mathematics*. See Force, History, and Mathematics.

Mixt, or *Mixed Larceny*. See Larceny.

Mixt *Mode*. See Mode.

Mixt *Number*, in *Arithmetic*, that which is partly an integer, and partly a fraction: as $4\frac{1}{2}$.

Mixt *Obligation*. See Obligation.

Mixt *Ratio*, or *Proportion*, is when the fum of the antecedent and confequent is compared with the difference between the antecedent and confequent: as if $\begin{matrix} 3 : 4 :: 12 : 16 \\ a : b :: c : d \end{matrix}$

then $\begin{matrix} 7 : 1 :: 28 : 4 \\ a + b : a - b :: c + d : c - d. \end{matrix}$

Mixt *Salts, Stairs, Service*. See Salts, Stairs, and Service.

Mixt *Tithes*, are thofe of cheefe, milk, &c. and of the young of beafts. See Tithe.

MIXTILINEAR Angle. See Angle.

MIXTION, Mixtio, or *Miftio*, the act of mixing; or the union and coalition of divers corfpucles into one body. The Peripatetics, who hold an alteration effential to mixtion, define it the union of feveral altered ingredients, or mifcibles.

Mixtion makes a confiderable operation in the chemical and Galenical pharmacy; where divers powders, fpecies, and other fimples, are faid to be *mixed, mifceri*, though without any communication, or tranfition of the virtues of one into thofe of another. See Combination and Composition.

MIXTURE, Mescolanza, a connection in the modes of canto-fermo, in chants which go higher or lower than the octave, and modulate into another mode, participating both

both of authentic and plagal. The mixture is only practicable in modes that go in pairs, as the firſt mode or tone, and the ſecond, the third with the fourth, the plagal with the authentic, and reciprocally.

MIXTURE, the name of a ſtop in the full organ, repeating the ſame intervals of the octave in the key of C throughout the ſcale. See FURNITURE.

MIXTURE, *Mixtura*, or *Miſtura*, in a philoſophical ſenſe, is an aſſemblage, or union, of ſeveral bodies of different properties, in the ſame maſs.

To determine the ratio of the ingredients of a mixture, is that celebrated problem propoſed by Hiero, king of Syracuſe, to Archimedes, on occaſion of a crown of gold, in which the workman had fraudulently mixed ſilver; the ſolution of which was matter of ſo much tranſport to that divine mechanic. See HIERO's *Crown*.

MIXTURE, in *Matters of Drapery*, denotes the union or blending of ſeveral wools of different colours, not yet ſpun. Hence a mixture, or mixed ſtuff, is that whoſe wool and warp are of wools of different colours, dyed and mixed before they were ſpun. See CLOTH.

MIXTURE, in *Pharmacy*, differs from a julep in this reſpect, that it receives into its compoſition not only ſalts, extracts, and other ſubſtances diſſoluble in water, but alſo earths, powders, and ſuch ſubſtances as cannot be diſſolved.

Mixtures depend upon diffuſion and ſuſpenſion in any liquid of inſoluble ſubſtances minutely divided; and for this purpoſe, it is often neceſſary that the liquid itſelf ſhould be rendered more denſe by the addition of ſome viſcid matter, as mucilage or ſyrup. Mixtures are ſometimes denominated from their medical properties and effects; ſuch as aſtringent, diuretic, laxative, &c. but moſt commonly from the name of the principal ingredient uſed in their compoſition. The London college includes under the general head of mixtures thoſe medicines which have uſually been denominated *emulſions*. See EMULSION.

The principal mixtures are the following:

Miſtura ammoniaci, Mixture of gum ammoniac, P. L. is formed by rubbing two drachms of gum ammoniac with half a pint of water gradually poured upon it, until they are perfectly mixed. A ſimilar preparation, under the name of *lac ammoniæ*, milk of ammoniac, is ordered by the Dublin college to be made by triturating a drachm of gum ammoniac in eight fluid-ounces of penny-royal water, gradually adding the water until the mixture acquires the appearance of milk, and then ſtraining it through linen. This preparation is beneficially employed as an expectorant in doſes of from f. ℥ſs to f. ℥j, combined with an equal quantity of almond mixture.

Miſtura amygdalæ, Almond mixture, P. L. 1809, Lac amygdalæ, P. L. 1787, Emulſio communis, P. L. 1745, is prepared by gradually adding a pint of diſtilled water to two ounces of almond confection, and rubbing them together. A ſimilar mixture, called *emulſio amygdalæ communis*, almond emulſion, in the Edin. diſp. is prepared by well beating an ounce of blanched ſweet almonds in a ſtone mortar, gradually adding 2½ lbs. of water, and then ſtraining. The *lac amygdalæ*, almond milk of the Dub. coll. is formed by rubbing 1½ oz. of ſweet almonds blanched with ½ oz. of purified ſugar, adding gradually 2½ pints of water, and then ſtraining. The *emulſio mimoſæ niloticæ*, emulſio arabica, Edin. or emulſion of gum arabic, is made in the ſame manner as the almond emulſion, 2 oz. of gum arabic being added during the trituration of the almonds. The *Arabic emulſion*, Dub. is prepared by diſſolving two drachms of gum arabic in powder in a pint of warm decoction of barley, and when it is almoſt cold, pouring it gradually upon half an ounce of blanched ſweet almonds beaten to a paſte, with the ſame quantity of purified ſugar, triturating at the ſame time ſo as to form a milky mixture; and then ſtraining.

The mixtures above deſcribed are uſed as diluents and demulcents in inflammatory fevers, ſtrangury, dyſury, and other affections of the urinary organs; but they are principally employed as vehicles for the exhibition of more active remedies. The doſe is from f. ℥ij to oſs frequently repeated.

Miſtura aſſafœtidæ, Mixture of aſſafœtida, P. L. 1809, Lac aſſafœtidæ, P. L. 1787, is prepared by rubbing two drachms of aſſafœtida with half a pint of water, gradually poured upon it, until they are perfectly mixed. The *lac aſſafœtidæ*, milk of aſſafœtida, Dub. is obtained by triturating a drachm of aſſafœtida with eight fluid-ounces of penny-royal water gradually added until an emulſion is formed. This mixture is chiefly uſed as an enema in flatulent colic, worms, and convulſions of infants occaſioned by irritation of the bowels during dentition. When given by the mouth, the doſe may be from f. ℥ſs to f. ℥jſs often repeated.

Miſtura camphoræ, Camphor mixture, P. L. 1809, Miſtura camphorata, P. L. 1787, Julepum é camphora, P. L. 1745, is formed by rubbing half a drachm of camphor with 10 minims of rectified ſpirit, then adding gradually a pint of water, and ſtraining the liquor. The *miſtura camphorata*, Dub., camphorated mixture, is prepared by rubbing a ſcruple of camphor with 10 drops of rectified ſpirit of wine, and then with half an ounce of refined ſugar, adding a pint of water during the trituration, and ſtraining the mixture through linen. This is an elegant vehicle for more active remedies in low fevers and nervous affections. The doſe is from f. ℥j to f. ℥ij, given every three or four hours. The *emulſio camphorata*, Edin., camphorated emulſion, is made of a ſcruple of camphor, two drachms of ſweet almonds blanched, a drachm of refined ſugar, and 6 oz. of water, in the ſame manner as the common almond emulſion. This is given with advantage in typhus and nervous caſes in doſes of f. ℥ij, every three or four hours. See CAMPHOR.

Miſtura cornu uſti, Mixture of burnt hartſhorn, P. L. 1809, Decoctum cornu cervi, P. L. 1787, Decoctum album, P. L. 1745, is prepared in the manner deſcribed under *Hart's* HORN.

Miſtura cretæ, Chalk mixture, P. L. 1809, Miſtura cretacea, P. L. 1787, Julepum é creta, P. L. 1745, is formed by mixing half an ounce of prepared chalk, three drachms of refined ſugar, half an ounce (an ounce Dub.) of acacia gum powdered in a pint of water. The *potio carbonatis calcis*, olim, *potio cretacea*, Edin., chalk potion, is made by rubbing together 1 oz. of prepared carbonate of lime (chalk), ½ oz. of refined ſugar, 2 oz. of mucilage of gum arabic, then gradually adding 2½ lbs. of water and 2 oz. of ſpirit of cinnamon, and mixing them.

Theſe preparations of chalk are given in acidity of the primæ viæ, and combined with opium or catechu in diarrhœa. The doſe is from f. ℥j to f. ℥ij, given every three or four hours; or after every liquid evacuation.

Miſtura ferri compoſita, Compound mixture of iron, P. L. 1809, is prepared by rubbing together a drachm of powdered myrrh, 25 grains of ſubcarbonate of potaſs, and a drachm of refined ſugar, and during the trituration adding gradually, firſt, 7½ oz. of roſe-water and half a fluid-ounce of ſpirit of nutmeg, and laſtly, a ſcruple of ſulphate of iron powdered. The mixture ſhould be immediately poured into a proper glaſs bottle and ſtopped cloſe. The myrrh requires to be well dried before it can be reduced to powder. This mixture, which is very ſimilar to the celebrated antihectic

hectic mixture of Dr. Griffiths, is a compound very commonly directed as an useful tonic, particularly in hysteria and chlorosis, and in phthisis, when no active inflammatory diathesis subsists. The dose is from f. ℥j to f. ℥ij, given two or three times a day.

Mistura guaiaci, Mixture of guaiacum, P. L. 1809, Lac guaiaci, P. L. 1787, is made by rubbing 1½ drachm of guaiacum gum-resin with two drachms of refined sugar; then with two fluid-drachms of mucilage of acacia gum, and when they are mixed, pouring on gradually eight fluid-ounces of cinnamon water. This is administered in doses of from f. ℥ss to f. ℥ij, two or three times a day; diluting freely with tepid barley water or gruel for aiding its operation.

Mistura moschi, Musk mixture, P. L. 1809, Mistura moschata, P. L. 1787, Julepum è moscha, P. L. 1745, is prepared by rubbing a drachm of musk with the same quantity of refined sugar, then with the same quantity of acacia gum powdered, and adding by degrees six fluid-ounces of rose-water. This may be given to the quantity of f. ℥ij every three or four hours in spasmodic affections and the sinking state of typhus. The late Mr. White of Manchester found this mixture combined with ammonia ℈ss, spirit of lavender f. ʒi, and spirit of juniper f. ʒj, very useful in sloughing phagedenic ulcers of a syphilitic and strumous nature.

MIZAEL, in *Geography*, a town of Norway, in the diocese of Drontheim; 44 miles N.E. of Romsdal.

MIZELL, a town of Bohemia, in the circle of Boleslaw; nine miles S.E. of Jung Buntzel.

MIZEN. See Misen.

MIZEN-HEAD, in *Geography*, supposed to be the Notium of Ptolemy, a cape of the county of Cork, Ireland, being the south-western extremity of the island as well as of the county of Cork. N. lat. 51° 23′. W. long. 9° 43′.

Mizen-head, a cape of Ireland, in the county of Wicklow, on the E. coast between Wicklow-head and Arklow. N. lat. 52° 52′. W. long. 6° 4′.

MIZNEPHETH, in the *Jewish Antiquities*, a kind of mitre worn by the high-priest. See Cidaris.

MIZQUITL, in *Botany*, a name used by some authors for that species of the acacia, or Egyptian thorn, whose unripe fruit affords the inspissated juice, which is the true succus acaciæ of the shops, and whose gum naturally flowing from the trunk and branches is the true gum arabic.

MIZZY, in *Agriculture*, a term sometimes applied to a bog, or a quagmire.

MLIOWNOWY, in *Geography*, a town of Poland, in the palatinate of Kiev; 40 miles S.W. of Czyrkasy.

MLLAVA, a town of the duchy of Warsaw; 40 miles N.N.E. of Plozk.

MLODE, a town of Poland, in the palatinate of Kiev; eight miles S.E. of Bialacerkiew.

MNAKEH, a town of Arabia, in the province of Yemen; 12 miles W. of Sana.

MNASIUM, in *Botany*, is most probably named by Schreber from some resemblance to the μνάσιον of Theophrastus, an Egyptian plant, eatable like *papyrus*, and of a very sweet taste. Mart. Schreb. 214. Willd. Sp. Pl. v. 2. 22. Mart. Mill. Dict. v. 3. (Rapatea; Aubl. Guian. v. 1. 305. Juss. 44. Lamarck Illustr. t. 226.)—Class and order, *Hexandria Monogynia*. Nat. Ord. *Ensatæ*, Linn. *Junci*, Juss.

Gen. Ch. *Cal.* Spatha of two, ovate valves, terminated by a linear, spreading leaf. Perianth inferior, of one leaf, divided into three, lanceolate, concave, acute, bordered segments. *Cor.* of one petal; tube very short; limb cloven into three, deep, lanceolate, concave, acute segments. *Stam.* Filaments six, very short, inserted into the tube; anthers long, square, terminated by an ovate, excavated, acute leaflet. *Pist.* Germen superior, three-lobed, roundish, marked with three streaks; style very long, striated; stigmas three, spirally twisted together. *Peric.* and *Seeds* unknown.

Eff. Ch. Spatha of two valves, many-flowered. Calyx three-cleft. Corolla of one petal, three-cleft, with a very short tube. Anthers terminated by a leaflet. Stigmas three, spirally twisted.

1. M. *paludosum.* Willd. and Martyn. (Rapatea paludosa; Aubl. Guian. t. 118.)—Native of woods, marshes, and the banks of rivers in Guiana, flowering in June.—*Root* perennial, woody, fibrous. *Stalks* numerous, naked, two feet high, striated, compressed, bordered, gradually broader towards the top, and springing from the bosoms of the radical leaves. *Leaves* very long, narrow, acute, smooth, striated, entire; sheathing at the base, and mutually embracing each other; narrower above the sheath. *Flower-stalks* scaly beneath the base of the calyx. *Corolla* yellow.

Willdenow observes, that *Mnasium* has greatly the habit of a *Pontederia*, but that it differs materially from that genus in the structure of its flowers.

MNEME-CEPHALICUM Balsamum, the name of a famous compound balsam, said to have been purchased from a certain English physician by Charles duke of Burgundy, at the price of 10,000 florins. Some who have been very lavish in its praises have affirmed, that it has a power of preserving in the mind the remembrance of all things that are past; but this kind of praise seems to be extravagant and unfounded; insomuch, that we think it needless to enumerate the ingredients of which this famous balsam (which we regard as fabulous in the effects ascribed to it) consists. We shall therefore content ourselves with referring to Sennertus' account of it in his Pract. lib. i. cap. 5.

MNEMONIC Tables. Among the artifices to assist the memory, this is one of great use.

Mnemonic tables exhibit in a regular manner, what is to be remembered of the same subject. And although the sciences ought to be taught in a scientifical manner, as much as possible, and that every thing should be so placed as to be intelligible and demonstrable from what has preceded it; yet tables ought not to be rejected, as they are helps to retain the doctrines of which the mind has had sufficient evidence. In such tables the properties of things are to be expressed concisely; illustrations and demonstrations should be left out, as the proposition ought to have been made sufficiently clear and certain, before it is registered in the table. Hence, the contents of such tables ought only to be the definitions, and the propositions relative to the subject. If a subject require a long table, this may be subdivided into smaller; by making first a table of the most general heads, and referring from each of these heads to a separate table; by this means the order and connection of the whole will be preserved. Such tables would produce a local and artificial memory, of great use to the retention and recollection of things. They would greatly facilitate a distinct view of the properties of their subjects, and facilitate recapitulation. Besides, as the expressions used in such tables ought to be very concise, so as just to be sufficient to excite the idea of the object to be remembered, soon after that idea has been acquired; after some time a certain obscurity will be found in perusing the tables, which will give us timely warning that our ideas begin to fade, and that they ought to be renewed. And this may be done without much trouble, if not too long delayed.

MNEMONICA, formed of μνημονευω, I retain in memory, denotes the art of memory. Under the article MEMORY we have illustrated the nature and operation of this faculty, and mentioned some of the principal methods, both ancient and modern, which have been invented for aiding the exercise of it. Since that article was printed, we have had an opportunity of perusing a publication, entitled "The Art of Memory, founded upon the principles taught by M. Gregor Von Feinaigle," &c. The author has, with great industry of research, detailed the principal systems of artificial memory, both before and after that of Mr. Grey was announced to the public in his "Memoria Technica," of which we have given a concise account under the article above cited. It sufficiently appears, without any laboured proof, that the principal expedient for assisting the memory is derived from association; and of this expedient Simonides, Cicero, and Quintilian availed themselves in the contrivances which they suggested for this purpose. Having fixed upon certain symbols of the subjects which they wished to recollect, they would transfer these symbols to the different compartments of a house, or public building, or to the different parts of the walls of a city, a public road, or a picture, and when these compartments, &c. presented themselves to view, or occurred in recollection, they would suggest the symbols attached to them, and these symbols would revive the remembrance of the sentences or subjects, or parts of those sentences, to which they appertained: and thus, by means of such compartments and symbols, a whole discourse might be committed to memory, and recollected when occasion required. Upon these principles, as we have reason to believe, was founded the topical memory of the ancients; and from this source, without doubt, are derived all the various systems of local and symbolical memory, that have been practised in more modern times.

Bradwardine seems to have been the first, who in this country made an attempt to form a system of topical memory on the plan of the ancients. (See BRADWARDINE.) The "Ars Memorativa" of Publicius, probably printed before the year 1482, treats of the arrangement of places, and the combination of images, and has been the fountain whence many subsequent writers have derived considerable information. Grataroli, in his "Castel of Memorie," a translation of which by W. Fulwood was published at London in 1562, and Thomas Watson of Oxford, in his MS. entitled "Artificiosæ Memoriæ Libellus," dated 1583, preserved in the British Museum, have referred to the ancient plan of dividing houses and walls for the assistance of the memory. J. Baptista Porta, in his "Ars Reminiscendi," printed at Naples in 1602, treats, like the authors already mentioned, of places and images; exchanges figures for symbols; represents letters by symbols, and gives two alphabets, one consisting of letters formed from various objects, and another, in which they are deduced from the different positions of the human body. Schenckel, a native of Bois-le-Duc, in 1547, and the author of "Gazophylacium Artis Memoriæ," published in 1610, propagated his discoveries in the mnemonic art through the Netherlands, Germany, and France, and they were received with great applause. The performances of this author excited astonishment; he repeated 40 sentences of some length, without any connection, and after merely writing them down and reading them twice, backwards and forwards, and in any order that was desired. Some of his pupils also distinguished themselves in a still more surprising manner. A German translation of Schenckel's work was published by Dr. Klüber, in 1804, under the title of "Compendium der Mnemonik, &c." The treatise of John Willis, entitled "Mnemonica &c." Lond. 1618, and a translation of which by Sowersby was published at London in 1661, contains many curious particulars. His plan is that of a topical memory, or of a memory to be assisted by some suitable edifice, and its appropriate divisions. The "Ars Memoriæ localis," published at Leipsic in 1620, and written by one of the professors of the university, merits preference, according to Morhof in his "Polyhistor," to all the treatises on mnemonics for perspicuity and arrangement. Morhof, in his dissertation "De Arte Lulliana" (see Polyhistor, T. t. l. 2. c. 5.) has preserved an elaborate account of Raymund Lully's system of artificial memory, to which he directed his attention at a very early period, and he is supposed to have been the first among the moderns who practised this art. (See the article LULLY.) D'Assigny's "Art of Memory," a third edition of which was published in London in 1706, contains many useful observations on the importance of a retentive memory, and on the mode of aiding the exercise of it; but it closes with some fanciful receipts for "comforting the memory," principally taken from early writers on this subject, and hardly deserving to be rescued from oblivion. Buffier's "Pratique de la Memoire Artificielle, &c." 8vo. Paris, 3 tom. 1719—1723, is intended to facilitate the acquisition of chronology and universal history, and his system is said to be ingenious and simple. Of Grey's "Memoria Technica" we have given a concise account under the article *Artificial* MEMORY; more need not here be said, as this useful manual is in almost every one's possession. Lowe's "Mnemonics delineated in a small Compass and easy Method, &c." 8vo. Lond. 1737, is considered by Dr. Watts as a material improvement of Grey's treatise, and accordingly it has been annexed to the eighth and last edition of that work. In Feyjoo's "Cartas Eruditas y Curiosas," 4to. 5 tom. Madrid 1781, there is a dissertation on remedies for the memory, and one on the art of memory. In another essay, the principles of the art are stated to consist in particular places and images, and a sphere or globe is divided into various compartments. In a section of this essay, Feyjoo speaks of remembering certain words by the means of images, and in another section he illustrates the application of the art to poetry. Since the posthumous publication of these essays, the author having died in 1765, after having been with difficulty saved from the horrors of the Inquisition, for the freedom of his censures on the licentiousness of the clergy, and the superstitions of the Romish church, (see FEYJOO,) no mention of the local and symbolical memory occurs until the year 1806, when it was announced in the "Philosophical Magazine," (vol. xxvi. p. 282.) that the study of the science of mnemonica was revived in Germany. In 1807, M. Gregor Von Feinaigle, a native of Baden, visited Paris, and delivered lectures on his "New System of Mnemonics and Methodics."

In 1811, M. Feinaigle visited England; and in June of that year he obtained leave from the managers of the "Royal Institution" to exhibit to the public an experiment of the efficacy of his method "of facilitating and assisting memory."—"Four children, two boys and two girls, all under 14 years of age, had been put under M. Feinaigle's care but two or three days before: he had one of the girls but an hour and a half; and the longest tuition that any of them had received was but four hours and a half.—One of them repeated Goldsmith's Hermit backward and forward, and stated the stanza, the line, and the order of any remarkable word required of him.—One little girl answered to questions in the chronology of the Roman emperors; and another multiplied, without slate or paper, two sums of eight figures by eight, and declared that she had not previously been taught arithmetic.—A boy determined the geographical

cal situation, in degrees and minutes, of 50 different cities; and on a planisphere chalked out on a board, marked down the true situation of places named to him.—Mr. Fincher, of the Institution, also recited the mineralogical tables of Haüy, the second part of which he had taught himself on M. Feinaigle's system, together with the first part of Brisson's ornithologic system; and he declared, from his own experience, that the principles of M. Feinaigle's art were equally calculated to give facility in the acquisition, and certainty in the retention, of the tables of any other science—a fact which was confirmed by several gentlemen present, who have attended the private courses of the professor."—M. Feinaigle has since that time repeated his exhibitions at Liverpool, in Scotland, and in London, to the astonishment of many persons who attended.

Locality, or the connection of our ideas with places, as we are informed by the anonymous author, whose treatise we have cited, is made the foundation of this system. In this respect, it is analogous to the scheme of mnemonics practised by the ancients, but it is here applied much more extensively and advantageously than it was by them. How far it deserves this commendation, the reader who is desirous of farther information concerning it will be informed by consulting the treatise already quoted; in which, as we conceive, there is a just developement of the principles of M. Feinaigle; but the detail is so extensive and so incapable of abridgment, that it would be inconsistent with our limits to enlarge, so as to give any satisfaction to our readers. The general principle of this art is that of dividing walls and houses into different compartments, and annexing numbers to them in a particular order, or words together with the numbers; the recollection of these words being assisted by associating some idea of relation between the objects and their situation. Consonants are also annexed to the figures, which letters are not merely arbitrary, but adapted as nearly as possible to the form of the figures. These letters, and the figures which they are intended to represent, should be impressed strongly on the memory, as the consonants must be converted into words by the introduction of vowels. To each word should be affixed some striking idea; and the objects that are selected, each of which is expressed by a word, must be arranged in different places, beginning with the floor, and proceeding to the first, second, and third wall, &c. Having divided a room into parts, as the floor and walls, subdivided these into places, changed figures into letters, and formed words, we shall by these means be enabled to remember a series of figures or things. For this purpose, it would be advantageous to fix upon some room to which we have been accustomed. If this room should have been hung with pictures, engravings or plans, or ornamented with busts, &c. the remembrance of places, or localities, will be facilitated. The order of things in a room will be familiar to us. The squares or places may be filled with some pictures of our own drawing, and it will be as easy to remember the symbols, or hieroglyphics, as to remember the situation or place of any picture, or article of furniture in a room. By supposing the floor to be constructed of mosaic, instead of being covered with a carpet, we shall have spaces for symbols. The outlines of the symbols are intended to represent, as accurately as possible, the various figures in the two rooms, to which our plan extends, so that they may be permanently fixed in our memory. How these symbols are made applicable to chronology, history, &c. requires a more diffuse detail than our limits will allow. Having already given our opinion of the various artifices that have been devised for aiding the memory, it is needless to enlarge. The reader will perceive that it must require time and labour, and no inconsiderable exertion of memory, to derive any advantage from mechanical modes of aiding the exercise of it.

Under the article MEMORY, we have given some examples of extraordinary retentiveness in the use of this faculty. To those already mentioned, we shall here add some others. See AVICENNA, FULLER, JEWEL, and SCALIGER.

Lipsius remembered the whole history of Tacitus, and pledged himself to recite it word by word, or any passage that might be required. Francis Suarez could repeat all St. Augustine's works by heart, alleging particular lines and words, with the volume and page in which they occurred. Magliabecchi had a surprising memory. A gentleman who wished to try it, lent him a MS. which he was going to print, and soon after it was returned, the author came to him with a melancholy aspect, and pretended it was lost. Magliabecchi being requested to recollect as much of it as he could, wrote the whole without missing a word, or making any variation in the spelling. We have mentioned some extraordinary instances of the power of memory possessed by Jedediah Buxton under his article. Without the assistance of pen, ink, chalk, or any other mark, he could multiply five or six figures by as many, or divide as large sums off hand, in less time than the most expert arithmeticians could perform their operations. Being asked how many cubical $\frac{1}{8}$ths of an inch were contained in a body, whose three sides were 23145789 yards, 5641732 yards, and 54965 yards; after about five hours, in the midst of more than 100 of his fellow labourers, he computed the result; and gave it in a line of 28 figures, without the least hesitation or mistake. He would repeat his answers to difficult questions a month or two after he had solved them. Of his own accord he calculated how much one farthing doubled 140 times would amount to; and the answer was set down from his lips in 39 places of pounds, and an odd 2*s*. 6*d*. Being once asked how many barley corns would reach eight miles; he answered, in $1\frac{1}{2}$ minute, 1520640 barley corns. In 13 minutes he computed, that the distance of York from London, being 204 miles, a coach-wheel, whose circumference was six yards, would turn round in that interval 59,840 times. By the strength of his memory he multiplied 39 figures by 39 figures, and had no recourse to pen, ink, or paper.

At the moment of writing this article, the editor is informed of a boy, from Vermont in America, not eight years of age, who performs wonders in extempore calculation. The rapidity and correctness with which he multiplies and divides large numbers, with which he finds all the factors of a composite number, and whether any number proposed be prime or not, and with which he solves a variety of arithmetical questions that are proposed to him, are truly astonishing.

The editor has been favoured by F. Baily, esq. of Gray's Inn, an eminently competent judge of those performances in which this boy excels, with the following account. His name is Zerah Colburn. He was born at Cabut, a town lying at the head of Onion river, in Vermont, America, on the 1st of September 1804. He began to manifest his extraordinary powers in August 1810, when he was not six years of age; though he had derived no other advantage from education beyond what was to be obtained at a small school in a remote part of the country. On the 12th of May 1812 he arrived in this country, and has since exhibited his astonishing performances to a great number of spectators, and before many persons of the first eminence for mathematical and philosophical knowledge.

At a meeting of his friends, which was held for the purpose

pose of concerting the best method of promoting the views of the father, this child undertook, and completely succeeded in, raising the number 8 progressively up to the sixteenth power; and in naming the last result, *viz.* 281,474,976,710,656, he was right in every figure. He was then tried as to other numbers, consisting of one figure; all of which he raised (by actual multiplication and not by memory) as high as the tenth power, with so much facility and dispatch, that the person appointed to take down the results was obliged to enjoin him not to be so rapid. With respect to numbers consisting of two figures, he would raise some of them to the sixth, seventh, and eighth power; but not always with equal facility: for the larger the products became, the more difficult he found it to proceed. He was asked the square root of 106929; and before the number could be written down, he immediately answered 327. He was then required to name the cube root of 268,336,125; and with equal facility and promptness he replied 645. Various other questions of a similar nature, respecting the roots and powers of very high numbers, were proposed by several of the gentlemen present; to all of which he answered in a similar manner. One of the party requested him to name the factors which produced the number 247483, which he immediately did by mentioning the two numbers 941 and 263; which indeed are the only two numbers that will produce it. Another of them proposed 171395, and he named the following factors as the only ones that would produce it; *viz.* 5×34279, 7×24485, 59×2905, 83×2065, 35×4897, 295×581, and 413×415. He was then asked to give the factors of 36083; but he immediately replied that it had none; which in fact was the case, as 36083 is a prime number. Other numbers were indiscriminately proposed to him, and he always succeeded in giving the correct factors, except in the case of prime numbers, which he discovered almost as soon as proposed. One of the gentlemen asked him how many minutes there were in forty-eight years; and before the question could be written down, he replied 25,228,800: and instantly added, that the number of seconds in the same period was 1,513,728,000. Various questions of the like kind were put to him; and to all of them he answered with nearly equal facility and promptitude; so as to astonish every one present, and to excite a desire that so extraordinary a faculty should, if possible, be rendered more extensive and useful.

Being asked to inform the gentlemen present how he was enabled to answer, with such facility and correctness, the questions that were proposed to him, he declared that he did not know how the answers came to his mind. It was observed, however, that the child performed his several operations by some rules known only to himself. The discovery was made in one or two instances, when he had been closely pressed upon that point. In one case he was asked to tell the square of 4395; he at first hesitated, fearful that he should not be able to answer it correctly: but when he applied himself to it, he said it was 19,316,025. On being questioned as to the cause of his hesitation, he replied that he did not like to multiply four figures by four figures: but, said he, "I found out another way; I multiplied 293 by 293, and then multiplied this product twice by the number 15, which produced the same result." On another occasion, his highness the duke of Gloucester asked him the product of 21,734 multiplied by 543: he immediately replied 11,801,562: but, upon some remark being made on the subject, the child said that he had, in his own mind, multiplied 65202 by 181. Now, although in the first instance it must be evident to every mathematician that 4395 is equal to 293×15, and consequently that $(4395)^2 = (293)^2 \times (15)^2$; and further, that in the second case 543 is equal to 181×3, and consequently that $21734 \times (181 \times 3) = (21734 \times 3) \times 181$; yet, it is not the less remarkable that this combination should be immediately perceived by the child, and we cannot the less admire his ingenuity in thus seizing instantly the easiest method of solving the question proposed to him.

Amongst a variety of cases of this kind, the following singular instance is particularly worthy of being recorded. He was asked to tell the square of 999999: which, after some little time, he stated to be 999,998,000,001; and he further observed, that he had produced this result by multiplying the square of 37037 by the square of 27. He then, of his own accord, multiplied that product by 49; and said that the result (*viz.* 48,999,902,000,049) was equal to the square of 6,999,993. He afterwards multiplied this product by 49; and observed that the result (*viz.* 2,400,995,198,002,401) was equal to the square of 48,999,951. He was again asked to multiply this product by 25; and in naming the result (*viz.* 60,024,879,950,060,025), he said that it was equal to the square of 244,999,755. These astonishing efforts of his mind require no comment; and sufficiently shew that he possesses a more intimate knowledge of the science of numbers than can be obtained by the ordinary, or even more abstruse rules of arithmetic.

It is well known to mathematicians, that Fermat had asserted that $2^{32} + 1 = 4,294,967,297$ was a prime number; but Euler detected that error, by discovering that it was equal to $6,700,417 \times 641$. The same number was proposed to this child, who (after a lapse of some weeks) found out the factors by the mere operation of his mind: and the method which he took to obtain his object, clearly shewed that he had not derived his information from any other source.

MNEMOSILLA, in *Botany*, a genus of Forskall's, which, according to Jussieu, is the same as HYPECOUM. See that article.

MNEMOSYNE, in *Mythology*, was the daughter of Cœlus and Terra, according to the theogony of Hesiod; and Jupiter being enamoured of her, made her mother to the nine Muses. To Mnemosyne is ascribed, according to Diodorus Siculus, the art of reasoning, and giving suitable names to every being, so that we can describe them, and converse about them without seeing them. Mnemosyne is generally allowed to have been the first who used helps for the memory, and this is intimated in her name.

MNETHEL, in *Geography*, a town of Persia, in the province of Chusistan; 102 miles E. of Suster.

MNEVIS, in *Mythology*, the name of a sacred bull, consecrated to the sun, and worshipped by the Egyptians at Heliopolis. The worship of Mnevis gradually disappeared, when Apis became the general deity of the country. From the era in which Cambyses overthrew the magnificent temple of Heliopolis, we may date the downfall of the worship of Mnevis. This Mnevis was, according to Bryant, a compound of Men-neuas, the lunar god Nevas, the same as Noas, or Noah. The name relates to the same person who, in Crete, was styled Minos; and the same also who was represented under the emblem of the Men-taur or Mino-taurus. Ant. Myth. vol. ii. p. 416, &c.

MNIARUM, in *Botany*, so called from μνιαρος, *mossy*, in allusion to its habit. Forst. Gen. 1. t. 1. Linn. Suppl. 18. Schreb. 9. Willd. Sp. Pl. v. 1. 30. Mart. Mill. Dict. v. 3. Juss. 441. Brown Prodr. Nov. Holl. v. 1. 412. Labill. Nov. Holl. v. 1. 8. (Ditoca; Gærtn. t. 126.)—Class and order, *Monandria Digynia*. Nat. Ord. *Holeraceæ*, Linn. *Atriplices*, Juss. *Chenopodiis affinia*, Brown.

Gen. Ch. *Cal.* Perianth inferior, pitcher-ſhaped, permanent, cut half way down into four equal, erect, obtuſe, rigid ſegments. *Cor.* none. *Stam.* Filament one, capillary, erect, inſerted into the mouth of the calyx, ſcarcely longer than its ſegments; anther roundiſh, furrowed. *Piſt.* Germen ſuperior, oval; ſtyles two, thread-ſhaped, gradually divaricated, the length of the ſtamen: ſtigmas ſimple. *Peric.* none. *Seed* ſolitary, ſmall, oblong, with a membranous coat, encloſed in the hardened tube of the calyx.

Eſſ. Ch. Calyx pitcher-ſhaped, four-cleft. Corolla none: Seed one, encloſed in the tube of the calyx.

Akin to *Scleranthus*, from which it differs in the ſtamen being, for the moſt part, ſolitary; the calyx four-cleft; and the ſtalks two-flowered, with four bracteas at the ſummit. The ſeed in both genera is inverted, the embryo curved round the albumen, the radicle ſuperior. *Brown.*

1. M. *biflorum.* Linn. Suppl. 81. Forſt. Prodr. 2. Comm. Goett. v. 9. 19. t. 1. (M. pedunculatum; Labill. Nov. Holl. v. 1. 8. t. 2. Ditoca muſcoſa; Gærtn. v. 2. 196. t. 126. f. 1.)—Stem tufted. Branches very ſmooth. Leaves finely toothed at the baſe only, ſhorter than the fruit-ſtalks. *Br.*—Native of New Zeeland, Terra del Fuego, and Van Diemen's land. The *ſtems* compoſe denſe maſſy tufts, varying in height, with the aſpect of a *Minuartia.* Every part of the herb is ſmooth. *Leaves* oppoſite, awl-ſhaped, united and finely toothed at the baſe; otherwiſe entire. *Flower-ſtalks* axillary, ſolitary, ſimple, at firſt ſhort, but ſubſequently elongated beyond the leaves; each bearing a pair of minute ſeſſile greeniſh *flowers*, accompanied by four little ovate *bracteas.* The *calyx* of the fruit is hardened, tumid, ovate, cloſed about the ſeed, and crowned with its own little permanent ſegments.

2. M *faſciculatum.* Br. n. 2.—"Stems procumbent, branched. Branches minutely downy. Leaves finely toothed throughout. Fruit-ſtalks ſcarcely ſo long as the leaves."—Gathered by Mr. Brown in Van Diemen's land.

MNIUM, a word adopted by Dillenius from the Greeks, whoſe μνιον is ſynonymous with Moſs. He therefore choſe it for one of his own genera of Moſſes, the character of which is to have two different kinds of heads, or fructification; the one powdery and naked, that is, deſtitute of calyx as well as of capſule; the other of the ſame capſular nature as in *Bryum* and *Hypnum.* Conſidering this character as ſufficient to diſtinguiſh *Mnium* from all other Moſſes, he proceeds to inquire into the nature of theſe different parts of fructification. In his concluſion he miſtakes the male for the female, though his error has not commonly been obſerved, becauſe he terms capſule what he believed to be the anther, but which is indeed the capſule, properly ſo called. (See Dillenius and Musci.) We therefore now reſume the language, though we diſcard the ideas, of this eminent writer.

Dillenius, conſidering every moſs as a *Mnium* in which he met with a powdery head, although he did not detect the capſule, has made eight ſpecies; but this principle has widely miſled him. His fifth and ſixth ſpecies are *Jungermanniæ*, his ſeventh is the *Blaſia puſilla*, previouſly well defined, as a diſtinct genus, by Micheli. In the reſt of his ſpecies, Dillenius is as correct as any perſon could, at that time, be.

Linnæus, following up the principle he had adopted from Dillenius, referred to *Mnium* every moſs, with a terminal fruit-ſtalk, in which the powdery head of male flowers, ſuppoſed by them female, had been obſerved. As his followers proceeded to look more and more cloſely into the ſtructure of theſe minute vegetables, the powdery heads, or ſtars, as they were termed when ſurrounded by leaves, were diſcovered in many ſpecies, hitherto referred to *Bryum.* Nor is this wonderful, for the diſcoveries of Hedwig have proved them eſſential to every moſs, they being unqueſtionably the male flowers. For a long time botaniſts were perpetually diſputing, whether to refer particular ſpecies to *Mnium* or *Bryum*, according as they had met with the powdery head or not. Hudſon alone has ſhewn his judgment, in conſidering the naked or leafleſs head as proper to the former; by which, except the original blunder reſpecting two or three *Jungermanniæ*, he has preſerved himſelf from error. Hedwig has confuſed the ſubject by reverſing the original characters. His *Bryum* has a round or capitate male flower, or powdery head; his *Mnium* a flat or diſcoid one. This leads to no natural character. Indeed the difference itſelf is uncertain, the part in queſtion varying in convexity at different periods of growth. The ableſt botaniſts who have in general followed Hedwig, as Schreber, Swartz, and Roth, well aware of his miſtake in this inſtance, thought to correct it, by uniting the two genera into one, under the name of *Bryum.* Hoffmann, more boldly but leſs ſucceſsfully, recurred to the fringe alone, making almoſt every terminal-fruited moſs with a ſingle fringe *Bryum*, with a double one *Mnium.* See Fringe *of Moſſes.*

The writer of the preſent article at length propoſed to diſtinguiſh *Mnium* by the longitudinal furrows of its capſule, which in another double-fringed genus, *Bartramia*, had been found a certain and clear mark of difference. This character keeps the original real *Mnia* of Dillenius together, except the firſt, which is the *Tetraphis pellucida*; and has the advantage of aſſociating with them moſt naturally the *Arrhenopterum* of Hedwig, a genus whoſe diſtinction was founded by its author on the axillary, not terminal, male flowers; a character which the ſlighteſt attention to moſſes will ſhew to be of no importance, as to generic diſcrimination. *Mnium* is therefore now defined as follows. Tr. of Linn. Soc. v. 7. 261. Fl. Brit. 1344.

Eſſ. Ch. Capſule cylindrical, at length furrowed. Outer fringe of ſixteen tapering teeth; inner a laciniated membrane. Veil ſmooth. Flowers terminal.

The furrows are always ſixteen, being equal in number to the teeth of the outer fringe, and indeed to the principal ſegments of the inner one. Six ſpecies are defined in the Tranſactions of the Linnæan Society above quoted.

1. M. *androgynum.* Narrow-leaved Spring-moſs. Linn. Sp. Pl. 1574. Sm. Fl. Brit. 1344. Engl. Bot. t. 1238. Hedw. Theor. 149. t. 12. f. 48—50. (M. peranguſtis et brevibus foliis; Dill. Muſc. 230. t. 31. f. 1. Bryum androgynum; Hedw. Sp. Muſc. 178. Turn. Muſc. Hib. 11.)—Monoecious. Capſule ſtraight. Lid conical. Leaves imbricated every way, ſpreading; toothed at the point.—Native of moiſt ſhady boggy places throughout Europe, flowering in March. The capſules, which ripen in April or May, are very rare. The *ſtems* form denſe perennial tufts, and are branched, clothed with bright green, dotted, pellucid, lanceolate, ſingle-ribbed, acute leaves; toothed towards the point; entire and revolute below. *Flowers* terminal; the male in little round ſtalked heads; female on the ſame plant, ſeſſile. *Capſule* nearly upright, on a ſhining red ſtalk an inch long. *Lid* ſhort, conical, blunt, ſtriated, a little curved.

2. M. *conoideum.* Club-fruited Spring-moſs. Sm. Fl. Brit. 1345. Engl. Bot. t. 1239. (Bryum conoideum; Dickſ. Crypt. faſc. 4. 9. t. 11. f. 2. Turn. Muſc. Hib. 112. Grimmia? Forſteri; Sm. Fl. Brit. 1196. Engl. Bot. t. 2225. Bryum Forſteri; Dickſ. Crypt. faſc. 3. 4. t. 7. f. 8.)—Monoecious? Capſule ſtraight, obovate. Lid awl-ſhaped. Leaves imbricated every way, ſpreading, entire.—Native of the

the trunks of trees in Scotland and Ireland, but rare. Smaller than the former. The *ſtems* compoſe ſmall, convex, perennial patches, and are moſtly ſimple, leafy, half an inch high. *Leaves* oblong, entire, pale green, ſingle-ribbed, pointleſs, dotted juſt as in the foregoing. *Male flowers* unknown. *Fruit-ſtalks* ſolitary, terminal, half an inch high. *Capſule* obovate, with a curved lid, of nearly its own length. The more we conſider the matter, the leſs doubt have we reſpecting the above ſynonyms.

3. M. *paluſtre*. Greater Forked Spring-moſs. Linn. Sp. Pl. 1574. Sm. Fl. Brit. 1346. Hedw. Sp. Muſc. 188. Schmidel. Ic. 218. t. 56. f. 2. (M. majus, ramis longioribus bifurcatis; Dill. Muſc. 233. t. 31. f. 3, 4. Bryum paluſtre; Engl. Bot. t. 391. Turn. Muſc. Hib. 113.)—Dioecious. Capſule oblique. Lid conical. Leaves acute; the upper ones curved to one ſide. Stem erect, forked.—Native of bogs, about mountain rivulets, and in various watery ſituations throughout Europe; flowering in April and May; fruiting in June and July. The *ſtems* are three or four inches high. *Leaves* of a light yellowiſh-green, lanceolate, acute, channelled, ſingle-ribbed, entire; wavy when dry. *Male flowers* like a broad diſk, ſurrounded with radiating leaves; often proliferous, throwing up ſtalked round heads, like the male flowers of the firſt ſpecies; *female* ſeſſile. *Fruit-ſtalks* ſolitary between the new ſhoots of the ſeaſon, two or three inches high, wavy, red below. *Capſule* curved, with a ſhort conical lid.

4. M. *reclinatum*. Procumbent American Spring-moſs. Sm. Tr. of Linn. Soc. v. 7. 262. (M. ramis brevibus, inordinatè progredientibus; Dill. Muſc. 239. t. 31. f. 8.) —Dioecious. Capſule nearly erect. Lid conical. Leaves bluntiſh, rather turned one way. Stem procumbent, much branched.—Gathered by Mitchell in bogs in Virginia. *Dillenius*. Its colour and habit are like the laſt, but the ſize only half as great. *Capſule* ſlender, nearly erect. *Stem* much branched, not forked. *Male flowers* ſtalked, naked.

5. M. *pendulum*. Pendulous-fruited Spring-moſs. Sm. n. 5.—Capſule pendulous. Lid nearly flat. Leaves awl-ſhaped, ſtriated, recurved. Stem erect.—Gathered by Mr. Menzies, in New Zeeland. *Stems* determinately branched, leafy, clothed with ruſty down, like many moſſes that grow in clear ſprings. *Leaves* yellowiſh, ſingle-ribbed, imbricated every way, but recurved, chiefly toward one ſide. *Fruit-ſtalks* red, two inches high. *Capſule* cylindrical, or ſomewhat bell-ſhaped, cheſnut-coloured. *Lid* flat, with a central knob.

6. M. *arrhenopterum*. Axillary Spring-moſs. Sm. n. 6. (Arrhenopterum heteroſtichum; Hedw. Sp. Muſc. 198. t. 46. f. 1—9. Bryum heteropterum pellucidum; Dill. Muſc. 352. t. 45. f. 11; but indifferent. B. foliis membranaceis obtuſis; Dill. Muſc. 552. t. 35. f. 19; better; both determined by the Dillenian herbarium. Hypnum illecebrum; Linn. Sp. Pl. 1594; excluding the ſynonym of Dillenius. Fl. Lapp. ed. 2. 329.)—Capſule inclining. Lid awl-ſhaped. Leaves elliptical, obtuſe. Stem erect. Native of Virginia, Pennſylvania and Lapland.—*Stems* about two inches high, branched. *Leaves* imbricated, pale whitiſh-green, elliptical, concave, ſhining, ſingle-ribbed, ſerrated at the end. *Fruit-ſtalks* an inch long, ſtraight, rather ſtout. *Capſule* curved, with a beaked red lid.

There appear to be ſeveral ſpecies ſtill referrible to this genus, which are not as yet any where deſcribed.

MO, in *Geography*, a town of Sweden, in Helſingland; ſix miles W. of Soderhamn.

MOA, an iſland in the Eaſt India ſea, about 30 miles long and 10 broad. S. lat. 8° 21′. E. long. 127° 45′.

MOAB, *Land of*, or MOABITIS, ſo called from Moab one of the inceſtuous ſons of Lot, in *Ancient Geography*, was ſituated in Arabia Petræa, on the north of Midian, having the river Arnon on the weſt, which divided it all the way from the tribe of Reuben, the Iſhmaelites on the eaſt, and the land of Gilead on the north. Their country was at firſt inhabited by the gigantic Emims, whom they expelled, making themſelves maſters of it, and of all its cities, which were both numerous and conſiderable. Some of theſe cities, mentioned by Joſephus, were on the other ſide of the Arnon, and therefore not ſo properly in Moabitis, as in the land of the Amorites, or Reubenites; particularly Heſhbon; but they might have been inhabited by the Moabites. The limits of this country, indeed, were continually fluctuating; ſo that we read of the plains of Moab, called alſo by Moſes the land of Moab; but which had been taken by Sihon, quite as far as the river above mentioned. Mount Nebo is placed by Moſes in the land of Moab, though ſeated on the other ſide of the Arnon, in the kingdom of Sihon. This river, however, ſeems to have been the proper northern boundary between theſe two kingdoms, as Moab ſeems to have been the ſouthern boundary between Arabia Petræa and Deſerta. See MOABITES.

MOAB, in *Geography*, a town of Arabia, in the province of Hadramaut; 83 miles W. of Hadramaut.—Alſo, a town of Arabia Felix, in the province of Yemen, and reſidence of the prince, built in 1708, and ſituated between Damar and Sanaa.

MOAB, or *El-Raba*, a town of Syria; 50 miles S.E. of Jeruſalem.

MOABITES, in *Ancient Hiſtory*, the deſcendants of Moab, the ſon of Lot, by his eldeſt daughter. The poſterity of Lot ſettled in the country bordering on the mountain, where he was born, which ſome make part of Cœleſyria, while others allege that it belongs to Arabia; and having driven out the old inhabitants, they poſſeſſed a ſmall tract called Moabitis, or the land of Moab. (See MOAB.) They were governed by kings, practiſed circumciſion, and employed themſelves moſtly in paſturage and breeding cattle, which conſtituted their chief wealth. It is probable that their language was a dialect of the Canaanitiſh or Hebrew. They had once the knowledge of the true God, and retained it till the time of Moſes, even after they had very much corrupted their religion by introducing the worſhip of falſe gods. The idols of the Moabites, mentioned in ſcripture, were Chemoſh and Baal-Peor. Some ſuppoſe that theſe were different names of the ſame idol: but others think that Baal-Peor was Bacchus, and Chemoſh ſeems to have been a different idol. In the practice of their religious rites, they ſacrificed both in the open air, on mountains dedicated to that ſervice, and in temples built for their idols in the cities: beſides oxen and rams, they offered on extraordinary occaſions human victims, according to the Phœnician cuſtom.

The firſt inhabitants of the country were a gigantic race, called Emims, or Terribles, probably deſcendants of Ham. Theſe were expelled by the Moabites; but the latter in proceſs of time loſt that part of their land which lay to the N. of the river Arnon. When the Iſraelites, after the death of Othniel, returned again to idolatry, Eglon, king of Moab, was an inſtrument in puniſhing them; he invaded Iſrael and kept the Iſraelites in ſubjection eighteen years. Ehud, having ſecretly put Eglon to death, was obliged to make his eſcape beyond Jordan; and there he aſſembled a body of forces, who attacked the Moabites, and ſlew 10,000 of their beſt men. By this diſaſter the power of the Moabites was broken, and the Iſraelites were freed from the yoke of of that nation. Notwithstanding the protection which the king of Moab afforded to the parents of David and to David himself, when he was persecuted by Saul, as soon as he came to the crown the Moabites entered into a confederacy against him; but in consequence of a signal victory which he obtained over them, many of them were put to the sword, and the rest became his vassals and tributaries. From this time they continued subject to Solomon and Rehoboam, until the revolt of the ten tribes, upon which they became tributaries to the kings of Israel, though they had kings of their own, who were little better than viceroys. After the death of Ahab, Mesha, king of Moab, rebelled against his son Ahaziah, but the short reign of this prince not permitting any attempt to reduce him, his brother and successor Jehoram, assisted by Jehoshaphat, king of Judah, and the king of Edom, his tributary, made an expedition for this purpose; the result of which was, the defeat of the Moabites and the devastation of a great part of their country. It was not long before the Moabites, entering into an alliance with the Ammonites, the Edomites of mount Seir, and other neighbouring nations, attempted to revenge the losses they had sustained in this invasion of their country on Jehoshaphat, king of Judah, who had encouraged Jehoram to undertake it. Their attempt proved unsuccessful, and terminated in their total ruin. After this period the Moabites do not seem to have disturbed Israel for many years. On the declension of the kingdom of Israel, they seem to have retaken from the tribes of Reuben and Gad a great part of the land which formerly belonged to them, before the invasion of Sihon; but elated by their success, they behaved with pride and insolence, in consequence of which several of the ancient prophets, and Isaiah in particular, threatened them with utter destruction. After the dreadful discomfiture of the army of Sennacherib, the son of Shalmaneser, the Moabites often revolted from his successors, and were as often reduced, till they were entirely subdued by Nebuchadnezzar; but upon Nebuchadnezzar's departure from Judea and Syria, after his second expedition into these parts, they, with the other neighbouring nations, proposed to Zedekiah to enter into a league against the Chaldæans, to which that prince consented, on the accession of the Egyptians to their confederacy; but this measure, adopted by Zedekiah against the remonstrance of the prophet Jeremiah, became the occasion of his utter ruin; for his new allies deserted him in his distress. From this period history makes little mention of the Moabites, who became subject to the great empires, and at length coalesced as one people with the neighbouring nations which inhabited the deserts of Syria; so that, although Josephus mentions the Moabites as a distinct nation long after, observing that they were subdued by Alexander Jannæus, king of the Jews, and that in his time they were a numerous nation; yet, in the third century after Christ, they had lost their ancient name, and were comprehended under the more general denomination of Arabians. Anc. Un. Hist. vol. i.

MOAGANORE, in *Geography*, a town of Hindoostan, in Golconda; 10 miles N.W. of Rachore.

MOAGAS, a cluster of small islands in the Caribbean sea, near the coast of South America, at the entrance of the gulf of Venezuela: they are eight or nine in number, extending from north to south, and but one excepted, low, flat, and covered with trees. The southernmost is the largest.

MOAMAA, a port and good harbour of Nubia, in the Red sea; 15 miles S. of Aidab.

MOANESS, a cape on the N. coast of the island of Shetland. N. lat. 60° 44′. W. long. 1° 32′.

MOANGUNGE, a town of Bengal; 72 miles N.N.W. of Dacca.

MOAR, a town of Hindoostan, in Bahar; 22 miles N.E. of Bahar.

MOAR-LOVRE, in *Agriculture*, a term made use of by some to express a peculiar distemperature of corn, a sort of blight. In this case the earth is said to sink away from the roots of the corn, and to leave the plants standing in a great part above the ground with naked roots; which are too weak to support the stalks: the plants, of course, fall down, and the ears become light. It is a distemper peculiar to corn growing on light and loose lands, which Mr. Tull has mentioned in his Horse-hoeing Husbandry. And it is supposed that the best remedy is to bring up mould against the rows, when they are strong enough to bear it, and it is fine and dry; the motion of the stalks with the wind draws in this loose powdery mould, and it spreads equally, settles about the roots, and covers them so as to produce fresh nourishment and support.

MOAT, in *Fortification*, a deep trench dug round a town or fortress to be defended, on the outside of the wall, or rampart. See *Plate* VII. *Fortif. fig.* 1. *lit. b, b, b,* &c.

The depth and breadth of a moat often depend on the nature of the soil; according as it is marshy, rocky, or the like. The brink of the moat next the rampart in any fortification is called the *scarp*, and the opposite one the *counterscarp*. See DITCH.

MOAT, *Dry*, is that which is destitute of water: this ought to be deeper than one which is full of water.

MOAT, *Lined*, is that whose scarp and counterscarp are cased with a wall of mason's work lying aslope.

MOAT, *Flat-bottomed*, is that which hath no sloping, its corners being somewhat rounded.

MOAT, *Angle of the*. See ANGLE.

MOATAZALITES, MOTAZALITES, or *Separatists*, a religious sect among the Turks, who deny all forms and qualities in the divine Being: or who divest God of his attributes.

There are two opinions among the Turkish divines concerning God. The first admits metaphysical forms, or attributes; as, that God has wisdom, by which he is wise; power, by which he is powerful; eternity, by which he is eternal, &c.

The second allows God to be wise, powerful, eternal; but will not allow any form or quality in God, for fear of admitting a multiplicity.

Those who follow this latter opinion are called *Moatazalites*: they who follow the former, *Sephalites*.

The Moatazalites also believed that the word of God was created *in subjecto*, as the schoolmen term it, and to consist of letters and sound; copies thereof being written in books to express or imitate the original; they denied absolute predestination, and affirmed that man is a free agent. They held that if a professor of the same religion be guilty of a grievous sin, and die without repentance, he will be eternally damned, though his punishment will be lighter than that of the infidels. Moreover, they denied all vision of God in paradise by the corporeal eye, and rejected all comparisons or similitudes applied to God. This sect is said to have first invented the scholastic divinity, and is subdivided into no less than twenty inferior sects, which mutually brand one another with infidelity. Of these the most remarkable are the Hodeilians, the Jobbaians, the Hashemians, the Nodhamians, the Hayetians, the Jahedhians, the Mozdarians, the Bacharians, the Thamamians, and the Kadarians. Sale's Prelim. Disc. p. 159, &c.

MOATE, or MOATE GRENOGUE, in *Geography*, a post-town,

town, or rather village in the county of Weſtmeath, Ireland. It is 52 miles W. by N. from Dublin, and 7½ from Athlone.

MOAWIYAH, in *Biography*, ſixth caliph of the Arabians, was the ſon of Abu Sofian, a chief of Koreiſh, and an eminent commander under Mahomet. Moawiyah was appointed ſecretary to the prophet, an office which he filled for ſeveral years, but after the conqueſt of Syria, he was made governor of the province of Omar, and was continued in that high ſtation by Othman. He obtained great ſucceſs againſt the Greek emperors, and, in 654, he conquered the iſle of Rhodes, and demoliſhed the famous coloſſus of the ſun. In the following year he became a competitor for the caliphate, but Ali was elected; Moawiyah inſtantly declared againſt him, and prevailed upon Amru to join him. He was proclaimed caliph at Mecca and at Medina, and maintained a civil war againſt Ali, till the aſſaſſination of that caliph in 660. Moawiyah was, at the ſame time, ſeverely wounded by one of the three conſpirators who undertook to reſtore peace among the Muſſulmans by the aſſaſſination of the two rivals, but he eſcaped with his life. At firſt, Haſſan, Ali's ſon, oppoſed the pretenſions of Moawiyah, but ſoon reſigned his power to his opponent, who obtained the caliphate without a rival in 661, being the firſt prince of the dynaſty of the Ommiyans. An inſurrection of the Kharegites was one of the firſt events of his reign, which was quelled by the people of Irak, with the total extermination of the ſect. A reconciliation with his illegitimate brother Ziyad, a man of great talents, who had taken the part of Ali, and was made governor of Perſia, added great ſtrength to the throne of Moawiyah, who, to gain him, did not ſcruple to violate the laws of the Koran, by acknowledging him as the blood of the Koreiſh, though his legal father was a Greek ſlave. The temper and ſeverity of Ziyad was of great ſervice in ſuppreſſing ſome commotions which threatened to diſturb the peace of the empire. In 668, Moawiyah ſent his ſon Yezid with an army to beſiege Conſtantinople, but the undertaking was beyond the Muſſulman power, and after ſpending ſeven years in a ſeries of repeated ſummer attacks, attended with a variety of petty events, but ſignalized by no great action, they relinquiſhed the enterprize. The caliph's arms were more ſucceſsful in another quarter, and obtained for him the complete poſſeſſion of Samarcand. Moawiyah fixed his reſidence at Damaſcus, and the great object of his latter years was to ſecure the crown to his ſon Yezid, who was by no means fitted for the high rank to which he aſpired. Moawiyah, after a long ſtruggle with the people, procured the public recognition of Yezid as his own colleague, and preſumptive heir to the caliphate. In a very ſhort time after this he expired at Damaſcus, after a reign of about twenty years, and when he had attained to the age of ſeventy-five. He was, ſays his biographer, the moſt eminent of the Saracen caliphs, and extolled for his capacity, courage, generoſity, and clemency. He was the firſt of the caliphs who wore rich garments, and affected royal ſplendour. He was a patron of learning, particularly of thoſe who were proficients in poetry. Univer. Hiſt.

MOBARACGUNGE, in *Geography*, a town of Hindooſtan, in Oude; 14 miles W. of Fyzabad.

MOBAS, a town of New Mexico, in the province of Hiaqui; 25 miles S.E. of Riochico.

MOBILE, Moveable, any thing ſuſceptible of motion, or that is diſpoſed to be moved either by itſelf, or by ſome other prior mobile, or mover.

Mobile, *Primum*, in the *Ancient Aſtronomy*, was a ninth heaven, or ſphere, imagined above thoſe of the planets, and fixed ſtars.

This was ſuppoſed to be the firſt mover, and to carry all the lower ſpheres round along with it; by its rapidity communicating to them a motion by which they revolved in twenty-four hours. But the diurnal revolution of the planets is now accounted for, without the aſſiſtance of any ſuch primum mobile.

Mobile, *Perpetuum*. See *Perpetual* Motion.

Mobile, in *Geography*, a large, navigable river of America, formed by two main branches, the Alabama, and the Tombeckbee, in the S.W. part of Georgia, juſt below a conſiderable iſland, the S. point of which is in about N. lat. 31° 26′, and W. long. 87° 55′. Purſuing a S. courſe into Weſt Florida, the confluent ſtream enters the gulf of Mexico at Mobile Point in N. lat. 30° 17′, 11 leagues below the town of Mobile. Large veſſels cannot approach the town within the diſtance of ſeven miles: the breadth of the bay is in general about three or four leagues. Alligators of a large ſize and in great number baſk on the ſhores, as well as ſwim in the rivers and lagoons. The courſe of this river from the N.E. ſource of the waters of the Alabama to Mobile Point is eſtimated at about 460 miles. Large boats can navigate 350 miles, and canoes much farther.

Mobile, a city of Weſt Florida, formerly important and ſplendid, but now in a ſtate of decline. Its figure is oblong, and it is ſituated on the W. bank of the river. The bay of Mobile terminates a little to the N.E. of the town in marſhes and lagoons, which ſubject the inhabitants to fevers and agues in the hot ſeaſon. The town contains ſeveral elegant houſes, occupied by French, Engliſh, Scotch, and Iriſh. Fort Conde, ſituated near the bay, towards the lower end of the town, is a regular fortreſs of brick; and there is a neat ſquare of barracks for the officers and ſoldiers. Mobile, when poſſeſſed by the Engliſh, ſent yearly to London ſkins and furs to the value of from 12 to 15,000*l.* ſterling. It ſurrendered to the Spaniſh forces in 1780.

Mobile, *Mobiles*, plural, in the *Ancient Greek Muſic*, the moveable or central ſounds of each tetrachord, ſuch as were tuned differently in different genera; whereas the two extremes, or the loweſt and higheſt ſound of each genus, were fixt: *ſoni ſtantes*. See Tetrachord, Genus, and Sound.

MOBILIA Bona, in the *Civil Law*, are what in common law, &c. we call *moveables*, or *moveable goods*.

MOBILITY, in the *Schools*, &c. an aptitude or facility to be moved.

The hypotheſis of the mobility of the earth is the moſt plauſible; and is that univerſally admitted by the later aſtronomers. Pope Paul V. appointed commiſſioners to examine the opinion of Copernicus touching the mobility of the earth. The reſult of their enquiry was, a prohibition to aſſert, not that the mobility was poſſible, but that it was actually true: that is, they allowed the mobility of the earth to be held as an hypotheſis, which gives an eaſy and ſenſible ſolution of the phenomena of the heavenly motions; but forbad the mobility of the earth to be maintained as a theſis, or real effective thing; becauſe they conceived it contrary to ſcripture. See Copernican *Syſtem*, and Copernicus.

MOCAMBO, in *Geography*, a river of Africa, which runs into the Indian ſea; 15 miles S. of Mozambique.

MOCANERA, in *Botany*, Juſſ. 318, the name by which the *Viſnea Mocanera*, Linn. Suppl. 251, is known in the Canary Iſlands, and which Juſſieu preferred as a generic appellation, becauſe he was informed the perſon from whom the other was derived, was unworthy of botanical commemoration. We have indeed been aſſured of this by the late

Mr. Masson, the discoverer of the shrub, who was very indignant at the name of *Visnea*. Mr. De Visme, designed to be honoured by it, was a merchant at Lisbon, who had a choice garden, and took delight in the cultivation of rare and curious plants, in a country where that taste was then in its infancy. So that, though he might not be a scientific botanist, his claim is equal to that of abundance of persons, on whom a similar honour has been, rather too indiscriminately indeed, bestowed. See VISNEA, or rather, as Schreber more correctly has it, VISMEA.

MOCARA, in *Geography*, a village of Egypt, situated in a chain of mountains, extending across the desert more than 150 miles from E. to W., in the road from Cairo to Siwah, and deriving their name from that of the village; 90 miles W. of Cairo.

MOCARANGA, or MOCARA, which has been erroneously called *Monomatapa*, from the title of the monarch, an extensive country of Africa, situated at some distance from the Indian sea, between 15° and 20' S. lat., and 28° and 36' E. long. But within its whole extent other countries are included, almost as far southward as the Cape of Good Hope, and on the N.W. to the confines of Congo; but on the W. and N.W. it is bounded by Monoemugi. The climate is temperate, though the mountains called Lupata, or the spine of the world, forming a great chain from N. to S., are perpetually covered with snow; the air clear and salubrious, and the soil fertile and well watered, so that its pastures feed a great number of cattle, more valued by the inhabitants than their gold. The country affords plenty of rice, millet, and other grain, but no wheat; fruit trees in abundance, and sugar-canes, which grow without culture; its forests swarm with wild beasts and variety of game; and its rivers abound with fish, and also with gold; nevertheless it is but thinly inhabited. Whilst those lands which are watered by the rivers Cuamo or Zambezi, which encircles the kingdom on the N. and W., and Spiritu Sancto, and others that flow into them, are fertile and productive, the inland parts are sandy, dry, and barren; and the occupiers, who are few in number, are under a necessity of fetching from a great distance water for washing their gold-dust, if their cisterns, for want of rain, fail to supply them. This country, though destitute of horses, and other beasts of burden, is overstocked with elephants, many of which are annually destroyed, so that the Portuguese are plentifully supplied with ivory. The ostriches of this part of Africa are of a large size, and supply grease and oil, which, as the inhabitants conceive, is a sovereign remedy against pains and aches as well as sprains and rigidity of the limbs, when taken inwardly, or applied externally. The natives are black, with woolly hair, they are well formed, robust, and healthy, and more agile and active than those of Quiloa, Mombaso, and Melinda. They are fond of war, which they prefer to traffic; and those of the lower class are habituated to diving; and by this practice, they fetch up from the bottoms of their rivers and lakes the mud that yields gold; and having separated the one from the other, they exchange their gold with the Portuguese for cotton cloths, and other articles of merchandize, which are brought hither from India and Europe. Their food consists of the flesh of oxen and elephants, salted and dried fish, and a variety of fruits; and also of bread made in their cities of rice or millet; and their drink is sour milk and oil of Sesame or Turkey wheat. Persons of superior rank and opulence have strong liquors made of honey, millet, and rice, and also palm-wine, which is held in high estimation. Their dress extends only from the girdle downwards; that of the common people is made of dyed cotton; but persons of quality wear Indian silks, or cotton embroidered with gold, over which they commonly have a lion's skin, or that of some other wild beast, with the tail hanging behind, and trailing on the ground. The men marry as many wives as they can maintain; but the first is the chief, and her children are the father's heirs, the rest being treated as servants. The king, or emperor, is said to have 1000 wives, all of whom are the daughters of some of his vassal princes; but the title and honour of queen belong exclusively to the first. He neither wears in his own dress nor suffers his subjects to wear any clothes that are manufactured out of his own dominions, under an apprehension that they conceal some charm or poison. The metropolis of this empire is called "Benematapa," or "Banamatapa," and by some writers it is called "Medrogan." It is a spacious city, about 20 miles W. of Sofala. The houses are neat, white-washed within and without, and adorned with beautiful cloths of cotton, finely wrought or dyed. But the greatest ornament of the city is the imperial palace, which is a large and spacious edifice of wood, well flanked with towers, with four avenues, or stately gates, at which a numerous guard is constantly stationed. The emperor's guard is said to consist of women lightly armed. The Portuguese have two fortresses, and another station near the mountains of Fura, which are said to abound in gold. One of the emperor's queens is said to be the protectress of the Portuguese, and another of the Moors. The emperor, by the account of a Dutch commodore who visited this country in 1606, ruled from Mozambique to the Cape of Good Hope. The chief province is in an isle or delta, between two branches of the Cuamo and the Espirito. This isle is about 750 French leagues in circuit, and the chief town was Banamataxa. At that period there were many subject kings, and the emperor had a guard of 200 deys. Among the rivers that roll gold are the Panami, Luanga, and Mangiano. But later accounts of this country, and of other Portuguese settlements on the eastern coast of Africa, are wanting; the Portuguese, probably from motives of interest, are silent.

MOCAUMPOUR, capital of a country of the same name to the N. of the country of Bengal; 40 miles S.S.E. of Catmandu. N. lat. 27° 35'. E. long. 85° 37'.

MOCEFU, a town of Peru, in the diocese of Truxillo; 10 miles S.E. of Lambayeque.

MOCENIGO, ANDREW, in *Biography*, a noble Venetian, flourished in the early part of the sixteenth century, and was employed in the public service of his country, which he managed with success. As an author he wrote in Latin a "History of the War sustained by the Republic of Venice, in consequence of the League of Cambray, from 1500 to 1501, in four Books:" and he composed a poem in Latin verse on the war with Bazajet II., which is lost. Moreri.

MOCHA, a small island in the Pacific ocean, near the coast of Chili. S. lat. 38° 30'.

MOCHA, or *Mokha*, a town of Arabia, in the province of Yemen, situated on a dry and barren spot in that part of the province called Tehama, or the plain country. Its fortifications are the walls which surround it, some towers on the way to Musa, dignified with the name of castles, and two other castles of the same sort, upon the two arms of the harbour. The greatest of these two castles is called "Kalla Tejar," and the smallest "Kalla Abdurrah," from the names of two saints buried in these places. These are provided with some few pieces of cannon. The houses in the city are built of stone: some of them are handsome; but others, both within and without the walls, are not better than the common huts that are found through all the

Tehama.

Tehama. In the environs of this city are abundance of date trees and many agreeable gardens. Mocha was built about four centuries ago, and like many other cities of the Tehama, it owes its origin to a ſaint, the celebrated ſcheik Schædeli. This ſaint was in ſuch reputation, that a multitude of perſons from the moſt diſtant countries reſorted hither to receive his inſtructions. His hermitage ſtood on the ſea-ſide, and many huts were built around it for the accommodation of his followers: theſe formed a village, which by degrees was enlarged into a city. Some other circumſtances contributed to give celebrity to its eſtabliſhment. A ſhip bound from India to Jidda caſt anchor, about 400 years ago, in this latitude. Several of the crew, perceiving huts in the deſert, had the curioſity to viſit them. The ſtrangers were hoſpitably received by the ſcheik, and regaled with coffee, to which he aſcribed ſingular virtues. The Indians, who were unacquainted with the uſe of coffee, thought that it might be a ſeaſonable remedy to the maſter of the ſhip, who was ill. Schædeli aſſured them, that he ſhould not only be cured by the efficacy of his prayers and of the coffee, but that if they would land their cargo there, they might diſpoſe of it to conſiderable advantage. Aſſuming at the ſame time the air and the tone of a prophet, he told them that a city ſhould one day be built upon that ſpot, which would become an eminent mart of the Indian trade. The maſter of the veſſel viſited the prophet, drank the coffee, and was reſtored to health. Many Arabs flocked to hear the preaching of the ſaint, and among them were ſeveral merchants, who purchaſed the whole cargo. The Indians returned home, related their adventure, and induced many of their countrymen to reſort to this place. An elegant moſque was raiſed upon the tomb of the prophet, which ſtands without the walls of the city. The well that ſupplies the inhabitants with water, and one of the city gates, bear his name. His deſcendants are held in honour, and enjoy the title of ſcheik; the people ſwear by him; and his name will be remembered as long as Mokha ſtands. He is not only the patron of Mokha; but all the Muſſulmans who drink coffee mention him every morning in their prayers, eſteeming him as *their* patron; thanking God that through his mediation mankind were taught the uſe of coffee, and imploring the favour of heaven on the ſcheiks, his deſcendants. Mokha was the laſt city in Yemen of which the Turks retained poſſeſſion. It is ſaid that the Arabs did not conquer but buy it. Since the Turks were diſpoſſeſſed, it has never had another maſter but the Imam. A Dola, having enriched himſelf in the government of this city, fortified it, and drew a ditch round it, which is now filled up. He was ſuſpected of aſpiring to independence, and was caſt into priſon. From that time, a Dola has never been continued above three years in this lucrative poſt. After the monſoon ſeaſon, the Dola of Mokha is annually obliged to give an account of his adminiſtration, and is either confirmed in his employment, or inſtantly recalled to Sana. Many Jews live here in a ſeparate village, as in the other cities of Yemen. Here are alſo about 700 Banians, Rajaputs, and other Indians, ſome of whom are merchants, and others gain a ſubſiſtence by the exerciſe of different mechanic arts. When they have made a ſmall fortune, they return home to India; and on this account are always regarded as ſtrangers. Several nations frequently traded to this port. The Portugueſe, who two centuries ago were very powerful on the Arabic gulf, have long ſince ceaſed to ſend ſhips thither. The Dutch rarely appear here; and the French never in time of war, though they ſtill continue to rent warehouſes. The Engliſh at preſent engroſs, by way of India, almoſt excluſively, the whole trade of this place, which is conducted for them by a Banian. The trade of Mokha being ſo conſiderable, the cuſtoms muſt afford a large revenue to the Imam. The Turks, Arabs, and Indians, pay eight or ten *per cent.* upon their value; after they have been inſpected at the cuſtom-houſe: all Europeans enjoy the privilege of having their goods inſpected in their own warehouſes, and of paying only three *per cent.* upon their value. The Indians of late, ſince the Engliſh have become ſo powerful in Bengal, pay only three *per cent.* but the merchants in Mokha pay likewiſe five *per cent.* on all Indian goods which they purchaſe. There is alſo a tonnage duty, regulated not by the tonnage of the veſſel but by the number of its maſts. A merchant, however, who lades a large European ſhip with coffee in this port, receives from the Dola a premium of 400 crowns. The Arabs have ſcarcely any article for exportation except coffee, and of this the Indians are not very fond. The Engliſh ſhips muſt return empty to India, if they did not gain conſiderably by carrying money, with which the Arabian merchants entruſt them. When a foreign veſſel arrives in the road of Mokha, it muſt not ſalute with guns, but only hoiſt a flag. It is obſervable, that the trade on the coaſts of the Red ſea cannot be advantageous to any nation which have not ſettlements in India. The Arabians make no uſe of the productions of Europe. There is, indeed, a quantity of iron ſold in Arabia, which has in times paſt been purchaſed chiefly from the Danes. A ſtranger cannot be too much on his guard againſt Mahometan brokers. He will find it advantageous to addreſs himſelf rather to the Banians, among whom are many conſiderable merchants, who are very honeſt men. N. lat. 13° 19′. E. long. 43° 23′.

Mr. Bruce, in his "Travels to diſcover the Source of the Nile," mentions two other Mochas, beſides that which we have above deſcribed. The firſt is in Arabia Deſerta, in N. lat. 30° nearly, not far from the bottom of the gulf of Suez. The ſecond is in S. lat. 3°, near Terſhiſh on the coaſt of Melinda. The meaning of Mocha, he ſays, is in the Ethiopic *priſon*, and it is particularly given to thoſe three places, becauſe in any of them a ſhip is forced to ſtay or be detained for months, until the change of the monſoon ſets her at liberty to purſue her voyage.

MOCHICAGUI, a town of New-Mexico, in the province of Cinaloa; 60 miles W.N.W. of Cinaloa.

MOCHLIA, from μοχλος, *a lever*, in *Surgery*, a reduction of bones from an unnatural to a natural poſition.

MOCHO, or MOCOA *Stones*. See AGATE and DENDRITIS.

MOCHOW, in *Geography*, a town of Bohemia, in the circle of Kaurzim; 12 miles W.N.W. of Kaurzim.

MOCK-BIRD, *Indian*, in *Ornithology*. See TURDUS *Cyanus*.

MOCK-*Bird of Guiana*. See ORIOLUS *Americanus*.

MOCK *Lead*, in *Mineralogy*, a name given by the Engliſh writers to a ſort of foſſil, called alſo *blende* and *galena*.

MOCK *Nightingale*, in *Ornithology*. See MOTACILLA *Atricapilla*.

MOCK *Orange*, in *Botany*. See PHILADELPHUS.

MOCK *Privet*. See *Mock* PRIVET.

MOCK, or running a *muck*, is a practice that has prevailed time immemorial in Batavia. To *run a muck*, in the original ſenſe of the word, is to get intoxicated with opium, and then ruſh into the ſtreet, with a drawn weapon, and kill any one that comes in the way, till the party is himſelf either killed or taken priſoner. If the officer takes one of theſe *omocks* or *mohawks* (as they have been called by an eaſy corruption) alive, he has a conſiderable reward, and the unhappy wretches are always broken alive on the wheel: but ſuch is the fury of their deſperation, that three out of four are

are neceſſarily deſtroyed, in attempting to ſecure them. See Amok.

MOCKELN, in *Geography*, a lake of Sweden, in the province of Smaland; 25 miles S.W. of Wexio.

MOCKERN, a town of the duchy of Magdeburg; 16 miles E. of Magdeburg.

MOCKJACK Bay, a bay of America, on the coaſt of Virginia, in the Cheſapeak. N. lat. 37° 24′. W. long. 76° 23′

MOCLIN, a town of Spain, in the province of Granada; 12 miles S. of Loja.

MOCO, in *Commerce*, a ſmall ſilver coin in the Weſt Indies, which in ſome places is $\frac{1}{4}$th of the dollar, and in others $\frac{1}{8}$th.

MOCOA, in *Geography*, a town of South America, in the province of Popayan; 70 miles S.E. of Popayan.—Alſo, a town of Mexico, in the province of Culiacan, on the river St. Sebaſtian; 90 miles N.W. of Culiacan.

MOCOCO, or Maucaco, in *Zoology*. See Lemur *Catto*.

MOCODAME, in *Geography*, a ſmall iſland near the S.E. coaſt of Nova Scotia. N. lat. 45° 4′. W. long. 61° 20′.—Alſo, a river of Sumatra.

MOCOES, a tribe of the Eboe ſlaves, brought from the interior of Africa. See Eboes.

MOCO-MOCO, a town of Sumatra, the capital of Anac-Soongey, on the S.W. coaſt. This country roſe from the ruins of Indrapour, and extends on the ſea-coaſt from Mandoota river to that of Oori. A ſmall tax was laid on the people of Anac-Soongey, in ſatisfaction for the murder of a prince by the raja of Indrapour, which is now paid to the ſultan of Moco-Moco. The tax is a ſoocoo (the 4th part of a dollar), a bamboo of rice, and a fowl, from each village annually. The government of Anac-Soongey is Malay, but a great part of the country dependent upon it is inhabited by the original dooſoon or village people. The chiefs are obliged to attend the ſultan, and carry their contribution or tax; but his authority is very much limited. The officers next in rank to the ſultan are called Mantrié, a corruption, as ſome have ſuppoſed, of Mandarin; 30 miles S.W. of Indrapour. S. lat. 2° 25′. E. long. 101° 12′. Marſden's Sumatra.

Moco-Moco, or *Little Oroonoko*, a river of South America, which runs into the Atlantic, a little S. of Oroonoko.

MOCORITO, a town of Mexico, in the province of Culiacan; 72 miles N.W. of Culiacan.

MOCOS, a collection of ſmall iſlands in the Indian ſea, near the coaſt of Siam. N. lat. 13° 50′. E. long. 97° 52′.

MODAGHIRY, a town of Hindooſtan, in Myſore; 13 miles N. of Vencatighery.

MODAIN, Madain, or *el Modain*, a town of the Arabian Irak, on the ſide of the Tigris, on the ſcite of the ancient Cteſiphon. It is ſaid by Herbelot to have been founded by Sapor and enlarged by Choſroes, who built a palace here that was the moſt magnificent in all the Eaſt. In 637 this place was taken and plundered by Said, the lieutenant of Omar. The riches of which it was deſpoiled were immenſe, conſiſting, in part, of the throne, the crown, the royal ſtandard, and carpet of the ancient Perſian kings; 20 miles S. of Bagdad.

MODAL, in *Logic*, &c. a term applied to propoſitions which include certain conditions and reſtrictions.

Modal, in *Muſic*. The characters for time in the firſt ſtages of figurative muſic or counter-point were called *modal ſigns* for the moods.

The different modes or moods for aſcertaining the *quantum* of each tact, or pulſation of time in muſic, were the following:

○ ○3, for a perfect long, or three breves.

○, a perfect breve, or three ſemibreves.

☉, two imperfect breves, and, in the compoſitions of Tallis and Bird, ſometimes three minims.

C, an imperfect breve, or two ſemibreves.

Beſides theſe, there were others for a ſpecies of jig time, in which ſemibreves or minims were ternary, and moving in triplets, while the longer notes were binary: C 3, C 2, C3, &c. Zacconi, Prat. Muſ. lib. ii. cap. 54. makes the modal ſigns amount to fourteen.

MODANE, in *Geography*, a town of France, in the department of Mont Blanc, and chief place of a canton, in the diſtrict of St. Jean de Maurienne; 15 miles E. of it. The place contains 925, and the canton 3267 inhabitants, on a territory of 450 kiliometres, in 7 communes.

MODBURY, a market-town and borough, ſituated in the hundred of Ermington, and county of Devon, England. The town conſiſts chiefly of four ſtreets, running in the direction of the cardinal points, and croſſing each other at right angles. It is a borough by preſcription, but has loſt its right of ſending members to parliament, having petitioned to be exempted from that *burthen*, as it was then conſidered, in the reign of Edward I. The plea of exemption was the poverty of the inhabitants, who were unable to pay their repreſentatives, as was cuſtomary at that early period. Modbury is now governed by a portreeve (uſually ſtyled mayor), two conſtables, and ſeveral other officers, who are elected annually at a court-leet held at Michaelmas. All perſons who poſſeſs any freehold within the borough are liable to be choſen; being conſidered in the light of freemen or free burgeſſes. Even ſo late as the commencement of the laſt century, it appears from the records, that the borough-court here took cognizance of all debts under forty ſhillings; and in the reign of Charles I. the ſame records ſhew that the inhabitants poſſeſſed the authority of enrolling deeds in the rolls of the borough. The chief ſupport of this town is its woollen trade, which was formerly much more conſiderable than at preſent. A great quantity of yarn was likewiſe ſpun here and in the neighbourhood about fifty years ago, at which time a weekly market was held, diſtinctly to facilitate the ſale of that article. This market has long been diſcontinued, but to preſerve the right, the bell ſtill rings for the yarn-market at twelve o'clock. A pluſh and hat manufactory have alſo been eſtabliſhed of late years. The petty ſeſſions for the hundred are held here. Thurſday is the market-day for proviſions.

The population of this town, according to the parliamentary returns of 1801, compriſed 1813 perſons, 832 males, and 981 females, of which number 862 were returned as engaged in trade, and 944 in agriculture.

The church of Modbury is a very ſpacious and handſome building, ſurmounted by a lofty ſpire, of later erection than the reſt of the edifice. On the ſouth aiſle ſtands a fine alabaſter ſtatue, in armour, ſuppoſed to be the effigy of one of the Champernoune family. Beſides the eſtabliſhed church, there are two other buildings in this town appropriated to divine worſhip; one belonging to the Preſbyterians, and the other to the Anabaptiſts. Here was formerly an alien priory, dependent on the abbey of St. Peter ſur Dive, in Normandy, which ſeems to have been founded ſhortly after the conqueſt. Its religious inmates were monks of the order of St. Benedict. On the diſſolution of the alien monaſteries, in the reign of Henry VI., this priory was granted to the college at Eaton. The preciſe ſcite on which it ſtood is uncertain, but as there are two fields adjoining to the weſtern ſide of of the church-yard, ftill called "Priors'-parks," it was moft probably fituated fomewhere near that fpot. Indeed, on the oppofite fide of the road which paffes thefe parks, there appear fome remains of an ancient building, which may have formed part of the priory.

The proprictor of the manor here, at a very remote period, was fir James Okeftone, or Oxton, from whofe family it paffed into that of the Champernounes, who poffeffed a fplendid manfion immediately adjoining to the town, only a fmall portion of which is now ftanding. Of the grandeur of this feat, and the magnificent manner in which its owner lived, tradition fpeaks very highly. They are faid, in particular, to have kept a fine band of fingers and muficians, with whofe execution queen Elizabeth was fo much delighted, that fhe requefted the loan of them for a month, but being refufed by Mr. Champernoune, out of pique found fome pretence to fue him at law, and occafion his ruin; he being compelled to fell no lefs than nineteen manors to fupport the litigation.

The vicinity of this town is adorned with a number of family feats, fome of ancient and others of modern erection. Wimpfton, the ancient manfion of the Fortefcues, is particularly remarkable as being the houfe in which the celebrated fir John Fortefcue was born. This gentleman raifed himfelf by his talents to the dignity of chief juftice and chancellor in the reign of king Henry VI., and wrote a work entitled "De Laudibus Legum Angliæ," which is ftill held in great repute among legal antiquaries. The other feats of note near Modbury, are Train, Fleet-houfe, Madridge, Fowlefcombe, Stowford, Butterford, Shilfton, and Fardel, which laft was long in poffeffion of the Raleighs. Polwhele's Hiftory, &c. of Devonfhire, two vols. folio. Beauties of England and Wales, vol. iv.

MODDAPOUR, a town of Bengal, on the right bank of the Ganges; 27 miles N. of Mahmudpour.

MODDIGONG, a town of Hindooftan, in Goondwana; 10 miles N. of Ramteak.

MODDIGUBA, a town of Hindooftan, in the circar of Gooty; 10 miles W. of Amantpour.

MODE, or Mood, *Modus*, in *Philofophy*, a manner of being; or a quality or attribute of a fubftance, or fubject, which we conceive as neceffarily depending on the fubject, and incapable of fubfifting without it.

Mr. Locke defines modes to be thofe ideas (he fhould have faid *things*) which do not imply any fuppofition of fubfifting by themfelves, but are confidered as mere dependencies, and affections of fubftances.

Our ideas of things may be reduced to two kinds: the one of things, which we conceive feparately, and by themfelves, called *fubftances;* and the other of things which we conceive as exifting in others, in fuch manner as that we cannot allow them exifting without them, and thefe we call *modes* or *accidents*.

It is the characteriftic, then, of a true mode, to have fuch a relation to fome fubject, as not to be clearly and diftinctly conceivable without conceiving the fubject, of which it is a mode, at the fame time: when, on the other hand, the conception of the fubject does not at all infer or require that of the mode.

Thus, what gives us to know that thought is not a mode of extended fubftance, or matter, is, that extenfion, and the other properties of matter, may be feparated from thought, without ceafing to conceive thought all the while.

We always confider things as clothed with certain modes, except we reflect on them in the abftract, or general; and it is the variety of modes, and the relations, that occafions the great variety of denominations of the fame thing. They are the various modes of matter, *e. g.* that make all the diverfity of bodies, or corporeal beings, in nature.

There are various divifions and kinds of modes: as, 1, *effential*, or *accidental*. An *effential* mode, or *attribute*, is that which belongs to the very nature or effence of the fubject in which it is; and the fubject can never have the fame nature without it, as roundnefs in a bowl, folidity in matter, thinking in a fpirit, &c. and this is *primary*, when it is the firft or chief thing that conftitutes any being in its particular effence or nature, and makes it to be that which it is, and diftinguifhes it from all other beings, as roundnefs in a bowl: or *fecondary*, which is any other attribute of a thing, that is not of primary confideration, called a *property;* as volubility in a bowl. An *accidental* mode, or *accident*, is fuch a mode as is not neceffary to the being of a thing; for the fubject may be without it, and yet remain of the fame nature which it had before; or it is that mode, which may be feparated from its fubject, as blacknefs or whitenefs in a bowl, learning in a man, &c.

2. Modes are *abfolute* and *relative*. An *abfolute* mode is that which belongs to its fubject; without refpect to any other beings whatfoever. A *relative* mode is derived from the regard which one being has to others: thus, roundnefs and fmoothnefs are the *abfolute* modes of a bowl; but greatnefs and fmallnefs are *relative*. See Relation.

3. Modes are *intrinfical*, or *extrinfical*. The former are conceived to be in the fubject or fubftance; as when we fay a globe is round, &c. The latter mode is a manner of being which fome fubftances attain by reafon of fomething that is external or foreign to the fubject, and is called external denomination; as the globe lies within two yards of the wall, &c.

4. Modes are alfo *inherent*, or *adherent*; i. e. *proper* or *improper*. *Adherent* modes arife from the joining of fome accidental fubftance to the chief fubject; which yet may be feparated from it; as when a bowl is wet, &c. *Inherent* modes have a fort of in-being in the fubftance itfelf; as the bowl is fwift or round, &c.

5. *Action* and *paffion*, ufing the terms in a philofophical fenfe, are modes which belong to fubftances; as when a fmith with a hammer ftrikes a piece of iron, the fmith and hammer are agents or fubjects of action, and the iron is the patient, or fubject of paffion.

6. Modes may be divided into *natural*, *civil*, *moral*, and *fupernatural*, all which pertain to the apoftle Paul, who was a little man, a Roman by the privilege of his birth, a man of virtue or honefty, and an infpired apoftle.

7. Modes belong either to *body*, or to *fpirit*, or to both. Modes of *body* belong only to matter, or corporeal beings; fuch are *figure*, *reft*, *motion*, &c. Thefe are *primary*, when they belong to bodies confidered in themfelves, whether there were any man to take notice of them or no, as fhape, fize, &c.; or *fecondary*, which are fuch ideas as we afcribe to bodies, on account of the various impreffions that are made on the fenfes of men by them, called fecondary qualities: fuch are all colours, founds, taftes, fmells, and all tactile qualities. (See Quality.) Modes of *fpirit* belong only to minds, fuch are *knowledge*, *will*, &c. Modes belonging to body and fpirit, are called mixt or human modes, becaufe they are found in human nature; fuch are *fenfation*, *imagination*, *paffion*, &c. in which there is a concurrence of the operation of animal and intellectual nature.

8. There are alfo modes of other modes, which, though they fubfift in and by the fubftance, as the original fubject of them, are properly and directly attributed to fome mode of that fubftance; thus fwiftnefs and flownefs are modes of motion, which is itfelf the mode of a body.—Watt's Logic, p. i. c. 2. § 3 and 4.

Mr.

Mr. Locke divides modes into *simple*, and *mixt* or *compound*.

Modes, *Simple*, are combinations of simple ideas of the same kind, or even of the same simple ideas divers times repeated; as a dozen, a score, &c. which are only the ideas of so many distinct units put together.

The modifications of any simple idea, Mr. Locke observes, are as perfectly different and distinct ideas in the mind, as those the most remote and inconsistent: thus, *two* is as distinct from *three* as blindness is from heat. With this view that author examines the *simple* modes of space; which are found to be distance, capacity, extension, figure, place, and duration.

The mind has several distinct ideas of *sliding*, *rolling*, *walking*, *creeping*, &c. which are all but the different modifications of motion. *Swift* and *slow* are two different ideas of motion, the measures of which are made out of the distance of time and space put together.

The like variety we have in sounds; every articulate word is a different modification of sound, as are all notes of different length put together, which makes that complex idea called *time*.

The modes of colours might be also very various; some of which we take notice of as the different degrees, or as they are termed *shades of the same colour*. But since we seldom make assemblages of colours without taking in figure also, as in painting, &c. those which are taken notice of, do most commonly belong to mixed modes; as, *beauty*, *rainbow*, &c. All compounded tastes and smells are also modes made up of the simple ideas of those senses.

As to the modes *of thinking*; when the mind turns its view inward upon itself, *thinking* is the first idea that occurs, in which it observes a great variety of modifications; and therefore frames to itself distinct ideas.

Thus the perception annexed to any impression on the body made by an external object, is called *sensation*. Where an idea recurs without the presence of the object, it is called *remembrance*. When sought after by the mind, and brought again in view, it is called *recollection*. When held there long under attentive consideration, it is called *contemplation*. When ideas float in the mind without regard or reflection, it is called in French a *reverie*. When the ideas are taken notice of, and, as it were, registered in the memory, it is *attention*. When the mind fixes its view on any one idea, and considers it on all sides, it is *intention* and *study*.

Of these various modes of thinking, the mind forms as distinct ideas, as it does of white and red, or of a square or a circle.

Modes, *Mixt*, are combinations of simple ideas of several kinds; as in *beauty*, which consists in a certain composition of colour, figure, &c.; *theft*, which is the concealed change of possession of any thing, without consent of the proprietor, &c.

There are three ways by which we get ideas of *mixt* modes: 1. By experience and observation of things themselves: thus, by seeing two men wrestle, we get the idea of wrestling. 2. By invention, or voluntary putting together of several simple ideas of our own minds: so he that first invented printing, had an idea of it first in his mind before it ever existed. 3. By explaining the names of actions we never saw, or notions we cannot see; and by enumerating all those ideas, which go to the making them up: thus, the *mixt* mode which the word *lye* stands for is made up of the simple ideas. 1. Articulate sounds. 2. Certain ideas in the mind of the speaker. 3. Words, the signs of these ideas. And, 4. Those signs put together by affirmation, or negation, otherwise than the ideas they stand for are in the mind of the speaker.

Mixt modes have their unity from an act of the mind, combining those several simple ideas together, and considering them as one complex one: the mark of this union is one name given to that combination.

This gives the reason, why there are words in every language, which cannot be rendered by any one single word of another. For the fashions and customs of one nation make several combinations of ideas familiar in one, which another had never any occasion to make. Such were ὀστρακισμὸς among the Greeks, and *proscriptio* among the Romans.

This also occasions the constant change of languages; because the change of custom and opinion brings with it new combinations of ideas, which, to avoid long descriptions, have new names annexed to them, and so they become new species of *mixed* modes.

Of all our simple ideas, those which have had most *mixed* modes made out of them, are thinking, and motion (which comprehend in them all action), and power, from whence these actions are conceived to flow.

Of this kind are the modes of actions, distinguished by their causes, means, objects, ends, instruments, time, place, and other circumstances; as also of the powers fitted for those actions. Thus *boldness* is the power to do or speak what we intend, without fear or disorder; and this power of doing any thing when it had been acquired by frequent doing the same thing, is that idea we call *habit*; and when forward and ready, upon every occasion, to break into action, we call it *disposition*: thus *testiness* is a disposition or aptness to be angry. Power being the source of all action, the substances, in which those powers are, when they exert this power, are called *causes*: and the substances thereupon produced, or the simple ideas introduced into any subject, are called *effects*. The efficacy by which the new substance or idea is produced, is called in the subject exerting that power, *action*; and, in the subject in which any simple idea is changed, or produced, *passion*: which efficacy, in intellectual agents, we can conceive to be nothing else but modes of thinking and willing: in corporeal agents nothing else but modifications of motion.

Mode, *Division of a*. See Division.

Mode, in *Grammar*. See Mood.

Mode, in *Logic*. See Mood.

Mode is also used for the modification of a proposition; or that which renders it *modal* and *conditional*.

Mode, *Indirect*. See Indirect.

Mode, Fr. a key in *Music*. In plain-chant the modes are numbered.

The ecclesiastical modes are called *authentic*, when the 5th is above the principal, as $\overset{a}{\underset{A}{E}}$; and *plagal*, when the 4th is above the principal, and the 5th below its octave, as $\overset{d}{\underset{D}{G}}$. See Canto-fermo, and Tones *of the* Church.

Modes *of the Ancient Greek Music*. The ancients differ extremely among themselves in defining their modes; obscure in all parts of their music, upon this subject they are nearly unintelligible. They all agree that a mode is a certain system or constitution of sounds, and it seems as if this constitution was in itself nothing more than an octave filled with all the intermediate sounds according to the genus.

In high antiquity, the Greeks had but three modes, at the distance of a tone from each other, which was national:

 the

the lowest being called the *Dorian*, the middle the *Phrygian*, and the highest the *Lydian*.

Afterwards, in dividing the tones into semitones, two other modes were obtained, as the *Ionian* and the *Æolian*; the first being inserted between the Dorian and the Phrygian, the second between the Phrygian and the Lydian.

In process of time the system being extended above and below, musicians established new modes at both extremities, which took their denomination from the first five, adding the prepositions *hyper*, above, and *hypo*, below. Thus the Lydian mode was followed by the hyper-Dorian, the hyper-Ionian, the hyper-Phrygian, the hyper-Æolian, and the hyper-Lydian, ascending: and after the Dorian mode, came the hypo-Lydian, the hypo-Æolian, the hypo-Phrygian, the hypo-Ionian, and the hypo-Dorian, in ascending. These fifteen modes are all enumerated in Alypius. See the plate, where their order and intervals are expressed in Greek characters, and by equivalent notes in the Guido scale. But it must be remembered, says Rousseau, that the hypo-Dorian was the only mode which was used to its whole extent. In proportion as the others mounted, the upper notes were avoided, in order not to exceed the natural compass of the voice. These observations are necessary for the clearing up some passages in ancient authors, which seem to imply that the lowest modes had the highest notes, which indeed was true, in having in their melodies more notes above the key-note. For want of this knowledge, Doni is extremely embarrassed by these apparent contradictions.

Greek theorists differ in the number of modes: while with some they amount to 15, Aristoxenus, according to Euclid, admitted only 13, suppressing the two highest; the hyper-Æolian, and hyper-Lydian. But in the work of Aristoxenus that is come down to us, he only specifies six, concerning which he relates the different sentiments of the times.

At length, Ptolemy reduced the number of these modes to seven; saying that modes were introduced in music in order to vary the melodies by the contrast of grave and acute; for it is evident that they may be multiplied far beyond 15; but these seven suffice to facilitate the transition from one mode to another, by consonant intervals easy to produce.

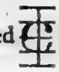
He therefore includes all the modes in the compass of an octave, of which the Dorian mode was the centre; so that the mixo-Lydian was a 4th above, and the hypo-Dorian a 4th below. The Phrygian a 5th above the hypo-Dorian; the hypo-Phrygian, a 4th below the Phrygian: whence it appears, that to count from the hypo-Dorian, which is the lowest mode, there was the distance of a tone to the hypo-Phrygian; from the hypo-Phrygian to the hypo-Lydian, another tone; from the hypo-Lydian to the Dorian, a semitone; from that to the Phrygian, a tone; from the Phrygian to the Lydian still a tone, and from the Lydian to the mixo-Lydian, a semitone, which extend to a seventh, in the following order:

1	-	F	-	-	Mixo-Lydian.
2	-	E	-	-	Lydian.
3	-	D	-	-	Phrygian.
4	-	C	-	-	Dorian.
5	-	B	-	-	Hypo-Lydian.
6	-	A	-	-	Hypo-Phrygian.
7	-	G	-	-	Hypo-Dorian.

Ptolemy retrenched all the other modes, pretending that these seven occupied all the sounds of the diatonic octave. From these seven modes of Ptolemy, with the addition of the hypo-mixo-Lydian, it is supposed that Guido formed the eight ecclesiastical modes. See TONES *of the* CHURCH.

Such is the clearest notion which we are able to form of the tones or modes of the ancient music; while we consider them as differing from each other only by grave and acute: but still other differences subsisted, which characterized them more particularly: as expression, the kind of poetry to which they were applied, the kind of instrument by which they were accompanied, the rhythm or cadence of the verse, names or airs peculiar to certain people from whom the principal modes had their names: as the Dorian, Phrygian, Lydian, Ionian, Æolian.

There were still other modes, which should rather be called styles or kinds of composition: as the tragic mode, appropriated to the theatre; the nomic, consecrated to Apollo; the dithyrambic, to Bacchus, &c. See STYLE and MELOPŒIA.

In our old music, the word *mode*, or *mood*, was applied to measure or time, in order to fix the relative value of all the notes in a movement by a general sign, which was placed after the clef, at first by circles and semi-circles pointed, or without points, according to the numbers 2 and 3, differently combined. It is from these ancient expedients that we still retain  for common time, and a barred  for a quicker dual measure. See MODAL and PROLATION.

These characters, except the two last mentioned, have long been disused; yet it is necessary to understand them, in order to be able to decipher old music.

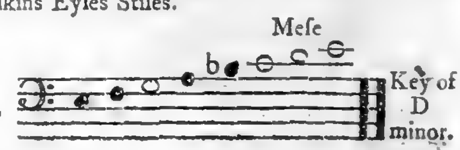
Thus far the chief of this article is from Rousseau, which includes almost all the knowledge on the subject, that the most laborious and profound commentators of the seven ancient Greek writers on music, published by Meibomius, ever conjectured, we dare not say discovered, on the subject.

The general opinion concerning the modes of Ptolemy, till about the middle of the last century, was such as we have described, till sir Fr. Haskins Eyles Stiles formed an ingenious hypothesis concerning them, which was read to the Royal Society in 1759, and afterwards published in the Philosophical Transactions, vol. li. part ii. for 1760, under this title: "An Explanation of the Modes or Tones in the Ancient Grecian Music." Sir Francis in this dissertation endeavours to prove, that the ancients had a double doctrine of the modes, an *harmonic* and a *musical* doctrine By the harmonic doctrine, the modes were all one and the same series of intervals, such as the general system furnishes, only at different pitches; by the musical, they consisted of so many different arrangements of intervals, or species of octave. Sir Francis regarded the harmonic doctrine as only a tuning trick, to produce more readily the different species of octave between the fixed sounds.

He explains this in a diagram, taking his pitch, according to Ptolemy, at hypate meson, our E in the base, and makes all his mutations between that sound and its octave, nete die zeugmenon. And this, according to sir F. E. Stiles, is the diapason chosen by Ptolemy, cap. 2, lib. ii. for the purpose of exhibiting his divisions of the several species.

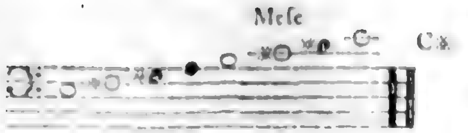
Diagram of the Species of Diapason in the seven Modes admitted by Ptolemy, according to the Doctrine of Sir Francis Haskins Eyles Stiles.

Mixolydian.



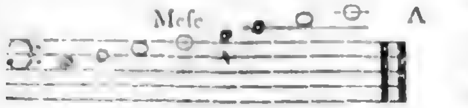
Lydian.

Lydian.

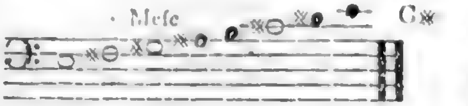


Phrygian.

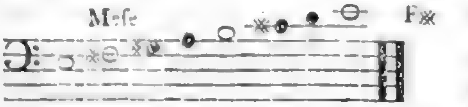
Dorian.



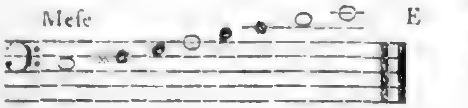
Hypolydian.



Hypophrygian.



Hypodorian.



Sir Francis gives quotations from the ancient Greek writers in confirmation of his doctrine, several of which indeed seem favourable to it; at least they imply a difference on some occasions from the intervals in the natural or great system: this difference he imagines to be expressed by the term μεταβολη, *mutation*.

He very truly asserts, that no transposition of the same melody into a higher or lower key, can have so powerful an effect as a change in the modulation, or succession of intervals; and observes, that modern music has but two considerable changes in the same key; these are from major to minor, and from minor to major. The first seems reserved for pathetic effects.

Sir Fr. Haskins Eyles Stiles falls foul on all his predecessors. After his opinion, we have that of Rousseau, the chief part of whose article in his Dict. de Mus. we have translated, and given whatever is most new and useful in former and subsequent articles, and his opinion on the ancient Greek modes and other articles peculiar to the music of the ancients.

Metastasio, in two letters to Saverio Mattei on the Grecian music, has considered it with his usual elegance, candour, and clearness; but he does not treat of the modes in particular, so much as on ancient Greek music in general. We shall therefore reserve our extracts from these two letters, till Greek music and music of the ancients are considered at large. See SYSTEM.

MODECCA, in *Botany*, a genus of the Cucurbitaceous order, figured in Rheede Hort. Malab. v. 8. t. 20—23, and indicated by Jussieu under *Passiflora*, Juss. Gen. 398. A species of the same, from Sierra Leone, flowered many years ago, in lady Amelia Hume's stove, and still exists there. We believe it to be a perfectly well defined genus, and have proposed to call it *Blepharanthes*, on account of the fringed petals, which make its essential character, and to preserve an analogy with its near ally *Trichosanthes*. We have only waited for a more correct knowledge of the several species, and of some circumstances in the generic character. It is abundantly distinct from *Passiflora*. S.

MODEL, an original, or pattern, proposed for any one to copy or imitate.

St. Paul's church is said to be built after the model of St. Peter's at Rome.

MODEL is particularly used in building for an artificial pattern, made of wood, stone, plaster, or other matter, with all its parts and proportions; in order for the better conducting and executing some great work, and to give an idea of the effect it will have in large.

In all great buildings it is much the surest way to make a model in relievo; and not to trust to a bare design, or draught. There are also models for the building of ships, &c. and for extraordinary stair-cases, &c.

MODEL, in *Painting* and *Sculpture*, is any thing proposed to be imitated. And

Hence, in the academies, they give the term model to a naked man, disposed in several postures, to give an opportunity to the scholars to design him in various views and attitudes.

The sculptors have little models of clay or wax to assist them in their designs of others that are larger, in marble, &c. and to judge of the attitude and correctness of a figure.

Statuaries likewise give the name model to certain figures of clay or wax, which are but just fashioned, to serve by way of guide for the making of larger, whether of marble or other matter.

MODENA, *Duchy of*, in *Geography*, a principality of Italy, bounded on the N. by the duchy of Mantua, on the E. by the Bolognese, on the S. by the republic of Lucca, and on the W. by the duchy of Parma, and part of Tuscany; about 60 miles in its greatest length, and from 20 to 36 in breadth. The soil resembles that of the duchy of Parma; the agriculture is little superior, the middle-men and metayers impeding industry, though some peasants in the mountains are proprietors of land. The breed of sheep is neglected. The country, however, abounds in corn, excellent wine, and other productions. In some parts is found a kind of alkaline earth, which, being reduced to powder, has been used as an antidote to poisons, fevers, dysenteries, and others disorders. In other parts wells are dug, 40 or 60 feet deep, and on the water a reddish petroleum is seen to float, which abounds most in autumn and spring. These wells are enclosed, and every fortnight oil is skimmed off the surface; and this oil is used for embalming, varnishing, painting, and as an ingredient in some medicinal preparations. Amber is dug out of a soil impregnated with petroleum. This duchy affords a variety of petrifactions. In digging wells near Modena, to a certain depth, a particular stratum is found, on penetrating which the water gushes up as from a subterranean lake or river. About 10 miles S. of the capital there is an aperture in the earth called "La Salza," whence, particularly in spring and autumn, ascend, with a very loud noise, smoke, flame, ashes, and stones, attended with a strong smell of sulphur. Carrara, in the S. of this duchy, affords the celebrated marble used in statuary. The chief rivers are the Crostolo, the Secchia, and the Panaro. This duchy is a remnant of the power of the celebrated family of Este, who also possesses the adjacent country of Ferrara, which was seized by the pope in 1598. The remaining territory contains about 320,000 souls, and the city of Modena 30,000; the revenue being 140,000*l.* Since the French revolution, which has produced such changes in the geography, as well as in the general state of Europe, the whole of this duchy forms a part of Italy, and is now divided into

into the departments of the Croſtolo, the Panaro, and the Apennines.

MODENA, the capital of the above duchy, and now capital of the department of Panaro, the ducal reſidence, and a biſhop's ſee, is an ancient, large, tolerably built, fortified town, with a ſtrong citadel, containing a ducal palace, which is large and ſplendid, and diſtinguiſhed by a well furniſhed picture-gallery, a cathedral, many pariſh churches and convents, and from 25,000 to 30,000 inhabitants. It is ſituated in a fertile plain; and its ſtreets are, in general, large, ſtraight, and ornamented with porticoes and piazzas. The univerſity was for a long time under the direction of eminent profeſſors; and the magnificent college of Charles Boromeo, is an academy for 70 or 80 young noblemen. In a chamber under the cathedral tower is the curioſity ſo much talked of by travellers, called "Secchia rapita," which is nothing more than a well-bucket, with iron hoops, hung up by an iron chain, taken in a war from the inhabitants of Bologna, and preſerved here as a trivial monument of courage and victory. The houſe of Eſte poſſeſſed this city ever ſince the year 1288. On the approach of the French, the duke retired from his dominions, with a large ſum of money, to Venice. Upon an armiſtice, he agreed to pay to the republic 7,500,000 livres in caſh, 2,500,000 livres in proviſions and military ſtores, and to give, beſides, pictures and other douceurs; 30 miles S. of Mantua. N. lat. 44° 38′. E. long. 10° 56′.

MODENORE, a town of Hindooſtan, in the circar of Condapilly; 20 miles N.W. of Maſulipatam.

MODERATA, MISERICORDIA, in *Law*, a writ that lies for him who is amerced in a court-baron or other court, not of record, for any tranſgreſſion beyond the quality or quantity of the offence. It is directed to the lord of the court, or his bailiff, commanding them to take a *moderate amercement* of the party. This writ is founded upon Magna Charta.

If a man be amerced in a court-baron on preſentment by the jury, where he did not any treſpaſs, he ſhall not have this writ, unleſs the amercement be exceſſive and outrageous: and if the ſteward of the court, of his own head, will amerce any tenant or other perſon without cauſe, the party ought not to ſue for this writ of moderata miſericordia if he be diſtrained for that amercement; but he ſhall have action of treſpaſs. (New Nat. Br. 167.) When the amercement which is ſet on a perſon is affeered by his peers, this writ of moderata miſericordia doth not lie; for then it is according to the ſtatute 10 Edw. II.

MODERATION, in *Ethics*, is a virtue conſiſting in the proper government of our appetites, paſſions, and purſuits, with reſpect to honours, riches, and pleaſures; and in this ſenſe it is ſynonimous with *temperance*: it is alſo often uſed to denote *candour*.

MODERATO, Ital. in *Muſic*, implies a time neither quick nor ſlow; much reſembling *andante*, but ſomewhat quicker. See ANDANTE.

MODERATOR, in the *Schools*, the perſon who preſides at a diſpute, or in a public aſſembly.

Such a doctor was the moderator, that is, the preſident, at ſuch a diſputation, in ſuch an aſſembly, &c.

MODERATOR *Ring*, in *Anatomy*, is uſed by Valſalva for that ring which the muſcles of the eye make round the optic nerve, at the bottom of the orbit. He alleges, that the exterior fibres of theſe muſcles which riſe from the nerve, muſt ſhorten it when they contract, and when the interior fibres act they muſt compreſs it; ſo that theſe different fibres of the muſcles affect the nervous fluid here very differently.

Valſalva alſo deſcribes ſuch another ring made round the motory nerves of the eye; but acknowledges, that it is neither ſo remarkable nor diſtinct as the former. Med. Eſſ. Edin. Abr. vol. ii. p. 410.

MODERE', Fr. in *Muſic*. See MODERATO.

MODERN, ſomething new, or of our time. In oppoſition to what is antique, or *ancient*.

Modern authors, according to Naude, are all thoſe who have written ſince Boethius: the modern philoſophy commences with Galileo: and the modern aſtronomy with Copernicus.

MODERN *Medals* are reckoned all thoſe that have been ſtruck within theſe three hundred years. See MEDAL.

MODERN, in *Architecture*, is improperly applied to the preſent, or Italian manner of building; as being according to the rules of the antique. Nor is the term leſs abuſed when attributed to architecture purely Gothic.

Modern architecture, in propriety, is only applicable to that which partakes partly of the antique, retaining ſomewhat of its delicacy and ſolidity; and partly of the Gothic, whence it borrows members and ornaments, without proportion or judgment.

MODERN *Muſic*, *Muſica Moderna*, may be divided into two parts: firſt, *antiquo moderna*, which is generally a ſerious ſort of muſic, conſiſting of many parts; and which has been in uſe from Guido's time to the beginning of the laſt century. Secondly, the *modern*, which has been uſed in the two laſt centuries: it is very different from the *antiquo moderna*, being briſker, lighter, gayer, and more ſprightly.

Tha characteriſtics of the firſt ſtate of counterpoint, or muſic in parts, were *plain ſimple harmony*, conſiſting of common chords, of note againſt note; then *figurative harmony*, or notes of different lengths, conſiſting of different figures or characters moving at the ſame time. After this was found to be poſſible, the more artificial contrivances were cultivated of fugue and canon, but without air or melody, except in fragments of canto-fermo, and tunes of ſuch popular ballads as were ſung in the ſtreets, and upon which moſt of the early maſſes in four parts were conſtructed.

MODERN, or *Moddra*, in *Geography*, a town of Hungary; 14 miles N.N.E. of Preſburg.

MODESTY, in *Ethics*, is ſometimes uſed to denote humility; and ſometimes to expreſs chaſtity or purity of ſentiment and manners. Modeſty was deified by the Romans under the name of "Pudicitia;" and at Rome ſhe had two temples, one dedicated to the chaſtity of the nobles, and the other to that of the populace, and alſo altars on which ſacrifices were offered to her. The origin of the diſtinction between the chaſtity of the Patrician ladies, and that of the Plebeians, is thus related by Livy (l. x. c. 25.) Virginia, of a Patrician family, having married a Plebeian named Volumnius, who was, however, afterwards conſul, her ſiſter, looking upon this match to be unworthy her name, having joined with the other matrons, would no longer ſuffer her to partake in the myſteries of the goddeſs of Chaſtity, but drove her out of the temple. Virginia, ſtung with this affront, got a chapel raiſed in the long ſtreet, the ſame where was the goddeſs's temple from which ſhe was excluded, and ſhe dedicated it to the chaſtity of the Plebeian ladies; where the wives, who were not of the ſenatorian order, convened from that time to offer ſacrifice to that goddeſs. Chaſtity was repreſented under the figure of a woman veiled, or ſeeming to point her right-hand, or her fore-finger, to her face, to ſignify that ſhe has no reaſon to bluſh.

MODI, in *Geography*, a ſmall iſland in the gulf of Engia. N. lat. 37° 27′. E. long. 23° 33′.

MODIANORE, a town of Hindooftan, in Myfore; 45 miles E.N.E. of Bangalore.

MODIBOO, a town of Africa, in the kingdom of Bambarra, delightfully fituated on the banks of the Joliba or Niger, which is here very broad, and enlivened with many fmall and verdant iflands, all of them ftocked with cattle, and crowded with villages; 65 miles N.E. of Sego. N. lat. 14° 38'. W. long. 1° 35'.

MODICA, a town of Sicily, in the valley of Noto; 8 miles W. of Noto. N. lat. 36° 51'. E. long. 14° 43'.

MODIFICATION, in *Philofophy*, that which modifies a thing; that is, gives it this or that manner of being.

Quantity and quality are accidents which modify all bodies.

According to Spinofa's fyftem, all the beings that compofe the univerfe are only fo many different modifications of one and the fame fubftance. And the different arrangement and fituation of their parts make all the difference between them.

MODIFICATIVE, fomething that modifies, or gives a thing a certain manner of being.

Father Buffier eftablifhes a new part of fpeech, which he calls *modificative*. Nouns and verbs, he obferves, are fufceptible of divers circumftances or modifications: in the phrafe, *zeal acts*, we have a noun and verb without any modification; but in that, *zeal without difcretion acts rafhly*, the noun and verb are each attended with a modification or circumftance.

The laft kind of words, which ferve to modify nouns and verbs, fince they have no general name in the common grammars, he choofes to call modificatives: which include what grammarians commonly call *adverb*, *conjunction*, and *prepofition*.

MODILLIONS, in *Architecture*, mutules carved into confoles, placed under the foffit or bottom of the drip of the corona in the Corinthian and Roman orders, for fupporting the larmier and cyma, or appearing to perform the office of fupport.

In Grecian architecture, the Ionic order is without modillions in the cornice, and alfo the Roman examples of the fame order, except the temple of Concord at Rome, which has both dentils and modillions.

A fingular and curious example of a modillion cornice, but contrary to the principles of architecture, is to be found in the interior cornice of the Tower of the Winds at Athens, where the projecting part is much thicker than the interior part, where the ftrefs feems to lie, and, confequently, gives the idea of weaknefs.

A fingular example of modillions is to be found in the frontifpiece of Nero at Rome, where they confift of two plain faces, feparated by a fmall cyma reverfa, and crowned with an ovolo and bead.

Another very extraordinary form of modillions is that placed in the frieze of the fourth order of the Colifeum, cut on the outfide, or projecting part of a cyma reverfe form.

In moft examples of the Corinthian and Roman orders, the cornices have both dentils and modillions; but in our opinion, if the two are ufed together, in good proportion to the other parts, fo as to appear diftinctly at a reafonable diftance, the cornice will be overcharged, both in proportion and weight, to the other principal members of the entablature, or the entablature to the whole order; the one or the other ought, therefore, to be omitted in the fame cornice.

In the general difpofition of modillions, if each one is conceived to be divided into two equal parts by a vertical plane at right angles to the furface of the frieze, one of the modillions is fo difpofed, that its dividing vertical furface will be entirely in a plane paffing through the axis of the column, and in the column next the angle of the building there is generally only one modillion between that through which the plane along the axis paffes, and the angle of the cornice.

The vertical fides of modillions at right angles to the face, are generally finifhed with volutes of different fizes, and turned on different fides of the fame line, the greater being that next to the vertical furface, to which they are attached, and the leffer at the extremity.

The foffits of the modillions, fo conftructed, follow the under line of the volutes, and the connecting undulated line which joins them. The upper part of each volute is on the fame level, and is attached to a moulding of the cyma inverfe form, which returns round it, and this moulding is again attached to the corona, which hangs over the modillion.

In fome of the Roman buildings the modillions are not placed over the axes of the columns, neither upon thofe at the extremes, nor over the axes of the intermediate fhafts. In the Pantheon, the modillion next each angle of the building has its vertical fide, which is oppofed to the next modillion nearer to the central plane of the portico, over the axis of the column, and confequently the whole breadth of the modillion on one fide of the axis entirely, and on that fide next to the angle of the building. In the whole portico are forty-feven modillions, including the one at each extreme; the intervals are, therefore, forty-fix in number, and forty-four between the columns that are between their axes. The portico is octo-ftyle, and, confequently, the inter-columns are feven in number: from this it will be found, that if the columns were placed equidiftantly, the number of inter-modillions would be $6\frac{2}{7}$ths in number. In this temple the correfponding intervals are very irregular. The two extreme ones are, according to Defgodetz, $9' \, 4\frac{1}{2}''$, and $9' \, 2\frac{1}{4}''$: the next two, nearer the centre, are $9' \, 5\frac{1}{4}''$, and $9' \, 1\frac{7}{8}''$: the next two, ftill nearer to the centre, are exactly equal, being $9' \, 5''$ each, and the central intercolumniation is $10' \, 4\frac{3}{4}''$: fo that the modillions appear to be equally divided, without any regard to the axis of the columns. The fame irregularity in the difpofition of the modillions may be obferved in the temple of Concord, and in that of Jupiter the Thunderer. In the three remaining columns of the temple of Jupiter Stator, each column has a modillion placed over its axis, and each inter-column has three modillions regularly difpofed: the diftance between the lower ends of the fhafts are 3 mod. 4 pa. $\frac{1}{2}$, and the columns are in height 20 modules, 6 parts $\frac{5}{7}$ths.

In the Pantheon, the modillions are placed in the pediment, contrary to the authority of Vitruvius.

MODILOWA, in *Geography*, a town of Poland, in Volhynia; 36 miles N.E. of Zytomiers.

MODIN, a village of Paleftine, fituated on a hill, deferving of notice, on account of the tomb of the Maccabees, and alfo of a victory obtained by Judas Maccabæus, over Antiochus Eupator; 14 miles E.S.E. of Jaffa.

MODINAGUR, a town of Hindooftan, in Bahar; 25 miles E.N.E. of Hajipour. N. lat. 25° 34'. E. long. 85° 51'.

MODIOLI, in *Natural Hiftory*, a name given by fome authors to the trochitæ or fingle joints of the rays of the petrified magellanic ftar-fifh, which, when connected in numbers together, form that foffil called entrochus. Others have alfo ufed this word, *modiolus*, to exprefs the compound body, or entrochus itfelf. Though the general form of the trochitæ be thin and flat, yet they are fometimes found confiderably thick; and though the entrochi or compound modioli are ufually fo many cylinders of equal diameter in all parts, yet there are fometimes found fuch as are thick in the middle, and thence gradually taper to each end; fome alfo alſo are compoſed of joints, each of this form; theſe differ very greatly from the common kind, and inſtead of conſiſting of a number of little wheels, are made up of a ſeries of little barrels, joined, as it were, end to end.

MODIOLUS, from *modus*, a meaſure, in *Surgery*, ſince it was formerly ſo conſtructed, that it would only enter to a certain depth: the crown or ſaw of the trepan. Anciently it reſembled in ſhape the nave of a wheel.

MODIUM, in *Geography*, a town of Norway, in the province of Aggerhuus; 20 miles W. of Chriſtiania.

MODIUS, in *Antiquity*, a kind of dry meaſure in uſe among the Romans for ſeveral ſorts of grain.

The modius contained thirty-two heminæ, or ſixteen ſextaries; or $\frac{1}{3}$ of the amphora; amounting to an Engliſh peck. See MEASURE.

MODIUS, FRANCIS, in *Biography*, a learned critic, was born at Oudenburg, in Flanders, in 1546. The wars of the Low Countries obliged him to retire to Cologne, and he ſpent the greater part of his life in Germany. Being at Bonne in 1587, he loſt all his effects, and was himſelf dangerouſly wounded. Towards the cloſe of life, he was preſented with a canonry at Aire, where he died in 1597. Modius wrote annotations upon many of the Latin claſſics, which are moſtly to be found in his "Lectiones Nov-antiquæ," which were firſt printed at Frankfort in 1584, and were reprinted in letters by Gruter, in the fifth volume of his "Theſaurus Criticus." He was author likewiſe of poems and other pieces. Moreri.

MODO & *Forma*, in *Law*, a phraſe uſed in proceſſes and pleadings, by which the defendant abſolutely denies the thing charged on him by the plaintiff, *modo & forma declarata*, in the manner and form ſet forth.

The civilians in the like ſenſe ſay, *negat allegata, prout allegantur, eſſe vera*.

MODON, in *Geography*, a ſea-port town on the S.W. coaſt of the Morea; with a large and ſafe harbour. The town is the reſidence of a pacha, and ſee of a Greek biſhop; 42 miles W.S.W. of Miſitra. N. lat. 36° 58′. E. long. 21° 35′.

MODRITZ, a town of Moravia, in the circle of Brunn; five miles S. of Brunn.

MODRSAW, a town of Auſtrian Poland, in the palatinate of Cracow; 24 miles W. of Cracow.

MODRUSCH, a town of Auſtrian Croatia, the ſee of a biſhop; 24 miles W.N.W. of Sluin.

MODULATION, from *Modulatio*, Lat., in *Muſic*, is one of the moſt important terms of a muſical dictionary. In the articles COMPOSITION and COUNTERPOINT, it has been treated after our own ideas and experience; here we ſhall give our readers the rules laid down by others, not to confute, but to confirm and ſtrengthen our own. And firſt, we ſhould give Padre Martini's inſtructions, and thoſe of Dr. Pepuſch on the ſubject, as the moſt profound contrapuntiſts of Italy and Germany during the early part of the laſt century, if theſe learned theoriſts had not adhered ſo religiouſly to the eccleſiaſtical modulation of the old maſters, founded on the modes or tones of the church, ſo as to preclude all the modulation of ſecular muſic, which has been extended, and in many inſtances improved, during the laſt hundred years. We ſhall, therefore, now chiefly tranſlate and confine ourſelves to the article *Modulation* in the dictionary of Rouſſeau, in which it is amply and clearly treated, according to the practice of the beſt maſters at the time of his writing; that is, 30 or 40 years ago. See works on the ſame ſubject by ſubſequent writers ſtill living, ſuch as Frike, Bemitzrieder, Kollmann, &c.

But firſt we muſt obſerve, that *to modulate* during the ſixteenth century, implied nothing more than a change of voice from one ſound to another; but the ingenious citizen of Geneva, more conſonant to preſent practice in muſic, defines modulation, "the manner of eſtabliſhing and treating a key;" but adds, that the word, at preſent, generally implies the art of conducting melody and harmony, ſucceſſively, into many keys, in a manner agreeable to the ear, and according to rule. If the key is announced by harmony, it is from harmony that the laws of modulation ariſe.

Theſe laws are eaſy to conceive, but difficult rigorouſly to obſerve. To modulate properly in the ſame key, we muſt begin firſt by running through all the notes of that key in good melody, frequently repeating its eſſential chords, and ſtrongly marking them. That is, paſſing from the chord of the 7th to the 5th, or $\frac{6}{5}$ of the 7th to the key-note; but in various ways to avoid monotony. Secondly, to make no cloſes, nor to repoſe but upon thoſe two chords, or at moſt on that of the 4th of the key, called by the French the ſubdominant, or 5th below the key. Thirdly, never to alter any of the ſounds of the principal key by a flat or ſharp, which would lead to another key.

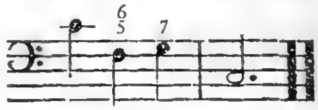
But to paſs from one key to another, which is now underſtood to be the principal buſineſs of modulation, analogy muſt be conſulted, with reſpect to the relation of keys, and the number of chords appertaining to two keys.

Let us begin by a major key, or key with a ſharp 3d. Whether we conſider the 5th of the key as being more immediately related and connected with it of any ſound except the octave of the key-note; or whether we regard it as the firſt ſound that is heard in the reſonance of the key-note, the 5th will always be found the moſt agreeable interval upon which to eſtabliſh a modulation the moſt analogous to that of the key-note.

The 4th of the key, if not a part of the chord of the key-note, the key-note is at leaſt a part of the chord of the 4th. For if C E G form the chord of the key-note, that of the 4th will be F A C; thus C is the bond of union between the two keys. Indeed it is only neceſſary to change one ſound of the principal key to form the ſcale of its 5th above, and 5th below, or 5th and 4th of any major key. In the key of C, an F♯ or a B♭ does the buſineſs.

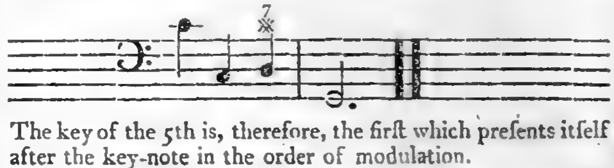
There are two minor chords in the key of C, in which only one note differs from the chord of C, as A *c e*, and *e g* B. But the ſharp 7th, and other accidents which happen to the chords and melody of theſe minor keys, changes their character ſo much, that the double relation between the chords of C and A, and C and E is ſoon effaced.

As all the ſounds of the ſcale of C are compriſed in the chords of the key-note, and its two 5ths,



See plates throughout this article.

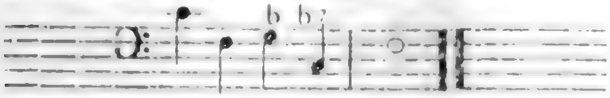
the gammut or ſcale of C, if altered only by one ſingle ſharp, furniſhes the ſcale and chords of G, the 5th above C, which ſhews the great analogy between theſe two keys, and facilitates the means of paſſing from one to the other by one alteration only.



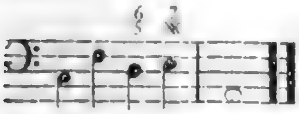
The key of the 5th is, therefore, the firſt which preſents itſelf after the key-note in the order of modulation.

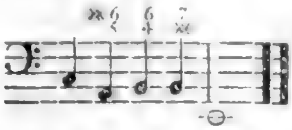
The

The fame fimplicity of relative founds between the key-note and its 5th above is alfo found to fubfift between the key-note and its 5th below, or 4th above.



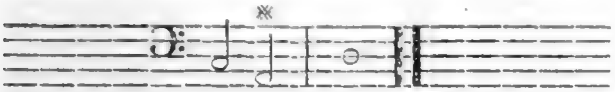
Though the modulating from C to A minor, its 6th, and from C to E minor, its 3d, is only by the change of one note in the chords, the fharp 7th muft be heard in one of the chords of thefe minor keys, to make either A or E a key-note.





Thefe immediate modulations furnifh the means of paffing to more remote keys by the fame rules, and of returning afterwards to the key-note, of which we muft never lofe fight.

We have four regular modulations from the key of C major; E F G A. To modulate into D, wholly unrelative to C, it muft be brought about by means of a confonant movement of the fundamental A with a fharp 3d.



But we muft dwell but an inftant in this modulation, left the key of C is forgotten, which itfelf is altered in going into D. A long period in D would require intermediate modulations to return to C, into which it would be dangerous to wander. No good modulation into B, the fharp 7th of C, can have place, at leaft immediately, as it has no true 5th, and would lead to a harmony too fudden and remote from that of the principal key. In every modulation, all the parts muft change the key at the fame inftant, to avoid carrying on two modulations at the fame time. Huygens, fays Rouffeau, has well remarked, that the prohibition of two fucceffive 5ths has this rule for its principle; for it is impoffible to have many perfect fucceffive 5ths between two parts, without modulating into two unrelative keys. The hexachords are compofed of pure harmony to fundamental bafes, without modulation. The defcending fcale in the *règle de l'octave*, modulates into the 5th of the key. But, in fact, only three notes in the bafe can afcend in one key, diatonically; the 4th note arrives at a new key to the top of the fcale, which produces a perpetual modulation by 4ths, from C natural into all the 23 keys.

To modulate on a keyed inftrument, is ufually done in arpeggio, by preluding extempore, of which the variety, to a man of fcience, is unbounded. Abel, no leffon-player on the clavichord or harpfichord, poffeffed this talent to a wonderful degree.

MODULE, in *Architecture*, a certain meafure taken at pleafure, for regulating the proportions of columns, and the fymmetry or diftribution of the whole building.

Architects ufually choofe the diameter or femidiameter of the bottom of the column for their module; and this they fubdivide into parts or minutes.

Vignola divides his module, which is a femidiameter, into twelve parts, for the Tufcan and Doric; and into eighteen, for the other orders.

The module of Palladio, Scamozzi, M. Cambray, Defgodetz, Le Clerc, &c. which is alfo the femidiameter, is divided into thirty parts, or minutes in all the orders.

Some divide the whole height of the column into 20 parts for the Doric, 22½ for the Ionic, 25 for the Roman, &c. and of one of thefe parts they make a module, by which to regulate the reft of the building.

There are two ways of determining the meafures or proportions of buildings: the firft by a fixed ftandard meafure, which is ufually the diameter of the lower part of the column, called a module, fubdivided into fixty parts, called minutes. In the fecond there are no minutes, nor any certain and ftated divifion of the module; but it is divided occafionally into as many parts as are judged neceffary. Thus the height of the Attic bafe, which is half the module, is divided either into three, to have the height of the plinth; or into four, for that of the greater torus; or into fix, for that of the leffer.

Both thefe manners have been practifed by the ancient as well as the modern architects; but the fecond, which was that chiefly ufed among the ancients, is in the opinion of Perrault preferable.

As Vitruvius, in the Doric order, has leffened his module, which, in the other orders, is the diameter of the lower part of the column, and has reduced that great module to a mean one, which is a femidiameter; M. Perrault reduces the module to a third part for the fame reafon, *viz.* to determine the feveral meafures without a fraction. For in the Doric order, befide that the height of the bafe, as in the other orders, is determined by one of thefe mean modules; the fame module gives likewife the heights of the capital, architrave, triglyphs, and metopes. But our little module, taken from the third of the diameter of the lower part of the column, has ufes much more extenfive; for, by this, the heights of pedeftals, of columns, and entablatures, in all orders, are determined without a fraction.

As then the great module or diameter of the column has fixty minutes; and the mean module, or half the diameter, thirty minutes; our little module has twenty. See COLUMN.

MODULER, Fr. in *Mufic;* to modulate extempore is a refearch after new effects and new combinations. Learning, hand, and experience are neceffary to do credit to the performer, and pleafe and furprife the hearer. And we may add that a prelude, toccata, or voluntary by a great player, feems infpiration, and is worth a hundred pieces committed to paper.

MODULI CAMPANORUM, chimes. See Graffineau, p. 139, a long article on the fubject. See CARILLONS.

MODUNDAH, in *Geography*, a town of Bengal; 18 miles N.N.E. of Calcutta.

MODUS DECIMANDI is when a parcel of land, a fum of money, or a yearly penfion, belongs to the parfon, either by compofition or cuftom, time out of mind, in fatisfaction for tithes in kind: or, when there is by cuftom a particular manner of tithing allowed, different from the general law of taking tithes in kind, which are the actual tenth part of the annual increafe.

This is fometimes a pecuniary compenfation, as twopence an acre for the tithe of land; fometimes it is a compenfation in work and labour, as that the parfon fhall have only the twelfth cock of hay, and not the tenth, in confideration of the owner's making it for him: fometimes in lieu of a large quantity of crude or imperfect tithe, the parfon fhall have a lefs quantity, when arrived to greater maturity, as a couple of fowls inftead of tithe eggs, &c. In fhort, any means by which the general law of tithing is altered

altered, and a new method of taking tithes is introduced, is called a *modus decimandi*, or ſpecial manner of tithing. In order to make a good and ſufficient modus the following rules muſt be obſerved:

1. It muſt be certain and invariable. (1 Keb. 602.) 2. The thing given, in lieu of tithes, muſt be beneficial to the parſon, and not for the emolument of third perſons only. (1 Roll. Abr. 649.) 3. It muſt be ſomething different from the thing compounded for. (1 Lev. 179.) 4. One cannot be diſcharged from payment of one ſpecies of tithe, by paying a modus for another. (Cro. Eliz. 446. Salk. 657.) 5. The recompence muſt be in its own nature as durable as the tithes diſcharged by it; *i. e.* an inheritance certain. (2 P. Wms. 462.) 6. The modus muſt not be too large, which in law is called a *rank* modus. (11 Mod. 60.) In theſe caſes of preſcriptive or cuſtomary moduſes, the law ſuppoſes an original real compoſition to have been regularly made, which being loſt by length of time, the immemorial uſage is admitted as evidence to ſhew that it did once exiſt, and that from thence ſuch uſage was derived. Now time of memory hath been long aſcertained by the law, to commence from the reign of Richard I. and any cuſtom may be deſtroyed by evidence of its non-exiſtence in any part of the long period from his days to the preſent. Blackſt. Com. b. ii.

MODYPOUR, in *Geography*, a town of Hindooſtan, in Bahar; nine miles S. of Patna.

MODZIEN, a town of Perſia, in the province of Mazanderan; 48 miles S.W. of Aſtarabad.

MOËCKARN, a town of the duchy of Magdeburg; 16 miles E. of Magdeburg.

MOEDA. See MOIDORE.

MOEN, or MONA, in *Geography*, an iſland of Denmark, in the Baltic, ſeparated from the S. end of the iſland of Zealand, and from the N.E. coaſt of Falſter, by a narrow ſea, about 16 miles in length, and from three to five in breadth; containing one town, *viz.* Stoege or Stege, and ſeveral villages. N. lat. 55°. E. long. 12° 20′.

MOEN, or MÖN, a river which riſes in Weſtphalia, three miles N.W. of Brilon, paſſes by Rhuden, &c., and joins the Roer at Nehem.

MOENCHIA, in *Botany*, received its name from Ehrhart in memory of Conrad Moench, a profeſſor of botany at Heſſe Caſſel, author of the *Flora Haſſiaca*. Ehrh. Beitr. faſc. 2. 177. This genus conſiſts of only one ſpecies, *Sagina erecta*, Linn. Sp. Pl. 185. Sm. Fl. Brit. 200. Engl. Bot. t. 609. The only difference in the eſſential character conſiſts in the ſtructure of the capſule, which ſplits at the top into eight teeth, inſtead of ſeparating, more or leſs perfectly, into four valves, like other *Saginæ*. The habit of this elegant little plant muſt alſo be allowed to be diſſimilar to that of the genus with which it has always been aſſociated. See SAGINA.

MOERDA, See MURDER.

MŒRHINGIA, in *Botany*, was named by Linnæus in honour of Paul Henry Gerard Mœrhing, a German phyſician, in the duchy of Oldenburg, who was the author of various botanical tracts. His firſt treatiſe appeared in 1733, entitled the anatomy of vegetables, in which the apparent ſtructure of leaves, after being macerated in water, is particularly conſidered.—Mœrhing printed a catalogue of his own garden in 1737, and furniſhed afterwards ſeveral papers for the *Ephemerides Naturæ Curioſorum*. He died in 1792, at the advanced age of 82 years. Linn. Gen. 195. Schreb. 264. Willd. Sp. Pl. v. 2. 439. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 2. 416. Juſſ. 300. Lamarck Illuſtr. t. 314.—Claſs and order, *Octandria Digynia.* Nat. Ord. *Caryophyllei*, Linn. and Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of four lanceolate, ſpreading, permanent leaves. *Cor.* Petals four, ovate, undivided, ſpreading, ſhorter than the calyx. *Stam.* Filaments eight, capillary; anthers ſimple. *Piſt.* Germen ſuperior, globoſe; ſtyles two, erect, the length of the ſtamens; ſtigmas ſimple. *Peric.* Capſule roundiſh, of one cell and four valves. *Seeds* numerous, roundiſh, convex on one ſide, angulated on the other.

Eſſ. Ch. Calyx inferior, of four leaves. Petals four. Capſule of one cell, and four valves.

1. M. *muſcoſa.* Linn. Sp. Pl. 515. Jacq. Auſtr. t. 449. (Alſine ſaxifraga anguſtifolia minima montana; Column. Ecphr. p. 1. 292. t. 290.)—Found growing in moſſy ſituations, near trickling rills, on mountains in the ſouth of Europe, flowering throughout the ſummer. *Root* perennial, thread-ſhaped and creeping. *Stems* annual, herbaceous, thread-ſhaped, round, ſlender, ſmooth, much branched. *Leaves* oppoſite, linear, very narrow, ſmooth, dilated at the baſe, ſo as to make the ſtem ſomewhat perfoliate. *Flowers* ſolitary, on long, erect, ſlender, axillary ſtalks. *Petals* ovato-linear, obtuſe, milk white. *Capſules* yellowiſh when ripe. *Seeds* eight or ten, kidney-ſhaped, dark-brown, furniſhed with a large, white, jagged border to their ſcar of inſertion.

MŒRIS, LAKE, in *Ancient Geography*, a lake of Egypt, concerning the ſituation and extent, and even the exiſtence of which, authors have differed. It has been repreſented as the nobleſt and moſt wonderful of all the works of the kings of Egypt; and accordingly Herodotus conſiders it as much ſuperior to the pyramids or labyrinth. As to its ſituation, Herodotus (lib. ii.) and Strabo (lib. xvii.) mark it out by placing the labyrinth on its borders, and by fixing the towns, which were round it, ſuch as Achantus to the ſouth, Aphroditopolis towards the eaſt, and Arſinoé to the north: Diodorus Siculus (lib. i.) and Pliny (lib. v.) confirm theſe authorities, by placing it at 24 leagues from Memphis, between the province of that name and that of Arſinoé. If the lake, like that of Mareotis, had totally diſappeared, doubts as to its ſituation might ſtill have been entertained; but the poſition marked by the above-mentioned hiſtorians leads us to a lake, actually exiſting, known by the name of BIRKET *Caroun*, (which ſee,) more than 50 leagues in circumference. With regard to the extent of this lake, we recur again to the teſtimonies above cited: Herodotus ſays, that the circumference of the lake Mœris was 3600 ſtadia, or 60 ſchenes, which, ſays the hiſtorian, form the dimenſions of the maritime baſe of Egypt, (75 leagues.) He adds, that it ſtretches from N. to S. and that its greateſt depth is 300 feet. The hiſtorian has fixed the meaſure of the ſchene in Lower Egypt at four miles, or 1¼ league, ſo that the 60 ſchenes make 75 leagues. If we compare the meaſures by Strabo and Diodorus Siculus, we ſhall find that the baſe of Egypt was eſtimated at 75 leagues, and hence it will follow, according to the account of Herodotus, that the lake was in circuit 75 leagues. Some writers, who have taken the uſual meaſure of the ſtadium at 100 toiſes, have aſſigned to this lake a circumference of 150 or even 180 leagues. But as the hiſtorian has determined the meaſure of 3600 ſtadia to be 60 ſchenes, or 75 leagues, he muſt have made uſe of ſtadia of 50 toiſes each. Boſſuet, the biſhop of Meaux, has vindicated the ſtatement of the largeſt extent of 180 leagues, which Voltaire has treated with raillery; and M. Rollin, conceiving it to be incredible, adopts the opinion of Pomponius

nius Mela, who says, that this lake is but 20,000 paces, that is, seven or eight French leagues in circumference. Pliny estimates it at 250,000 paces, or about 80 leagues. M. d'Anville, with a view of conciliating the different contending parties, has, in his map of Egypt, marked a great canal, to which he gives the name of the lake Mœris. The depth of 300 feet ascribed to this lake by historians must be exaggerated; but perhaps less so than we may be led to imagine. The bottom which it occupies is a bason, formed by the mountains. It is very low, since the Nile runs into it even by the canal of Tamieh. Although the mud may have gradually collected in a series of ages, its depth is still very considerable. Two pyramids, says Herodotus, constructed in an island towards the middle of the lake, rise from 300 feet below the water, and are as high out of it. Each of them has on its summit a colossal statue, seated on a throne. Their total elevation, taken from the base, is a stadium of 600 feet; thus marking the measure of the stadium, as he had before, in giving the circumference of the lake, reduced it to 50 toises. These pyramids no longer exist; nor indeed did they exist in the time of Augustus, for they are not mentioned by Strabo. Lake Mœris, says Herodotus, occupies a soil very dry, and destitute of springs. It derives its waters from the Nile, which runs into it during six months; and during the remainder of the year it restores them to the river. During the former period, the fishery produces a talent of silver daily to the royal treasury, and 20 minas only during the latter. According to the natives of the country, a canal is pierced across the mountain, the extended chain of which commands Memphis. This is an outlet by which the superfluous waters are poured into the sands of Libya on the western side. As for the earth that was taken from the lake, the historian was informed, that it had been conveyed to the river, and carried by the current into the sea. According to the account of Strabo, the province of Arsinoé contains the wonderful lake of Mœris, which resembles the sea in its extent, its colour, and its shores. As deep as it is extensive, it receives at the beginning of the inundation the waters which would otherwise cover the harvests and the habitations of men; they are conducted thither by a large canal. When the Nile subsides, they return by two other canals (those of Tamieh and of Bouch), which, as well as the former, serve for watering the fields, which is naturally performed. At the head of the canals sluices are formed, which are opened at pleasure; whether to introduce or to let off the waters.

At present this lake is only about 50 leagues in circuit; but this diminution by no means proves that Herodotus and Pliny were deceived in their calculations. Considering the revolutions to which Egypt has been subject for a series of 2000 years, it might have undergone still greater changes. The noble design of forming this lake is said to have been conceived by one of the Pharaohs, called Mœris, and he determined to change a part of the country, which was sandy and desert, into an useful lake. After the excavation had been made by the labour of some thousands of men, and at an immense expence, he drew a canal 40 leagues in length, and 300 feet wide, for the purpose of conducting thither a part of the waters of the Nile. This great canal, which still subsists entire, is known under the name of "Bahr Jousseph," Joseph's river. It opens near "Tarout Eccherif," and ends at "Birket Caroun." As in several places this canal was cut out of the rock, the labour and expence must have been very great. It was not sufficient to have disengaged Egypt from the excess of the inundation, which in those remote ages remained too long on the lands, at that time lower than they are in our days, and occasioned its sterility; it was necessary also to render these waters useful to agriculture. This great prince succeeded in doing this by drawing two other canals from the lake to the river. At their opening were formed two sluices, which were kept shut during the increase of the Nile; then the waters conveyed by the canal of Joseph were heaped up in the immense inclosure of lake Mœris, encompassed with dykes and mountains. During the six months that the Nile was on the decline, these sluices were opened, and a surface of water of about 80 leagues in circumference, and 30 feet higher than the ordinary level of the river, formed a second inundation to be directed at pleasure. One part returned to the Nile, and served for the navigation. The other part branched out into innumerable rivulets, watered the fields, and diffused fertility even to the very sandy hills. This great work supplied the deficiency of water in years of a moderate overflow, by retaining those precious waters, which otherwise would have flowed uselessly to the sea. Its benefits were still more strongly marked in the time of a great inundation. It received that hurtful superfluity of them, which would have prevented the sowing of the earth. Lest this artificial sea should break down the barriers that were opposed to it, and cause frightful devastation in the country, a canal was cut through the mountains, by which the superfluous waters were poured into the sands of Libya. At present this lake has lost almost all its advantages. From the period of nearly 1200 years, since which Egypt has fallen into the hands of barbarous nations, they have either destroyed, or suffered to perish, the chief part of these monuments. The Mareotis is dried up, the canal of Alexandria is no longer navigable, and the Mœris is only 50 leagues in circumference. If the canal of Joseph were cleared out, where the mud is collected to a vast height, if the ancient dykes were re-established, and the sluices of the canals of Tamieh and of Bouch restored, lake Mœris would still serve the same purposes. It would prevent the devastation, of the too great swellings of the rivers, and supply the deficiency of those which are inadequate. We should see it, as on former occasions, extending itself from Nesle and Arsinoè to the Libyan mountains, and offering to the view of the astonished traveller, a sea formed by the hand of man. Rollin's Anc. Hist. vol. i. Savary's Letters in Egypt, vol. i.

MOERSBERGEN, in *Geography*, a town of Holland, in the department of Utrecht; 10 miles E. of Utrecht.

MŒSIA, called by the Greeks *Mysia*, in *Ancient Geography*, a country of Europe, lay N. of Macedonia and Thrace, and extended from S. to N. as far as the right bank of the Danube. From W. to E. it extended from Pannonia, where the Drinus (Drin), passing to Sirmium and Singidunum (Belgrade), in order to discharge itself into the Danube, served for its boundary: to the W., comprehending the territory called "Pontus-Euxinus," from the promontory called "Hæmi-Extrema," and to the S. as far as the Istropolis. This large extent of country was divided into two distinct territories, partly by the mountains, and partly by the river Cebrus (Zebris), which discharged itself into the Ister. The part comprehended between the Drinus and the Cebrus was called "Mœsia Superior," and that which extended from the Cebrus to the sea was called "Mœsia Inferior;" *i. e.* Upper and Lower Mœsia. The principal river of Upper Mœsia was the Margus (Morava), formed of two other rivers; and farther to the E. it had the Tinacus (Timak). The principal towns were Singidunum (Belgrade), Viminacium (Minas), Bononia (Vidin), and Ratiaria (Artzar). In the interior of the country is Neissus,

Neissus (Nissa); besides other places mentioned by Ptolemy. The principal rivers of Lower Mœsia were the Œscus (Esker), the Osmus (Osmo), the Utus (Vid), the Iatrus (Jantra), all which rivers ran from S. to N. and emptied themselves into the Danube: the Panysus ran from W. to E., and discharged itself into the Euxine sea, near Odessus (Vasna). The principal towns are, upon the Danube, Œscus (Artzar), Nicopolis (Nicopoli), Durostom (Dristra or Silistria), Axopolis (Rassovat), and Trasmi. In the interior country were Sardica or Triaditza, near Sophia, Tauresium, the birth-place of Justinian, called Justiniana prima (Dginstendil), Nicopolis ad Hæmum (Ternova), Nicopolis ad Iatrum (Nicopi), and Marianopolis (Marienopoli). Upon the coasts of the Euxine sea, in the part called Scythia, and S. of this part, were Tomi (Temeswar), the place of Ovid's exile, Caria (Kalgri), and Odessus (Varna).

MOESKIRCH, in *Geography*, a town of Germany, and capital of a lordship, belonging to the princes of Furstenburg; 18 miles N. of Constance. N. lat. 47° 59′. E. long. 9° 14′.

MOESTLIN, Michael, in *Biography*, a German Lutheran divine, and celebrated mathematician, who flourished in the 17th century, was born at Goppingen, in the duchy of Wirtemberg. He obtained the friendship and patronage of the duke, who sent him to the university of Tubingen, where he was quickly distinguished by his diligence and talents, and took his degrees. After this he embarked in the ministry, was chosen pastor of the town of Tetschen, and discharged the duties of his office to the satisfaction of his flock, and acquired universal respect by his unaffected piety and exemplary manners. He also obtained considerable reputation for profound skill in the mathematics, for which he had a sort of natural turn. On this account he was elected mathematical professor at Heidelberg, where he remained about three years, and then returned to Tubingen. Here he was appointed to the mathematical chair, in which he continued during the remainder of his life. He died in 1650. He is said to have been the first person who explained the cause of the pale light observable on the disk of the moon a little before and after the change. In Italy he delivered an harangue in defence of the Copernican system, and is thought to have influenced Galileo in renouncing the old hypotheses, and in embracing the system which has now obtained a sure footing. He published "Ephemerides," and several other works connected with science. Moreri.

MŒURS, Fr. morals, manners. Rousseau has treated this word as a musical term; and informs us that it constituted a branch of Greek music, under the title of "Hermosmenon," which consisted in knowing how to choose what was most beautiful and proper in each genus, without permitting musicians to give to each object and each character all the forms of which it was susceptible; but obliged them to confine themselves to what was most appropriate to the subject, the occasion, the persons, and the circumstances. The morals consisted further in so arranging and proportioning all the constituent requisites in musical composition, such as the mode, the time, the rhythm, melody, and even the transitions; so that in the entire piece there should be a conformity and agreement which left no disproportion; but that all its several parts should constitute one perfect whole.

To prescribe to what point of perfection an art should be carried, and reduce to rules what is decorous, fitting, and excellent, was a degree of refinement to which the moderns pretend not to have arrived.

MOEY, in *Geography*, a small island in the East Indian sea. S. lat. 5° 50′. E. long. 132° 50′.

MOFFAT, a large village in the county of Dumfries, Scotland, is situated upon the banks of the river Annan, at the distance of fifty miles south-west from Edinburgh, and is distinguished chiefly as the most celebrated watering place in the northern division of our island. It stands upon a considerable eminence, encompassed on the east, west, and north sides by hills of different heights, some of which are inclosed and cultivated, and others laid out as pasture lands. A fine holm, or valley, extends to the south, carrying in its bosom the limpid stream of the Annan. The principal street, declining in the direction of this vale, commands a charming view of it, for the space of several miles. The houses here are for the most part well built, and the streets are kept exceedingly clean and smooth; and from their height and gravelly foundation dry so rapidly, that in an hour after the heaviest rain, the inhabitants may promenade without the smallest inconvenience. There is one capital inn in the village, where the post-office is kept, and several lesser ones, as well as excellent lodging-houses, fit for the reception of the most genteel families. Here are an assembly-room and a bowling-green.

The Moffat Well is situated about a mile and a half from the village, having an excellent carriage road leading to it, and a long room, stables, and other conveniences for the accommodation of the company when they are stationed there. The valuable medicinal properties of this well were first discovered about 160 years ago; since which time it has been constantly held in great estimation. Its waters are powerfully diuretic, and generally allowed to be effectual in the cure of scurvy and scrophula, if the patient's lungs are not injured previously to the use of them. When poured into a glass the water sparkles like champagne, and is so extremely volatile that it cannot be drank in perfection, unless at the fountain. According to the late Dr. Garnet, who paid considerable attention to this subject, when analysed, it is found to contain of muriat of soda (common salt) 36 grains; sulphuretted hydrogen gas 10 cubic inches; azotic gas 4 ditto; carbonic acid 5 ditto.

At the distance of four miles from Moffat, is another mineral spring, called the Hartfell Spaw, because issuing from a rock of alum-slate in a tremendous ravine, on the side of a mountain of that name. The chief mineral substances of this water are the sulphats of iron and alumina, which give it a powerful tonic quality. It is principally used, therefore, in cases of weakness; but has likewise been found serviceable in tetterous complaints and obstinate old ulcers. This well is honoured with high encomiums by Dr. Johnson. Several other chalybeate and petrifying springs have been discovered in the country adjacent to this village. One at Evan-bridge is equal in strength to the wells at Harrowgate, but it has hitherto been entirely neglected.

The vicinity of Moffat is no less fruitful in remains of antiquity than in salubrious springs. Part of a Druidical temple is still visible close to the bank of a rivulet which passes out of a small lake, and falls into the water, deriving its name from the village. Near this spot are likewise vestiges of a Roman road; and several stations and encampments of that people. A piece of gold was found a few years ago in a moss adjoining to the road, which is supposed to have formed part of some military ornament. Its outer edge was adorned with a border, in which were the following letters formed by cutting through the interstices, IOV. AVG. VOT. XX. Vestiges of a British encampment may be seen about three miles south-east from the village. On the road between it and the well is a large mound, of of a conical form, with a very deep ditch round it: another of smaller dimensions stands at the distance of a few hundred yards. A mile east from the Roman road are two caves, cut out of free-stone rock; they are of a large size, but by whom formed, or for what purpose, it is difficult to conjecture. Many ruins of old towers are visible in this parish, as well as in the adjoining one of Kirkpatrick-juxta; some of which are placed in small enclosures, defended by walls and ditches. Among the more remarkable of the entrenched parks, as they are called, is the park of Achencass, where the walls measure 15 feet in thickness, and upwards of 20 in height.

According to the parliamentary returns of 1801, the resident population of this parish amounted to 1619 persons, viz. 748 males, and 871 females. Sinclair's Statistical Account of Scotland.

MOFFEN ISLAND, in *Geography*, an island in the North sea, N. of Spitzbergen; it is of a round form, about two miles in diameter, with a lake or large pond of water in the middle, and between this lake and the sea the ground is from half a cable's length to a quarter of a mile broad: the whole island, besides this pond, is covered with gravel and small stones, without the least verdure or vegetation of any kind. The navigators of the Carcass, who visited this island, saw only one piece of drift wood, about three fathoms long, with a root on it, and as thick as the ship's mizen-mast, which had been thrown up near the high part of the land, and lay upon the declivity towards the pond. They also saw there bears, and a number of wild ducks, geese, and other sea-fowls, with bird's nests all over the island. They found an inscription over the grave of a Dutchman, who was buried there in July 1771. The tide seemed to flow eight or nine feet, and a current was found which carried the ship to the N.W. from the island, but which before carried it to the S.E., at the rate of a mile an hour, towards it. On the W. side is a fine white sandy bottom, from two fathoms, at a ship's length from the beach, to five fathoms, at the distance of half a mile. It is remarked, as surprising, that no notice should be taken of this island by the old navigators; unless it may be supposed that it did not then exist, and that the streams from the great ocean up the W. side of Spitzbergen, and through the Waygat's shoals, meeting here, raised this bank, and occasioned the quantity of ice that generally blocks up the coast in its vicinity. N. lat. 80° 5'. E. long. 12° 30'. Phipps's Voyage towards the North Pole.

MOFHAK, a small town of Arabia, in the province of Yemen, situated on the summit of a steep hill. This town has a dola. The revenue of the town, and of the territory annexed to it, is enjoyed by one of the Imam's sons. Mofhak lies in the route from Sana to Beit el Fakih.

MOGADOR, or MOGODOR, called also by the Moors *Suera*, a town of Morocco, in the province of Hea, which received its name from a saint, held here in great veneration, by the name of Sidi Mogodor, whose tomb is to be seen at a small distance to the south of the town. It had formerly a wretched castle, built by the Portuguese, to preserve a communication with their settlements to the south of this coast; and also to protect the entrance of a harbour, formed by a channel between the main land and a small island. The situation appearing favourable for a place of trade, the emperor resolved to found a city here; and the wealthier Moors began to build houses, to gratify the wishes of their sovereign. Foreign merchants were invited to do the same; and with a view of inducing them to comply with the emperor's wishes, large abatements were offered in the custom duties; but promises to this purpose were not very scrupulously observed. This city was begun in 1760, and has since been completely finished. It contains a great number of houses, handsomely and solidly constructed. The streets are all straight lines, and there is no town in the empire in which a regularity of plan is so strictly observed. It is surrounded with walls, and batteries are erected, not only on the sea-side, but towards the land, to defend it from any incursion of the southern Moors. The emperor has brought all the European merchants to settle at Mogodor, and, notwithstanding its distance from Europe, it is the only port on the coast which maintains a continual commercial intercourse with that quarter of the world. This city stands on marshy ground, and so low, that, at spring-tides, it is almost surrounded by the sea. The country about it is a melancholy desert of accumulated sand. The Europeans, however, have the advantage of a more easy communication with the southern provinces, which, by exchanging their productions for the commodities of Europe, render the trade of this place very flourishing. The port of Mogodor is formed by a channel between the main land and an island more than a mile in length. The entrance of this channel is to the north-west, and its outlet to the south. It is sufficiently large for ships of a middling size, but in general it has not sufficient depth; and this disadvantage is daily increased by the accumulation of sand. The number of ships which have been lost in this port in winter, by violent storms from the south-west, sufficiently prove how very dangerous it is in bad weather; 80 miles S.W. of Morocco. N. lat. 31° 30'. W. long. 9° 30'. Chenier.

MOGADOURO, a town of Portugal, in the province of Tras-los-Montes; 22 miles S.W. of Miranda di Duero.

MOGAMI, a town of Japan, in the island of Niphon; 110 miles N. of Jedo.

MOGANOOR, a town of Hindoostan, in Bahar; 11 miles S. of Namacul.

MOGARO, an island in the gulf of Venice, near the coast of Friuli. N. lat. 45° 47'. E. long. 31°

MOGATA, a town of Sweden, in East Gothland; 7 miles E. of Soderkioping.

MOGGIO, in *Commerce*, an Italian corn measure, which at Florence contains 8 sacchi, or 24 staja; the stajo being 4 quarti, 16 metadeli, or 32 mezzete: the moggio contains about 16 English bushels. At Leghorn, a moggio contains 2 rubbi, or 7½ sacchi; a sacco, 3 staja, or 384 bussoli. A sacco of good wheat weighs about 168 lb. of Leghorn, and contains 3720 French, or 4503 English cubic inches; so that 43 sachs of Leghorn are equal to 90 English bushels. See Tab. XXXI. under the article MEASURE.

MOGGURAH, in *Geography*, a town of Bengal; 8 miles N.W. of Goragot.

MOGHOSTAN, the denomination by which the southern part of the province of Kerman, in Persia, is distinguished.

MOGILEV, a town of Russia, and capital of a government, on the river Dnieper. The town is handsome and commercial, and a place in which the Russians carry on a considerable trade. It was taken from the Russians by the Poles in 1662; and by the division of Poland, in the year 1773, it was ceded to Russia, with its territory, and erected into an archbishopric of the Roman church, with an assistant bishop; 340 miles E.N.E. of Warsaw. N. lat. 53° 52'. E. long. 30° 14'.

MOGILEVSKOE, a government of Russia, bounded on the north by the government of Polotsk, on the north-east by that of Smolensk, on the south-east by that of Novgorod Sieverskoe, on the south by that of Tchernigov, and on the west by Poland; about 176 miles in length, in its widest breadth 120, in the north part 68, and in the south only 24. N. lat. 52° to 55°. E. long. 29° to 33°.

MOGILNICA, or MOULNICZA, a town of the duchy of Warsaw; 36 miles E. of Rawa.

MOGIMERI, a town of Brazil, in the government of St. Paul; 35 miles E. of St. Paul.

MOGLA, or MULLA, a town of Asiatic Turkey, and principal place of a Sangiacat, in Natolia, on the ruins of the Alinda; 100 miles S.E. of Smyrna. N. lat. 37° 8'. E. long. 28° 22'.

MOGLE, a town of Bosnia; 35 miles E. of Banjaluka.

MOGNA, a town of Italy, in the Feltrin.

MOGO, a town of Persia, in Laristan, on the coast of the Persian gulf; 40 miles W. of Lundsje.

MOGONTUEVSKOI, a town of Russia, in the government of Irkutsk, on the borders of China; 60 miles S.S.E. of Dorouinsk.

MOGORIN, in *Botany*, a name given by the Portuguese to an Indian or Chinese flower, growing on a small shrub. It is of a wonderful white colour, and not unlike the *ginseng*, only that it abounds more with leaves, and smells much sweeter; one single flower filling a whole house with its odoriferous effluvia. On this account the Chinese put a high value upon it, and carefully defend the shrub it grows on from the inclemency of the winter, by covering it with vases provided on purpose.

MOGORIUM, a name of barbarous origin, applied by Jussieu, *Gen.* 106, to such of the Linnæan species of *Nyctanthes*, as have a pulpy fruit, the calyx and corolla of such being presumed to have at least eight divisions; and the real *Nyctanthes*, being agreed to have a dry capsular fruit, besides other marks of distinction. Sir Joseph Banks and Dr. Solander have referred all the above-mentioned species to JASMINUM, (see that article,) in which they have been followed by Vahl and Willdenow. The measure is justified by the variableness of number in the parts of these flowers, even on the same individual plant, and the strong generic affinity between them all, independent of number. Such as have naturally a five-cleft flower, very commonly acquire one, two, or three additional segments; and those which have naturally eight, as *J. Sambac*, are liable to have twelve or more, without any obliteration of their organs of impregnation. When the latter takes place, the divisions of the corolla become greatly multiplied, as in other common instances.

MOGRABIANS, MOGARBA, or *Men of the West*, in *Military Language*, a name given to the infantry of the Turks, composed of the peasants of Tunis, Algiers, and Morocco, who have thought proper to seek in Syria and in Egypt that respect which is denied them in their own country. All the accoutrements and baggage of these soldiers are confined to a rusty firelock, a large knife, a leathern bag, a cotton shirt, a pair of drawers, a red cap, and sometimes slippers. Their pay is 5 piastres (about 10*s.* 10*d.*) *per* month, out of which they are obliged to furnish themselves with arms and clothing. They are maintained at the expence of the pacha, &c.

MOGUAR, in *Geography*, a town of Spain, in the province of Seville, at the mouth of the Tinto; 43 miles W. of Seville. N. lat. 37° 12'. W. long. 6° 58'.

MOGUL EMPIRE, in an extensive sense, denotes that empire of Asia, over which Tamerlane and his immediate successors reigned, and in which India was not included; but in a more restricted sense, it signifies, as custom has in later times appropriated the name, that empire which was held by the descendants of Tamerlane in Hindoostan and the Deccan. The origin of the Mogul empire is so far remote, that it is difficult to distinguish between fabulous tradition and the records of authentic history. It probably arose from small beginnings, and extended itself by the conquests of ambitious princes. It appears, however, to have been of very limited extent, if indeed it existed at all under this appellation, when Temujin, better known under the name of Jenghiz Khan, or Gengiz Cawn, made his appearance. The birth of this conqueror is referred to the year 1163; and at the time of his father's death, his subjects are said to have amounted to between 30,000 and 40,000 families: but a majority of these revolted, and in the earlier part of his life and reign he was left almost without any subjects. He rose, however, into notice and power, under the protection of Vang Khan, who was sovereign of a considerable number of Tartar tribes, situated to the north of Kitay, or China, and who has been known among Europeans by the name of Prester John. Thus encouraged and aided, he subdued those subjects who had revolted in the year 1201, and was able to keep possession of his throne. It was not long, however, before Vang Khan became jealous of the growing power, and perhaps manifest ambition, of Temujin, whom he had made his general; so that he contrived treacherous measures for destroying a prince, whom he considered as his rival. This disagreement terminated in an open war, which Temujin prosecuted with success. Vang Khan was defeated in a battle, by which he lost 40,000 men; and soon after was ungenerously put to death by the father-in-law of Temujin, to whom he had fled for refuge. The conqueror seized on the dominions of the vanquished Khan, and rapidly extending his marches and victories, reduced all the Mogul tribes in the year 1205. In a diet, held in the spring of the following year, to which all the great lords both of the Moguls and Tartars were summoned, the Mogul empire was confirmed to him and his successors, together with those kingdoms which he had subdued, and he was solemnly proclaimed emperor. During his inauguration, a prophet is said to have appeared in the assembly with a divine message, declaring that from this time Temujin should assume the name of "Jenghiz Khan, or the most great khan of khans;" and at the same time predicting, that his posterity should be khans from one generation to another. Thus established on the throne, and held in the most profound veneration by his subjects, he projected the extension of his dominions by more conquests. He began with the emperor of Hya, the western part of the empire of Kitay, and in 1209 compelled him to become his tributary: and when, in 1210, an acknowledgment of his being tributary to the emperor of Kitay was demanded of him, he resisted the demand, the consequence of which was a war, that terminated in the dissolution of the Kitay empire. In the year 1216 he resolved to carry his arms westward, and, in his progress, defeated an army of 300,000 Tartars, who had revolted; and in 1218 he deputed ambassadors to express his desire of an alliance with Mohammed Karazm (Charasm) Shah, emperor of Gazna or Ghizni. Although the alliance was concluded, it was soon treacherously violated; and this event occasioned a war, which in 1221 accomplished the conquest of the empire of Ghizni, and thus terminated the dynasty of Charasm. Jenghiz Khan, however, left Hindoostan undisturbed. After the reduction of Charasm, some of the Moguls marched into Iran or Persia, where they made extensive conquests; and others invaded Georgia, and the countries lying west of it, committing in their progress the most atrocious enormities. In 1225 Jenghiz Khan returned to Hya, slew the emperor, and destroyed

ſtroyed the country. But this was the laſt exploit of this ambitious and ſavage conqueror, who died in 1227, as he was marching to complete the deſtruction of the Chineſe. At the death of Jenghiz Khan, the Mogul empire extended over a prodigious tract of country; being, as it has been ſaid, more than 1800 leagues in length from eaſt to weſt, and upwards of 1000 in breadth from north to ſouth. The ſucceſſors of Jenghiz Khan, urged by an inſatiable ambition, purſued the ſame plan of conqueſt; ſo that Oktay was acknowledged emperor after Jenghiz, and had under his immediate government Moguleſtan, or the country of the Moguls properly ſo called, Kitay, and the countries to the eaſt of the Tartarian ſea. His brother Jagaty governed under him a great part of the weſtern conqueſts. The country of the Kipjacks, and others to the eaſt and north-eaſt, north and north-weſt, were governed by Batu or Patu, the ſon of Juji, who had fallen in the wars; while Tuli or Tolay, another ſon of Jenghiz Khan, had poſſeſſion of Khoraſan, Perſia, and that part of India which had been conquered. On the eaſt ſide the Mogul arms prevailed, and ſubdued not only the empire of Kitay, but the ſouthern part of China. In the year 1254, Magu, or Menkho, the fourth khan of the Moguls, raiſed a large army, and gave the command of it to his brother Hulaku, or Hulagu, for the purpoſe of extending his dominions towards the weſt. With this army, in 1255, he invaded Iran, ſuppreſſing the Iſmaelians or Aſſaſſins; and two years afterwards he advanced to Bagdad, which he captured. Cruelty and devaſtation marked the footſteps of the Moguls; fire and ſword were the implements of their warfare; and it is ſaid, that in Bagdad, and its vicinity, the number of ſlain amounted to 1,600,000. In the following year he invaded Syria, took poſſeſſion of Damaſcus without reſiſtance on the part of the inhabitants, whoſe lives were therefore ſpared; and having captured Aleppo by ſtorm, murdered the inhabitants, without ſparing even the children in their cradles. Theſe cities, which in the ſucceeding year revolted, were again taken by the Moguls and plundered, and the inhabitants were either ſlaughtered without mercy, or carried into ſlavery. Hulaku died in 1264; and at the time of his deceaſe we may fix the greateſt extent of the Mogul empire. It comprehended the whole of the continent of Aſia, excepting part of Hindooſtan, Siam, Pegu, Cochinchina, and a few of the countries of Leſſer Aſia, which the Moguls had not attacked. From this period, however, this vaſt and overgrown empire began to decline. The ambitious khans failed in their attempts upon Japan and Cochinchina, and alſo upon Hindooſtan; and the empire itſelf was divided into ſeveral ſmaller partitions. The governors of Perſia, being of the family of Jenghiz Khan, owned no allegiance to any ſuperior; thoſe of Tartary purſued the ſame courſe; the Chineſe threw off the yoke: and thus the continent of Aſia aſſumed, in a great degree, the ſame aſpect which it had before Jenghiz Khan began his conqueſts. At length, in the year 1369, Timur Bek, or Tamerlane, one of the petty princes of this broken empire, having conquered a number of others, was crowned at Balk, with the pompous title of "Sakeb Karan," *i. e.* the emperor of the age and conqueror of the world. He began his reign with the exerciſe of various cruelties.

In 1370, Timur croſſed the Sihon, made war on the Getes, and attacked Charaſm. In 1379 he had fully conquered the country of the Getes, as well as Khoraſan; and from that time he purſued his conqueſts, as Jenghiz Khan had done, though with leſs cruelty. In 1387, he had reduced Armenia, Georgia, and the whole of Perſia; the conqueſt of which laſt country was completed by the reduction of Iſpahan; 70,000 of the inhabitants of which city were ſlaughtered on account of the ſedition of ſome diſaffected perſons. After the reduction of Perſia, Timur turned his arms northward and weſtward, ſubduing all the countries as far as the Euphrates. He took the city of Bagdad; reduced Syria; and having ravaged a great part of Ruſſia, returned in 1396 to Perſia, where he made a ſplendid feaſt for his whole army. After ſeveral irruptions which had been made by the Moguls into Hindooſtan, after the death of Jenghiz Khan, Timur, who had already extended his empire over all the weſtern Aſia and Tartary, turned his arms towards this country in 1398. In the preceding year he had ſent his grandſon Peer Mahomed to reduce the Panjab and Moultan, and in October croſſed the Indus himſelf; and joining his grandſon near Moultan, his army proceeded in different diviſions to Delhi, which ſubmitted without what may be properly termed a battle. The maſſacres and exterminations that ſucceeded his taking poſſeſſion of the city, were executed under his immediate direction; and juſtly entitled him to the appellation of the "deſtroying prince." Timur ſtaid in Delhi only 15 days; and then appears to have been on his return to the ſeat of his empire, when, hearing of a fortreſs in the Dooab that had reſiſted the arms of a former Mogul invader, he marched towards it and took it. From thence he proceeded to the place where the Ganges iſſues out of the mountains, and where the Hindoos reſort at certain ſeaſons, in vaſt numbers, to pay their adorations to, and to purify themſelves in, that ſacred ſtream. His object was the extermination of theſe inoffenſive people; and he partly ſucceeded. From this place, turning to the N.W., along the foot of mount Sewalick, he continued his maſſacres, though not without oppoſition, until he arrived on the frontiers of Caſhmere. He ſpent little more than five months, between the time of his croſſing and recroſſing the Indus, and in doing this he paid greater attention to the ſeaſons than Alexander had done. Timur, however, may be ſaid rather to over-run than to conquer or ſubject; for he did not diſturb the order of ſucceſſion in Hindooſtan, but left Mahmood on the throne; reſerving to himſelf the poſſeſſion of the Panjab country only; which his ſucceſſors did not long retain. His views were at this time directed towards the Turkiſh empire; and this circumſtance induced him to neglect India, which did not promiſe ſo plentiful a harveſt of glory as the other. During his life, which terminated at Samarcand in the year 1405, he was prayed for in the moſques of Hindooſtan, and the coin was ſtruck in his name; but this might be more the effect of policy in the uſurpers of Mahmood's throne than the act of Timur. On Timur's death his empire fell into great diſorder, and was diſtracted by civil wars, till at length peace was reſtored by the ſettlement of Shah Rukh, Timur's ſon, on the throne. The empire ſubject to his dominion was much reduced; Charaſm, Khoraſan, Candahar, Perſia, and part of Hindooſtan being the countries of which it conſiſted. By him his dominions in this reduced ſtate were tranſmitted to his ſon Ulug Beg, well known by his aſtronomical tables. A ſucceſſion of princes filled up the interval till the death of Abuſaid Mirza, a lineal deſcendant of Timur. From this time we may conſider the empire of Timur as diſſolved, though his deſcendants ſtill reigned in Perſia and Hindooſtan.

The conqueſt of Hindooſtan was effected by Sultan Baber, a deſcendant of Timur or Tamerlane, and Jenghiz Khan. This prince reigned over a kingdom compoſed generally of the provinces ſituated between the Indus and Samarcand. Being diſpoſſeſſed of the northern part of his dominions by the Uſbecs, he determined to try his fortune in Hindooſtan, whoſe diſtracted ſtate under Ibrahim II. in 1516, encouraged his

hopes

hopes of conqueſt. His firſt expedition from Cabul, where he reſided, acroſs the Indus, was undertaken in 1518; this was ſucceeded by four others; and in the fifth (A.D. 1525), he defeated the emperor of Delhi, and put an end to the dynaſty of Lodi. He reigned only five years in Hindooſtan, chiefly employing himſelf in the reduction of the eaſtern provinces. It was in the perſon of Baber that the line of Tamerlane firſt mounted the throne of Hindooſtan; and it was in that of Acbar, his grandſon, that it was eſtabliſhed. The conqueſt of their anceſtor, about a century and a half before, had no ſhare in effecting the preſent ſettlement. Baber was, in reality, the founder of the Mogul dynaſty; and from this event Hindooſtan derived the appellation of the "Mogul empire." The princes of the houſe of Timur have ſince their firſt eſtabliſhment on the throne eagerly purſued the conqueſt of the Deccan, not conſidering that this region, which poſſeſſed ample reſources within itſelf, and innumerable advantages in point of ſecurity from an enemy without, was alſo ſituated at ſuch a diſtance from the capital, as to hold out to its viceroy the temptation of independence whenever a favourable opportunity offered. Perhaps, ſays major Rennell, if the Deccan had been originally left to itſelf, the poſterity of Timur might ſtill have ſwayed the ſceptre of Hindooſtan. In proceſs of time the Mogul empire became merely nominal; and the emperors were regarded as of no political conſequence, otherwiſe than as their names and perſons are made uſe of by different parties to forward their own views. The Mogul empire attained its full meaſure of extent under the reign of Aurungzebe, ſee his article. In this empire many parts of it were 1000 miles diſtant from the ſeat of government; and accordingly its hiſtory is one continued leſſon to ſovereigns, not to graſp at too much dominion, and to mankind to circumſcribe the undertakings of their rulers. Rennell's Memoirs, Introd. See DECCAN, DELHI, and HINDOOSTAN. See alſo MONGOLES.

MOGULISTAN, or MOGOLISTAN, the country of the Mogul Tartars. In a larger ſenſe, this term comprehends the whole of Tartary, from the Caſpian to the North Atlantic; but, in a more reſtricted ſenſe, to an extenſive tract of country between Bucharia and China, north of Thibet. See MOGUL *Empire* and MONGOLES.

MOGULMARY, a town of Bengal; 18 miles S. of Burdwan.

MOGULPOUR, a town of Hindooſtan, in the circar of Schaurunpour; 36 miles S.S.W. of Schaurunpour.

MOGULPURRAH, a town of Hindooſtan, in Bahar; 18 miles N.N.W. of Bahar.

MOGULS. See MONGOLES.

MOGULSERAI, a town of Hindooſtan, in Benares; 10 miles S.E. of Benares.—Alſo, a town of Hindooſtan, in the circar of Sirhind; 15 miles N.N.E. of Sirhind.—Alſo, a town of Hindooſtan, in the country of Agra; 24 miles N.N.W. of Kerowly.

MOGURANI, a town of Walachia; 48 miles N. of Buchareſt.

MOGWITZ, a town of Sileſia, in the principality of Neiſſe; 6 miles N.N.E. of Ottmuchau.

MOGYESZO, a town of Hungary; 12 miles W. of Tokay.

MOHACS, a town of Hungary, on the Danube; 56 miles W. of Zegedin. N. lat. 46° 2′. E. long. 18° 44′.

MOHADAN, AL, a town of Arabia, in the province of Hedsjas; 80 miles E. of Madian.

MOHADY, a town of Hindooſtan, in Berar; 31 miles E.N.E. of Nagpour.

MOHAIR, in *Commerce*, the hair of a kind of goat, frequent about Angora in Turkey; the inhabitants of which city are all employed in the manufacture of camblet made of this hair. See CAMBLET and CAPRA *Angorenſis*.

Some give the name mohair to the camblets or ſtuffs made of this hair: of theſe there are two kinds; the one ſmooth and plain; the other watered like tabbies: the difference between the two only conſiſts in this, that the latter is calendered, the other not. There are alſo mohairs both plain and watered, whoſe woof is of wool, cotton, or thread.

MOHAIR-*Shell*, in *Natural Hiſtory*. See MOIRE.

MOHANG-LENG, in *Geography*, a town of the kingdom of Laos, ſo called by the Chineſe; *Mohang*, in the language of the country, ſignifying town. It is of conſiderable extent, but only encloſed with a paliſade; on the weſt are large foreſts and ſeveral rivers. This city ſtands on both ſides of a river, called Meinam Tai, which, by the Chineſe accounts, joins the river of Siam. Fiſh is rare, but buffalo and veniſon are common in the markets.

MOHANOO, a town of Hindooſtan, in the circar of Chanderee; 33 miles W. of Chanderee.

MOHASSIL, formerly called "Difterdar," an officer at Aleppo, is reckoned the ſecond perſon of the city in the civil line, and, on the demiſe of the baſhaw, is by the Divan uſually appointed Mutſillem, or temporary governor, till orders come from the Porte. He is farmer-general of the land-tax, the cuſtoms, and the capitation tax; on which account he is obliged to retain a number of ſubordinate officers diſperſed in the province, and to perform conſiderable buſineſs. He exerciſes a limited judicial power in matters of revenue, and has a priſon in his own palace. The Mohaſſil's influence is conſiderable: he lives ſplendidly, and is much courted by the agas or land-renters, as well as by the merchants. He is, from his office, one of the members of the Divan, or council.

MOHAUN, a town of Hindooſtan, in Oude; 15 miles N. of Lucknow.

MOHAWK BAY, a bay in Frederickſburg, Upper Canada, which lies oppoſite to Mohawk's ſettlement, and cloſe to the mouth of the river Apannac.

MOHAWK *River*, a river of New York, which riſes to the northward of Fort Stanwix, about eight miles from Black or Sable river, a water of lake Ontario, and runs ſouthwardly 20 miles to the fort, then eaſtward 110 miles, and after receiving many tributary ſtreams, falls into Hudſon's river, by three mouths, oppoſite to Lonſinburgh and Troy, from ſeven to ten miles N. of Albany. This fine river is navigable for boats from Schenectady, nearly or quite to its ſource; and the opening of this navigation by means of the locks and canals round the Little Falls, completed in 1795, is very advantageous to the commerce of the ſtate. A ſhore of at leaſt 1000 miles in length is thus waſhed by boatable waters, excluſive of all the great lakes; and many millions of acres of excellent tillage land, rapidly ſettling, are accommodated with water communications for conveying their produce to market. The intervals on both ſides of this river, of various widths, are ſome of the richeſt and beſt lands in the world; and are diſtributed into farms, which are occupied and cultivated principally by Dutch people, whoſe agricultural practice admits of great improvement, as they neglect to employ the manure of their barns in the culture of their land. The banks of this river were formerly thickly ſettled with Indians; and at the period when Albany was firſt ſettled, it is ſaid that at Schenectady there were 800 warriors, and that 300 warriors ſubſiſted within a ſpace now occupied by a ſingle farm. About three miles from

from its entrance into the Hudson, the river is about 1000 feet wide; the rock over which it pours, as over a mill-dam, extends from S.W. to N.E. almost in a line from one side of the river to the other, and is about 40 feet in perpendicular height, and including the descent above, the fall is as much as 60 or 70 feet. About a mile below the falls is a handsome bridge; and immediately below the bridge the river divides into three branches, which form several large islands.

MOHAWK, or *Cookquago*, a branch of Delaware river, which, after it mingles with the Popachton branch, is called Delaware.

MOHAWK, formerly a town on the S. side of the river of the same name, in Montgomery county, New York, situated in a very fertile country. It was abandoned by the Mohawk Indians in 1780.

MOHAWKS, an Indian nation, acknowledged by the other tribes of the Six Nations to be the true old heads of the confederacy. They were formerly very powerful, and had their habitation on Mohawk river. As they were strongly attached to the Johnson family, a part of them emigrated to Canada with sir John Johnson as early as the year 1776. About 300 of this nation now reside in Upper Canada.

MOHAWK *Settlement* is in the bay of Quinti, Upper Canada, W. of Richmond, and comprehended between the river Shannon and Bowen's creek.

MOHAWK *Village*, on the Grand river, or Ouse, in Upper Canada, is the principal village of the Six Nations, in the tract purchased from the Missassaga nation, by his present majesty, on account of their loyalty and attachment during the late revolution, in which they lost their possessions on the Mohawk river. This tract is 100 miles long, and 12 wide, intersected by Grand river, from its mouth in lake Erie upwards. The village is beautifully situated, has a neat church with a steeple, a school-house, and a council-house; and not far from it a grist and a saw-mill. These buildings have for the most part been erected by government, which pays a miller, schoolmaster, and blacksmith, for their services at the village; and the society for propagating the gospel makes an allowance to a clergyman of the established church for occasional visits to these tribes. The liturgy of the church of England has been translated into the Mohawk language, and printed for the use of the Six Nation Indians. In 1800, this nation, the Seneca and Oneida pagans, revived their custom of sacrificing white dogs to their gods, which had been neglected for 30 years, under a notion that the neglect of this sacrifice had been one cause of their various misfortunes.

MOHAWKS' *Corn*, in *Botany*, a name given by the Indians to a peculiar sort of the maize, or Indian corn. It is most frequent in the more northerly parts of America. The general time of sowing the maize in Virginia and other places, is in the end of April; but this mohawk kind need not be sown before June, and yet will come well to maturity before the winter. The stalks of this kind are shorter than those of the common sort. The ears also are shorter and grow nearer the ground, and the corn is generally of various colours. Phil. Transf. N° 142.

MOHAWK. See MOCK.

MOHAWRY, in *Geography*, a town of Hindoostan, in the circar of Chanderee; 45 miles W. of Chanderee.

MOHEGAN, a place situated between Norwich and New London, in Connecticut, in America; which is the residence of the remaining few of the Mohegan tribe of Indians. A considerable part of this small number removed lately to Oneida, with the late Mr. Occom.

MOHELNO, a town of Moravia, in the circle of Znaym; 24 miles N. of Znaym.

MOHERNANDO, a town of Spain, in New Castile; 10 miles N. of Guadalajara.

MOHERRY, a town of Hindoostan, in the circar of Cicacole; 20 miles S.W. of Ganjam.

MOHGONG, a town of Hindoostan, in the circar of Ruttunpour; 16 miles S.E. of Dumdah.

MOHICCONS, a tribe of Indians, whose habitations lie on a branch of the Susquehannah, between Chagnet and Gwegy. Hutchins, some years ago, reckoned them at 100, but Imlay, in 1773, estimates them only at 70 fighting men. They were formerly a confederate tribe of the Delawares.—Also, an Indian tribe, in the N.W. territory, which inhabits near Sandusky, and between the Scioto and Muskingum: their warriors are reckoned to be 60.

MOHILA, one of the Comora islands, in the Indian sea, between the island of Madagascar and the coast of Africa. It has a good road for ships, and it is said to be fertile. It is governed by a sultan, whose children share his authority in different districts of the island, bear the same appellation, and possess the same insignia of state, though they hold their power in subordination to him. The sultan himself never appears in public, without being attended by 20 of the principal persons of the island, and on such occasion his dress is a long robe of striped calico, hanging from his shoulders to his feet, with a turban on his head. The people are also generally clad in the same manner, and are perpetually chewing the areca, or betle nut, like the Indians of the East, whose manners they greatly resemble. S. lat. 12° 30′. E. long. 43° 50′.

MOHILL, a post-town of the county of Leitrim, Ireland; 78 miles W.N.W. from Dublin.

MOHILNA, a town of Poland, in Volhynia; 44 miles N. of Zytomiers.

MOHILOW, a town of Poland, in the palatinate of Braclaw; 60 miles S.W. of Braclaw.

MOHN, called by the Esthonians "Muhoma," which literally signifies the land of boils or sores, an island of the Baltic, separated from the main land by a strait, called the Great Sound, about two Swedish miles over in its broadest part, and near a mile where it is narrowest; the transport being made in summer by large boats, called Prames. Boats of a similar kind pass between Mohn and Oesel, across the Little Sound, which bears some resemblance to a spacious haven. Mohn lies to the S.W. of Oesel, forming a parish of itself, with its own church and preacher. Near the middle of the island, on an eminence, stands the church. Many of the boors live here comfortably; and having a little portion of forest, which, and also their hay fields, are inclosed by a wall of stones. As a shelter from storms, to which these seas are subject, some have their houses built in the midst of these little thickets. Not only acorns and bilberries, but also wild nuts and crab apples grow here, of which last the boors make a tolerably well tasted cyder; and in the farms they use them also for swine-wash. The circumference of the whole island measures about 95 versts. The passage over the Great Sound in summer is made with oars in about four hours, but with a sail and fair wind in less than two. To Mohn belong two small islands; one lying towards the N., and quite uninhabited, is merely a hay-field for the boors of Mohn; the other lies nearly between Oesel and Mohn in the Little Sound, and is occupied by three boors. On Mohn is a large stagnant lake, from which a canal has been made into the sea. Tooke's Russ. Emp. vol. i.

MOHO, a town of Peru, in the diocese of La Paz; 25 miles S.E. of Asungaro.

MOHR, a town of Germany, in the county of Hoya; five miles W. of Hoya.

MOHRAU, a town of Sileſia, in the principality of Neiſſe, near a river of the ſame name; 28 miles S. of Neiſſe.

MOHRIA, in *Botany*, a curious genus of ferns, named by Dr. Swartz after his friend Dr. D. M. H. Mohr, of Kiel, the coadjutor of profeſſor Weber, in ſeveral excellent botanical publications, particularly reſpecting the claſs *Cryptogamia*. In theſe he has diſplayed great knowledge and application, though not without ſome inaccuracy, and rudeneſs, rather than acrimony, of criticiſm. Experience, and a naturally good diſpoſition, would gradually have overcome ſuch defects, while his ſcientific abilities would have rendered the moſt extenſive ſervices to botany, had not an early death diſappointed the hopes of his friends.—Swartz. Syn. Fil. 6. 159.—Claſs and order, *Cryptogamia Filices*. Nat. Ord. *Filices*. Linn. Juſſ.

Gen. Ch. *Capſules* ſeſſile, diſtinct, roundiſh, depreſſed, concentrically ſtriated, of one cell, burſting by a longitudinal fiſſure at one ſide, without any ſeparate ring, ſituated near the margin of the frond. *Seeds* numerous, roundiſh, minute. *Involucrum* from the crenate inflexed margin of the lobes.

Eſſ. Ch. Capſules near the margin of the frond, diſtinct, ſeſſile, concentrically ſtriated, without a ring, burſting longitudinally. Involucrum from the crenate inflexed margin.

1. M. *thurifraga*. Incenſe-fern. Swartz. Syn. Fil. 159. 385. t. 5. (Polypodium caffrorum; Linn. Mant. 307. Adiantum caffrorum; 447. Oſmunda marginalis; Lamarck Dict. v. 4. 655. O. thurifera; Swartz in Schrad. Journ. for 1800. 105. Filicula æthiopica, denticulatis pinnulis, averſâ parte, Aſplenii ritu, villoſâ lanugine tectis, pediculo ſplendente nigro; Pluk. Mant. 77. t. 150. f. 3.)—Gathered by Koenig at the Cape of Good Hope; by Sonnerat, as well as Commerſon, in the iſle of Bourbon. The *roots* conſiſt of many long, branched, blackiſh, hairy fibres. *Fronds* in denſe tufts, near a ſpan high, bipinnate, denſely clothed beneath with imbricated, taper-pointed ſcales, as are alſo the *ſtalks* in ſome degree. *Leaflets* of the barren fronds roundiſh or ovate, ſharply pinnatifid; thoſe of the fertile fronds, which are conſiderably taller, ovate, obtuſe, deeply and bluntly lobed, their edges, or terminations of the lobes, inflexed over the *capſules*, which are each the ſize of the ſmalleſt pin's head, ranged in a ſimple row, at a little diſtance from the margin of the leaflet. There are generally two *capſules* under each ſegment of the leaflet. The ſmell of the recent fern is ſaid to reſemble that of incenſe, or gum benzoin; hence the French in the iſle of Bourbon term it *la feuille d'encens*.

We cannot trace the error of Dr. Swartz's citation of Lamarck. His miſquotation of Plukenet could not, on account of the confuſed arrangement of this author's book, be, without great care, avoided; but we truſt our correction is right.—This genus differs from *Oſmunda* in the ſtructure as well as ſituation of its capſules, and is unqueſtionably very diſtinct from that and all others.

MOHRIN, in *Geography*, a town of Brandenburg, in the New Mark; 20 miles N. of Cuſtrin. N. lat. 52° 54'. E. long. 14° 31'.

MOHRUNGEN, a town of Pruſſia, in the province of Oberland, ſituated on a lake of the ſame name, which almoſt ſurrounds it; 55 miles S.S.W. of Königſberg. N. lat. 53° 31'. E. long. 19° 51'.

MOHUN, a town of Hindooſtan, in the circar of Kitchwara; 10 miles S. of Budawar.—Alſo, a town of Hindooſtan, in Oude; 16 miles N E. of Cawnpour.

MOHUNGUR, a town of Hindooſtan, in the circar of Gohud; 18 miles S.W. of Narwa.

MOHUR, in *Commerce*, a coin in the Eaſt Indies. Gold mohurs, ſometimes called gold rupees, are ſtruck at the mint of Calcutta, as well as Sicca rupees, called ſilver rupees; 16 of the latter are, by regulation, to paſs for one of the former. The value of the gold mohurs has undergone conſiderable variations at different periods. At preſent the weight of the mohur is 13.28 maſſa, or 190,894 grains, and its fineneſs $23\frac{21}{22}$ carats, containing 189,462 grains of fine gold; and it is, therefore, worth 1*l.* 13*s.* $6\frac{1}{2}$*d.* ſterling. At Madras, the mohurs, or gold rupees of Bengal, occaſionally paſs for four ſtar pagodas. (See PAGODA.) At Bombay, the gold mohur paſſes in account for 15 rupees. In 1774 the coin, called the gold mohur, or gold rupee, was ordered to be made of the ſame weight as the ſilver rupee, and to be equal in fineneſs to a Venetian ſequin; ſo that the proportion of gold to ſilver in the Bombay coins was nearly as 15 to 1. Afterwards this proportion ceaſed; and gold, coined according to the regulation of 1774, exchanged for only 13 times its weight of ſilver. Accordingly, in order to remedy this, it was ſettled in 1800, that the mohur ſhould be of the ſame weight and fineneſs as the ſilver rupee; and that it ſhould paſs for 15 ſuch rupees.

The following TABLE ſhews the Aſſay, Weight, Contents, and Value of the Eaſt Indian Mohurs.

	Aſſay.		Weight.			Contents in pure Gold.	Value in Sterling.		
	car.	gr.	oz.	dwt.	gr.	Grains.	£	s.	d.
Mohur, or gold rupee of Shah Allum, 1770	1	$2\frac{3}{4}$	0	7	$22\frac{1}{4}$	186.8	1	13	$0\frac{3}{4}$
Mohur of the ſame, 1787 - - -	1	$2\frac{3}{4}$	0	7	23	188.5	1	13	$4\frac{1}{2}$
Half mohur of the ſame, 1787 - -	1	$2\frac{1}{2}$	0	3	$23\frac{1}{2}$	94.	0	16	$7\frac{1}{2}$
Quarter mohur of the ſame, 1787 - -	1	$2\frac{1}{2}$	0	1	$23\frac{3}{4}$	47.	0	8	$3\frac{3}{4}$
Sicca gold mohur of Bengal, dated 19th June, 1789	1	$3\frac{3}{8}$	0	7	23	189.7	1	13	7.
Old Bombay mohur ſtill in circulation -	0	$3\frac{1}{2}$	0	7	$10\frac{1}{3}$	170.	1	10	1
Surat mohur, of the lateſt coinage - -	0	$0\frac{1}{2}$	0	7	11	165.	1	9	$2\frac{1}{2}$
Tippoo's gold rupee - - - - -	1	2	0	8	$20\frac{1}{2}$	181.5	1	12	$1\frac{3}{4}$
Mohur, of the Dutch E. I. Company, 1783	3	$3\frac{1}{4}$	0	10	2	181.5	1	12	$1\frac{1}{2}$
Ditto - - - 1797	4	1	0	9	20	174.5	1	10	$10\frac{1}{2}$
Half ditto - - - 1801	3	$1\frac{1}{4}$	0	5	$3\frac{1}{2}$	96.2	0	17	$0\frac{1}{4}$

Kelly's Univ. Cambiſt.

MOHURBUNGE, a province of Hindooftan, S.W. of Bengal.

MOHYLNA, a town of Lithuania, in the palatinate of Minfk; 36 miles S.S.W. of Minfk.

MOIA, a town of Naples, in Principato Citra; 18 miles S.S.W. of Cangiano.

MOJABRA, a town of Africa, in Tripoli; 10 miles E. of Augela.

MOJAN, an ifland in the Baltic, belonging to Sweden. N. lat. 39° 22'. E. long. 18° 45'.

MOJARA, a town of South America, in the province of Tucuman; 18 miles N. of St. Salvador de Jugui.

MOIDENA, a town of Bengal; 20 miles S. of Kifhenagur.

MOIDORE, Moeda, or *Lifbonnine*, in *Commerce*, an old gold coin, ftruck and formerly current in Portugal.

The moidore and its divifions are reckoned by the *rees*; which fee.

The gold pieces coined in Portugal before the year 1722, are now, on account of the figuorage and the rife in the price of gold, 20 *per cent.* higher than their original value: thus, the old dobras, coined at 20,000 rees, are worth 24,000: the Lifbonnines or moidores, coined at 4000 rees, are worth 4800; and the halves and quarters in proportion; but few of thefe coins are now in circulation. The gold coins ftruck fince 1722, are the dobra, of 12,800 rees; the meia dobra, Joanefe, or Portugal piece, of 6400 rees; the half Joanefe of 3200; the dezefeis teftoons, of 1600; the quartinho, of 1200; the oito teftoons, of 800; the old crufado, of 400, now very fcarce, and the new crufado, of 480 rees.

The Affay, &c. of Portugal Coins, will appear in the following Table.

	Affay.		Weight.			Contents in pure Gold.	Value in Sterling.		
	car.	gr.	oz.	dwt.	gr.	Grains.	£	s.	d.
Dobraon of 24000 rees - - - -	Standard		1	14	12	759.	6	15	0
Meio dobraon of 12,000 rees - - -	Ditto		0	17	6	379.5	3	7	6
Dobra of 12,800 rees - - - -	Ditto		0	18	6	401.5	3	11	$0\frac{3}{4}$
Joanefe of 6400 rees - - - -	0	$0\frac{1}{4}$	0	9	$6\frac{1}{2}$	203.	1	15	$11\frac{1}{4}$
Half Joanefe of 3200 rees - - -	0	$0\frac{1}{4}$	0	4	15	101.5	0	17	$11\frac{1}{4}$
Moidore, or Lifbonnine (½, &c. in proportion)	Standard		0	6	22	152.2	1	6	$11\frac{1}{4}$
Piece of 16 teftoons, or 1600 rees - -	0	$0\frac{3}{8}$	0	2	6	49.3	0	8	$8\frac{1}{4}$
Piece of 12 teftoons, or 1200 rees - -	0	$0\frac{3}{8}$	0	1	$16\frac{1}{4}$	36.7	0	6	6
Piece of 8 teftoons - - - -	0	$0\frac{3}{8}$	0	1	$4\frac{1}{2}$	25.9	0	4	7
Old crufade of 400 rees - - -	0	$0\frac{1}{2}$	0	0	15	13.6	0	2	5
New crufade of 480 rees - - -	0	$0\frac{1}{3}$	0	0	$16\frac{1}{4}$	14.7	0	2	7
Milrea, coined for the African colonies, 1755	Standard		0	0	$19\frac{1}{4}$	18.1	0	3	$2\frac{1}{2}$

The impreffions on the gold coins of Portugal are as follows:

The dobraon: arms of Portugal, with 20,000 on one fide, and five flowers on the other: legend, JOANNES V. D. G. PORT. ET ALG. REX. (John V. by the grace of God king of Portugal and Algarves): reverfe a crofs, with four M's in the four angles; legend, IN HOC SIGNO VINCES, (by this fign thou fhalt conquer). The half dobraon bears the fame impreffions, except that it is marked 10,000.

The moidore bears the fame impreffions as the dobraon, except that it is marked 4000, and has four B's in the four angles of the crofs; but fome of an ancient date bear on the reverfe a crofs, furrounded by four connected femi-circles, and a whole circle, with the legend ET BRASILIÆ DOMINUS ANNO, &c. (and lord of Brazil, in the year, &c.) The half and quarter moidores are marked 2000 and 1000; their impreffions are in other refpects the fame as on the moidore.

The Joanefe: head of the reigning fovereign, with name and titles; thus JOANNES V. D. G. PORT. ET ALG. REX; or MARIA I. D G. PORT. ET ALG. REGINA, (Mary I. queen of Portugal and Algarves); and the pieces coined by the prince regent, fince 1804, bear his head, with JOANNES D. G. PORT. ET ALG. P. REGENS (John, prince regent, &c.): reverfe, arms of Portugal. The dobra or double Joanefe, the half, quarter, and eighth Joanefe, all bear the fame impreffions.

The quartinho: arms of Portugal, with 100, and the legend, MARIA, D. G. &c.: reverfe, a crofs, with four flowers, and the legend IN HOC SIGNO VINCES, as before.

The old crufade: head of the reigning king; reverfe, a crown; legend, JOAN, V. D. G. P. REX, as before.

The new crufade: name of the reigning fovereign, over it a crown; and under the name two palms, with 400 at the bottom; reverfe the crofs and legend, as in the quartinho.

The milrea: coined for the African colonies,—arms of Portugal, with 1000 on the fide, and the name and title as above: reverfe, a crofs and circles as in the old moidores; legend, ET DOMINUS AF. OR. ANNO, &c. that is, "Dominus Africæ orientalis" (lord of eaftern Africa). Kelly's Un. Cambift.

MOIETY, Medietas, the half of any thing.

MOIGOLSCHAR, in *Geography*, a cape of Ruffia, on the N.W. coaft of Nova Zembla. N. lat. 72° 40'. E. long. 52° 14'.

MOIKA, a river of Ruffia, which runs from the right of the Fontanka, not far below its departure from the Neva, and runs almoft parallel with it, into which it falls to the left of the Great Neva, clofe above its mouth.

MOILON, is a name given by the French to a kind of ftone, that forms the upper cruft, and lies round the free ftone in moft quarries. It is an excellent fubftance for forming the body of fluxes or foft enamel.

MOIMENTA DE BEIRA, in *Geography*, a town of Portugal, in the province of Beira; 13 miles S.W. of Caftel Rodrigo.

MOINE, Peter le, in *Biography*, was born at Chaumont, in Baſſigny, in 1602. He entered into the ſociety of the Jeſuits at ſeventeen, and continued to ſerve it by his labours and writings till his death, at Paris, in 1671. The principal work for which he is famous as a poet, is "Saint Louis, ou la Couronne reconquiſſe ſur les Infidelles," in eighteen books, which, for a time, ſtood high among the epic poems in the French language. It is ſaid to diſplay a vigorous imagination, and conſiderable powers of poetical expreſſion. Boileau, being called upon for an opinion of Le Moine, ſaid, "he had too much extravagance for his praiſe, and too much poetry for his cenſure." He was a conſiderable writer in proſe, in which his ſtyle and manner reſemble thoſe of verſe. His "Peintures Morales;" "Traitè de l'Hiſtoire;" "La Galerie des Femmes fortes," have conſiderable merit. Moreri.

Moine, Stephen le, a very learned French Proteſtant divine in the 17th century, was born at Caen, in Normandy, in the year 1624. Having laid in a good ſtock of elementary learning at his native place, he was ſent to Sedan, where he went through a courſe of divinity under the celebrated Du Moulin. From thence he went to Leyden to ſtudy the Oriental languages. Upon his return to France in 1650, he was appointed paſtor to the church of Geſoſſe. He afterwards removed to Rouen, where his zeal in maintaining Proteſtant principles expoſed him to the perſecution of the Catholics. In 1676 he left France, came over to England, and was honoured with the degree of doctor by the univerſity of Oxford. From hence he paſſed over to Holland, and obtained the profeſſorſhip of divinity at Leyden, which he occupied with much reputation during the reſt of his life. In the year 1685, he publiſhed a collection of curious Greek treatiſes, relating to eccleſiaſtical hiſtory, preceded by long *prolegomena;* it was entitled "Varia Sacra, ſeu Syllоge variorum Opuſculorum Græcorum ad rem eccleſiaſticam ſpectantium." He was author of many other curious and learned works. He died in 1689, in the 65th year of his age. Moreri.

Moine, John le, a French cardinal, who flouriſhed in the 13th and 14th centuries, and founded a college at Paris called after his name, was a native of Creſſy, in Ponthieu. He was educated at the univerſity of Paris, where he ſtudied divinity and the canon law, and was admitted to the degree of doctor. After various promotions in the church, he was raiſed to the purple, either by pope Celeſtine, or by Boniface VIII. By the laſt mentioned pontiff he was held in high eſteem, and appointed his legate in France, at the time of his conteſt with Philip the Fair. In this buſineſs the cardinal was ready to ſacrifice the intereſts of the ſovereign and of his country, that he might gratify the ambition of the court of Rome. He died at Avignon, in 1313, He was author of "A Commentary on the ſixth Book of the Decretals," which is ſaid to diſplay the knowledge and abilities of an able and profound canoniſt. It was printed at Paris in 1536, and at Venice in 1586. Moreri.

Moine, Abraham le, a French Proteſtant divine, who was born towards the cloſe of the 17th century, and became a refugee in England on account of his religion. He officiated as miniſter to a French church at London, and died in the year 1760. He is known chiefly by "A Treatiſe on Miracles," which was written in anſwer to Chubb, and which, on many accounts, was thought well of by the late learned Mr. Hugh Farmer. Subjoined to the treatiſe on miracles is a poſtcript, intended to vindicate the authority of the ancient fathers, in anſwer to what had been advanced by Dr. Middleton in his "Free Enquiry." Le Moine publiſhed alſo "A Sermon in Defence of Sacred Hiſtory, in Anſwer to Lord Bolingbroke," and ſome other ſermons. He alſo tranſlated into the French language biſhop Gibſon's "Paſtoral Letters;" "The Trial of the Witneſſes of the Reſurrection of Jeſus;" and "Diſcourſes on the Uſe and Intent of Propheſy," by biſhop Sherlock. Theſe tranſlations are accompanied with curious and intereſting diſſertations, by the tranſlator. Gen. Biog.

Moine, in *Geography*, a river of Louiſiana, which runs from the N.W. into the Miſſiſippi, in N. lat. 40° 5′. W. long. 91° 54′.

Moine, *La*, a bay on the S. coaſt of Newfoundland; 25 miles E. of Cape Ray.

MOINEAU, in *Fortification*, is a flat baſtion, raiſed before a curtain when it is too long, and the baſtions of the angles too remote to be able to defend one another.

Sometimes the moineau is joined to the curtain, and ſometimes it is divided from it by a moat. Here muſqueteers are placed, to fire each way.

MOINHO Diego, in *Geography*, a town of Portugal, in Eſtramadura; 30 miles N.E. of Liſbon.

MOJOS, a town of South America, and capital of a province, in the viceroyalty of Buenos Ayres; 14 miles N. of St. Salvador de Jujui.

MOIRA, a poſt-town of the county of Down, Ireland, chiefly inhabited by perſons concerned in the linen manufacture, for which the neighbouring country is peculiarly favourable. White lime-ſtone is abundant in the neighbourhood. Moira gives the title of earl to the Rawdon family. It is 69 miles N. from Dublin.

Moira's *Strait*, an inlet on the E. coaſt of the Prince of Wales's Archipelago, in the duke of Clarence's ſtrait. N. lat. of the entrance 54° 58′. E. long. 228° 22′.

MOIRANS, a town of France, in the department of the Jura, and chief place of a canton, in the diſtrict of St. Claude. The place contains 1190, and the canton 6855 inhabitants, on a territory of 195 kiliometres, in 30 communes.

MOIRE, in *Conchology*, the mohair ſhell, a name given by the French virtuoſi to a peculiar ſpecies of *voluta*, which ſeems of a cloſely and finely reticulated texture: and reſembles on the ſurface a piece of mohair, or a very cloſe ſilk-worm's web.

MOISDON la Riviere, in *Geography*, a town of France, in the department of the Lower Loire, and chief place of a canton, in the diſtrict of Chateau-Briant; ſix miles S. of it. The place contains 1505, and the canton 4958 inhabitants, on a territory of $257\frac{1}{2}$ kiliometres, in 5 communes.

MOISIE, a river of Lower Canada, on the N. ſhore of the St. Lawrence, a little E. of the Seven Iſlands: it runs into the latter river in N. lat 50° 15′. W. long. 65° 40′.

MOISSAC, a town of France, in the department of the Lot, and chief place of a canton, in the diſtrict of Montauban, ſituated on the Tarn, near its confluence with the Garonne; 13 miles N.W. of Montauban. The place contains 10,035, and the canton 14,008 inhabitants, on a territory of $162\frac{1}{2}$ kiliometres, in ſix communes. N. lat. 44° 6′. E. long. 1° 10′.

MOISTURE. See Humidity and Hygrometry.

The inſtrument uſed for determining the degree of moiſture in the air is called an hygrometer. Under the article Hygrometry, we forgot to introduce an account of a new hygrometer, with which the editor was ſome years ago favoured by Mr. Coventry, of Southwark, the conſtruction of which is as follows: take two ſheets of fine tiſſue paper, ſuch as is uſed by hatters and watch-makers, and ſometimes called lawn-paper, each ſheet of which generally weighs about twenty-ſeven grains. Let the moiſture be thoroughly evaporated by the fire, without scorching the paper; till after repeated trials it is brought to its driest state: in this state cut each sheet till it weighs exactly twenty-five grains. These sheets, thus prepared, should be kept in a box or drawer, with a quantity of the same paper designed for use; and they will always serve for determining the proper weight of any quantity of paper for other hygrometers. This paper hung in any place, and kept free from dust, and weighed with a nice pair of scales, will serve to exhibit the moisture of the air, by its increase of weight above fifty grains. But to avoid the trouble of weighing, Mr. Coventry prepared an hygrometer of it in the following manner. A (*Plate* XIV., *Hydraulics*, *fig.* 2.) represents a pillar supporting the beam B B, to one end of which are suspended fifty grains of paper D, cut round, and threaded on a silk string, with a small glass bead between the sheets, for the freer admission of the air: at the other end of the beam is a brass weight E, to counter-balance the weight of the paper and its appendages. At the bottom there is an ivory scale F F, of twelve prime divisions, answering to twelve grains of moisture: each prime division is subdivided into ten parts, making in the whole 120 divisions: on the index C is a sliding weight G, which, with the weight E on the beam, serves to adjust the instrument; so that twelve grains shall make the index just traverse the scale of the twelve divisions. If the air was so dry as to leave no moisture in the paper, the index would then point to 0: if it contained six grains of moisture, the index would point to sixty; if twelve grains were in the paper, it would point to the moist extreme, one hundred and twenty: but the air has never yet been observed so moist, as to make the index point to the moist extreme, nor so dry as to allow its reaching to the driest extreme, even in the hottest part of summer, by nearly twenty divisions: whence it is inferred that there is in the air a greater quantity of moisture in hot weather than is generally imagined. H is an adjusting screw for fixing the stand upright by means of the point of a plummet that hangs behind. This hygrometer, adjusted, may be made to correspond with another, ascertained to the same weight at any distance: by which we might determine the exact difference of the state of the air, with respect to moisture, in inland, and places near the sea-side. The advantages of this hygrometer are the following: as it is made of the thinnest substance that can be procured, it is the soonest affected with dryness or moisture, and exhibits immediately the first change of the weather: it is not acted upon by heat or cold, or any other cause, as most other instruments of this kind are; it has one datum from which to reckon, *viz.* the dry extreme, whence all other degrees of moisture may be nicely estimated. All hygrometers of this sort will act nearly alike, as thermometers or barometers; and may be reduced to a regular standard. Mr. Coventry found by this hygrometer, that in clear frosty weather, the air contains a very considerable degree of moisture: for on Jan. 27, 1776, in the morning, being a very hard frost, the thermometer in the house 24°, and in the open air 17°, the hygrometer stood at ten grains, *i. e.* at the division 100: and on the next morning, when a thaw came on, it stood at 96; which shews that there is as much moisture in the air during the frost, as when we perceive it dissolved in a thaw. He adds, that it is pleasing to observe the constant motion of this hygrometer: for even in constant settled weather, it is always in motion, from moist towards dry, from about eight in the morning till about four in the afternoon: and from dry to moist, from about 4 P.M. to about 8 A.M. In hot gloomy weather, the hygrometer is mostly found to advance with speed towards moist, and shews that the air at such times retains a great quantity of moisture: and this always forebodes heavy showers. For curious experiments some of these hygrometers are made to traverse the whole scale of divisions for every grain of moisture that is imbibed by the papers.

MOISTURE, *Radical.* See RADICAL.

MOITORET, DE BLAINVILLE, ANTHONY, in *Biography*, a French architect and geometrician, was born at a village four leagues from Dijon, in the year 1650. His genius led him to the study of geometry and architecture, in which he became an expert proficient, and settled in business at Rouen. Here he acquired considerable reputation by his skill as an artist, and by his useful and popular elementary writings. He was appointed surveyor and guager-royal of Rouen, under which office the public breweries of that city were included by a commission from the king. He died at Rouen in 1710, when he was about sixty years of age: he was author of "A Treatise on Guaging, with Instructions for measuring Mason's Work, &c." which went through several editions during the author's life, and after his death it was republished with improvements at Rouen, in 1714, under the care of M. Hacquet, with the title of "Blainville's New Elements of Geometry." He also published "A Treatise on the extensive Commerce of France, for the Information of Tradesmen," which was reprinted after his death, in 1728, with considerable additions, in two volumes: he is author, likewise, of abridgments "On the Art of Levelling;" "On Spherics," &c. which were favourably received by the public, and became very popular.

MOIVRE, ABRAHAM DE. See DE MOIVRE.

MOKA, in *Geography*, a town of Hindoostan, in Golconda; 28 miles S. of Adoni.

MOKAMO, a town of Hindoostan, in Bahar; 40 miles N.E. of Ramgur.

MOKATTAM, a mountain of Egypt, near *Cairo*; which see.

MOKEIA IBN AMER, a town of Arabia, in the province of Yemen; 22 miles N.N.E. of Chamir.

MOKERAMPOUR, a town of Bengal, 12 miles from Midnapour.

MOKESSET, a town of the Arabian Irak, on the Tigris; 116 miles N.W. of Bassora.

MOKEYA, a name given by the Arabs to those coffee-houses which stand in the open country, and are intended, like our inns, for the accommodation of travellers. They are mere huts, and are scarcely furnished with a "serir," or long seat of straw ropes; nor do they afford any refreshment but "kischer," a hot infusion of coffee-beans. This drink is served out in coarse earthen cups; but persons of distinction always carry porcelain cups in their baggage. Fresh water is distributed *gratis*. The master of the coffee-house lives commonly in some neighbouring village, whence he comes every day to wait for passengers. We may here observe that a "mansale" is a house in which travellers are received and entertained *gratis*, if they content themselves with such treatment as is usual in the country; they are all lodged in a common apartment, which is furnished with a "serir," and are served with "kischer," hot millet bread, camels' milk, and butter. Niebuhr.

MOKLAFF, in *Geography*, a town of Arabia, in the province of Yemen, the residence of a scheick; 30 miles S.E. of Loheia.

MOKLIA, or MUCHLI, a town of European Turkey, in the Morea; 16 miles S.S.W. of Argos.

MOKNAN, or MOHANAN, a town of Egypt, on the W. side of the Nile, near which, according to Dr. Pocock and M. d'Anville, was the scite of the ancient Memphis; 5 miles S. of Gizeh. See MEMPHIS.

MOKO, a town and diſtrict of Africa, in the country of Calabar.

MOKOKF, in *Botany*, Kæmpf. Amœn. 873. t. 774, a Japaneſe tree, with very fragrant but ſhort-lived bloſſoms, the *Cleyera japonica* of Thunb. Jap. 224. This proves of the ſame genus with the Linnæan *Ternſtroemia*, and the *Taonabo* of Aublet. (See TERNSTROEMIA.) Some diſcordance between the deſcriptions of Kæmpfer and Thunberg, which puzzled Juſſieu, aroſe from a degree of inaccuracy in Thunberg's deſcription of the corolla, which is really monopetalous, like that of *Camellia*.

MOKOMOE, in *Geography*, a town of Bengal; 37 miles N.E. of Ramgur.

MOKONTPOUR, a town of Hindooſtan, in Oude; 14 miles S. of Canouge.

MOKRETZ, a town of European Turkey, in Bulgaria; 44 miles S.S.E. of Viddin.

MOKSCHAK, a town of Ruſſia, in the government of Penza, near the ſource of the river Mokſcha; 36 miles W.N.W. of Penza. N. lat. 58° 40′. E. long. 44° 50′.

MOKUI, a town of Mingrelia; 20 miles N.E. of Iſgaur.

MOL, Fr. an epithet which Ariſtoxenus and Ptolemy give to a kind of diatonic genus, and a ſpecies of the chromatic. See GENUS.

For modern muſic the word *mol* is only uſed in compoſitions where B ♭ occurs, or B *mol*, in oppoſition to B-*quarre*, or B-*quadro*, which formerly was called B-*dur*, or B-*durum*. Zarlino, however, calls the diatonic mol a kind of diatonic genus. See DIATONIC.

MOLA, PIETRO FRANCESCO, in *Biography*, was a celebrated painter, born at Lugano in 1609. He was a diſciple of Ceſari d'Arpino, but did not follow the principles of that maſter long, having too good a taſte not to improve by an abode which he enjoyed for ſome time at Venice, where he carefully ſtudied the works of Titian. Mola poſſeſſed conſiderable ſkill in hiſtorical painting; but his forte lay in landſcape; the heroic ſtyle of which he ſought from Titian; but, like him, he often weakened the intereſt of his pictures by the introduction of figures upon ſo conſiderable a ſcale as to excite a doubt which is principal, the actors or the ſcene. His peculiar excellence lay in the richneſs of his colour and the freedom and fulneſs of his touch; together with the grandeur of compoſition which he exhibited in his landſcapes, frequently not unworthy of Titian himſelf. There is a picture by him in the gallery of the Louvre in Paris, which for ſublimity almoſt vies with the St. Peter Martyr; and for colour, is quite equal to it. The ſubject of this picture is St. Bruno's Viſion in the Deſart.

The genuine pictures of this maſter are rarely to be met with in this country, though there is plenty of thoſe which bear his name, and perhaps were executed by his brother Giovanni Battiſta Mola; whoſe works bear more reſemblance to Albani than thoſe of Franceſco. He died in 1665, at the age of 56.

MOLA, or *Mola di Gæta*, in *Geography*, a town of Naples, in the province of Lavora, ſituated near the ſea. It has a cuſtom-houſe and a garriſon, which is relieved every week from Gæta. It was anciently a Roman colony, but after the defeat of the Samnites it became a prefecture, and thus continued till it was ranked among the military colonies of Italy by the triumvirs Octavius, Antonius, and Lepidus. Under the emperors it became conſiderable; but it was at length ranſacked and deſtroyed by the Saracens in 956, and its biſhopric transferred to Gæta. It is ſituated on the ancient Appian way; and it was from this place that Cicero endeavoured to make his eſcape into Greece. (See CICERO.) The city of Formiæ ſtood on or near this ſpot. Between Mola and Gæta the road is rendered agreeable by the number of orange-trees which are planted in the adjoining fields; three miles N.E. of Gæta. N. lat. 41° 18′. E. long. 13° 29′.

MOLA *di Bari*, a town of Naples, in the province of Bari, on the coaſt of the Adriatic; 20 miles E. of Bari.

MOLA, in *Phyſiology*. See MOLE.

MOLA, in *Ichthyology*, a ſpecies of *Tetrodon*; which ſee: —Alſo, a ſpecies of *Diodon*; which ſee.

MOLA, in *Anatomy*, a bone of the knee, called alſo *patella*, *rotula*, &c.

MOLANAGUR, in *Geography*, a town of Hindooſtan, in Bahar; 21 miles E.S.E. of Saſeram. N. lat. 24° 50′. E. long. 84° 32′.

MOLANDS, a town of Norway; 12 miles N.N.E. of Chriſtianſand.

MOLANUS, JOHN, in *Biography*, was born at Liſle, in Flanders, in the year 1533. As his parents were originally of Louvain, whither they returned with him while he was very young, and alſo on account of his having ſpent the greateſt part of his life in this city, the ſurname of *Lovanienſis* is generally given to him. He was educated at Louvain, where, having ſeduouſly applied himſelf to the ſtudy of divinity, he was admitted in the year 1570 to the degree of doctor of divinity, and for ſome years filled the chair of profeſſor of that faculty with great reputation. He was nominated cenſor of books by the pope and the king of Spain, as well as canon of the church of St. Peter at Louvain. He died in 1585, at the age of fifty-two. He was author of a great number of works which were in high eſtimation at the time when they were written, but are now ſcarcely ever enquired for. He was concerned, with other members of the univerſity, in publiſhing the Antwerp edition of the works of St. Auguſtine in the year 1577, and the notes at the end of the Latin bible of the divines of Louvain, publiſhed alſo at Antwerp in 1580. Moreri.

MOLANUS, GERARD-WALTER, a Lutheran divine and profeſſor in the ſeventeenth and eighteenth centuries, was born at Hamelen, in the duchy of Brunſwick-Lunenberg, in the year 1633. In 1660, he was elected profeſſor of mathematics, and in 1672 he became profeſſor of divinity in the *Gymnaſium* of Rintelen, in the duchy of Schaumburg. He obtained other inſtances of preferment, and took precedency in the ſtates of Calenberg, and was preſident of the conſiſtory of Hanover. He died in 1722, at the age of eighty-nine. He had collected a valuable cabinet of medals, and an excellent library, of which he made a good uſe. As an author his moſt important work was publiſhed firſt in the German language, in the year 1697, aud afterwards repeatedly reprinted in Latin, under the title of "Lipſanographia, ſeu Theſaurus Reliquiarum Electoralis Brunſwico-Luneburgicus." He was author alſo of "Epiſtola ad Dominum Joachimum Meyerum quâ exponit cogitationes ſuas de nummo aureo Poſthumi ab eo edito, &c." Moreri.

MOLAPARA, in *Geography*, a town of Bengal; 30 miles W. of Dacca.

MOLARES, in *Anatomy*, the grinding teeth. In the old arrangement, the five poſterior teeth on each ſide of the jaw are ſo called. At preſent the two front and ſmaller of theſe are called bicuſpides, and the term molares is applied excluſively to the three poſterior ones. See the deſcription of the teeth in the article CRANIUM.

MOLARIS *Glandula*, one of the mucous glands of the mouth, placed near the back grinding teeth.

MOLARES, in the *Natural Hiſtory of the Ancients*, the name for

for the compound mineral bodies we now call pyritæ, and marcasites.

MOLASSES. See Molosses.

MOLBETZKOI, in *Geography*, a town of Russia, in the government of Novgorod; 24 miles S.E. of Tichvin.

MOLCHINA, a town of Russia, in the government of Tobolsk; 60 miles S.E. of Narim.

MOLCZAR, a town of Lithuania, in the palatinate of Novogrodek; 16 miles S. of Novogrodek.

MOLD, or Mould, a market-town in the hundred of Mold, Flintshire, North Wales, is pleasantly situated in a small but fertile plain, surrounded by lofty and rugged hills. It consists chiefly of one long and very spacious street, and, according to the parliamentary returns of 1801, contains a population of 4235 persons. The market is held on Saturday every week, and there are four fairs during the year. The assizes for the county of Flint are holden in this town. On the north side of it rises a large mount called Baily-hill, said to be partly natural and partly artificial, the summit of which was formerly crowned by a Norman castle, probably erected by Eustace de Cruer in the reign of William Rufus. This fortress seems to have been a place of great strength, as the sides of the mount are not only very arduous of ascent, but are defended by a deep foss and ramparts. History records that it stood several sieges without being compelled to surrender, till at last it was stormed by the Welsh forces under the command of prince Owen Gwynedd, in the time of Henry I. Subsequent to this period it suffered many vicissitudes, and was completely demolished during the desperate contests maintained against England by the celebrated Owen Glyndwr. Wynne, in his History of Wales, informs us, however, that it was soon rebuilt, and thereafter once more levelled with the ground by Griffith a Gwynwyn, about the year 1267, since which time it does not appear to have been restored. The view from the scite of this castle, though circumscribed, is extremely beautiful. The church here is a very handsome edifice in the pointed style, consisting of a nave and two side aisles, with a tower at the west end. In the interior are several monuments. The living is a vicarage in the patronage of the bishop of St. Asaph. A considerable cotton-thread manufactory is carried on here. The vicinity of Mold is decorated by several mansions, some of ancient and some of modern erection, the seats of independent gentlemen, who generally reside on their estates. Of these the most conspicuous are Leeswood, Tower, Rhual, and Nerquis-hall. Immediately adjoining to Rhual is Maes-y-Garmon, or the field of Germanus, so called from its having been the scene of a most decisive victory achieved by the British Christians under the missionary bishops, Germanus and Lupus, over the Pagan Picts and Scots, in the year 448. A pyramidal stone, erected on the spot in 1736, by Nathaniel Griffith, the then proprietor of Rhual, bears a Latin inscription commemorative of the event. The hills which inclose the vale in which Mold is situated abound with rich lead mines some of which are wrought with signal advantage both to the proprietors and contractors. On Meel-y-Famma, the highest point of these hills, a monument has been lately erected by subscription, as a memorial of the event of our most gracious sovereign having reigned for the unusual period of fifty years. Beauties of England and Wales, vol. xvii. from Wynne's History of Wales.

Mold. See Mould.

MOLDAU, in *Geography*, a town of Bohemia, in the circle of Leitmeritz; 21 miles N.W. of Leitmeritz.

MOLDAVIA, a province of European Turkey, bounded N. and N.E. by Poland, from which it is separated by the Dniester, E. by Bessarabia, S. by Walachia, and W. by Transilvania; estimated at about 180 miles in its greatest length from N. to S., and somewhat less in breadth from E. to W. It is crossed from N. to S. by the river Pruth. Some lands in this province are very fertile, but a considerable part of the eastern division consists chiefly of deserts, and is uncultivated; and on the western side it is very mountainous. The Pruth and the Siret are its principal rivers. Its inhabitants are of Walachian extraction, and their religious profession is that of the Greek church; but they are intermixed by Mahometans, Russians, Poles, Rascians, and Armenians. About the close of the twelfth century a colony of Walachians from Transilvania settled in this country. They migrated under the conduct of a person named Bogdan, who established their government both civil and ecclesiastical; and who obtained, with a view to the latter, an archbishop and other ecclesiastics from the patriarch of Constantinople. As he was the first prince, and founded the chief towns, the country was denominated Bogdania. The prince or waywode of this province is styled hospodar, and is the vassal of the Ottoman Porte, to whom he pays a yearly tribute. Moldavia is divided into Upper and Lower. Upper Moldavia extends almost to Jassy, and its boundaries are the river Dneister on the E., on the N. that river and Poland, and on the W. Transilvania. Moldavia on the W. borders on the mountains of Transilvania; its southern boundary is the Danube; Bessarabia bounds it on the S.E., and on the E. it is bounded by the Dneister. Its capital is Jassy.

MOLDAVICA, in *Botany*, Tourn. Inst. 184. t. 85. Moldavian Balm. (See Dracocephalum.) Tournefort associates with it also the *Dracocephalum canariense* of Linnæus

MOLDAVITZA, in *Geography*, a town of European Turkey, in Moldavia; 40 miles W. of Suczava.

MOLE, Thomas, in *Biography*, a learned English Protestant dissenting minister, of whom little is known but from his works. He is supposed to have received his academical education under Mr. Jones of Tewkesbury, by whom bishop Butler, and archbishop Secker, were also inducted into the knowledge of the sciences and theology. He was probably first settled as minister at Uxbridge, in Middlesex, in 1725, from which place he removed in 1728 to Rotherhithe; and about the year 1743, he quitted Rotherhithe for Hackney, where he lived some years, and then returned to Uxbridge, or its neighbourhood, to spend the remainder of his life. The latter part of his days he employed in writing, in the Latin language, a life of the celebrated Laurentius Valla, including the religious and literary history of his time. The MS. of this work was sold at a common auction with his other books, and has probably been long since consumed as waste paper. Mr. Mole died near Uxbridge about the year 1780, at a very advanced age. He was the author of several single sermons and tracts, that do much credit to his talents as a writer and controversialist. Dr. Kippis ranks him, in point of learning, with Lardner, Benson, and Chandler; and Dr. Lardner has shewn his respect for Mr. Mole's critical skill, by incorporating with his own some very ingenious observations that he received from him, on the case of the demoniac who resided among the tombs on the coast of Gadara. Gen. Biog.

Mole, in *Agriculture*, is a small well-known subterraneous animal, which often does great mischief in the fields, by loosening the earth, raising hills, and destroying the roots of corn, grass, and other productions of the vegetable kind.

In respect to the natural history of the mole, as connected with

with the art of husbandry, it has been observed by M. Aurignac, that it lives under ground. Its health is liable to be injured by too free access of the air: yet that it sometimes leaves one subterraneous habitation and passes on the surface in search of a better. It lives on the roots of plants, on insects, and on worms. Hence it is commonly found in lands of soft fertile soil. It never fixes its abode in miry, nor in gravelly grounds. If surprised in its subterraneous recesses by water, it springs in great haste to the surface. And that in winter, and during rain, it betakes itself to the upper grounds, which are the least humid, and the least liable to be inundated. But in spring, the mole comes down from its winter residence to the meadows, where it finds a soft mould capable of being easily penetrated, and containing plenty of roots. And after suffering long drought, it flies to ditches, to the brink of the first stream, or to shelter under hedges. In the months of February, March, April, and May, the female produces its young; bringing commonly four or five at a birth. These animals prepare beforehand, for this occasion, an arched recess under ground in a situation somewhat elevated, and generally under cover of a bush or hedge. To the number of four or five mole-hills may be observed very near to the upper side of this recess. It cannot live without being at work. Being obliged to search under ground for its food, it forms there long tunnels or subterraneous passages, named in French *boyaux*. These tunnels are usually parallel to the surface of the earth, and vary in depth according to the changes of seasons, from four to six inches. And as the moles are almost equally afraid of cold and of heat, they make their passages the deepest, and work at the greatest distance under the surface, in summer and in winter. They are extremely timid when they perceive themselves to be in danger. They then penetrate by a perpendicular opening, to the depth of a foot and a half below the level of their ordinary residence. And in forming their passages they throw back the mould, which they remove towards the surface. It is thus the mole-hills are raised. Upon every new change of place a mole raises three, four, six, or even nine of these hills, according to its age. Consequently, all the mole-hills formed by any one mole, communicate by subterraneous passages with one another. When with any instrument, a tunnel or passage, recently formed by a mole is opened, the mole will, in a few minutes, come to close up the aperture, in order to secure herself from danger, and from the access of the external air. It constructs, for this purpose, over the aperture, an arch of loose mould, having, externally, the appearance of an oblong mole-hill, and mending up the tunnel much in the same manner in which a plumber might mend a leaden pipe, by clumsily applying, on the outside, a piece of lead to cover any hole in it. And should this new mole-hill likewise be broken down, the mole will again return to repair it. These two capital facts constitute the fundamental principles of the art of the mole-catcher. The mole works in all seasons; because it cannot otherwise have subsistence. That it sleeps, as some naturalists have affirmed, all winter, is not true. It is, however, languid in this season; working now much less than in summer. It is about the beginning of spring, that the mole sets to work with the greatest activity, and raises the greatest number of mole-hills. It is then obliged to find food for its young; as spring is its season for parturition. The ground is now more easily wrought than at other times. The animal, too, in itself becomes more vigorous, by the diminution of the cold, and the return of the genial temperature of spring. These are the causes of its increased activity in toil. The male is much stronger than the female, and raises a greater number of mole-hills, and those larger. The female works less than the male, throws up fewer mole-hills, and those smaller. And the young moles form only long covered ways at the surface; the mould raised over which is scarcely sufficient to hide them. When they begin to make mole-hills, these are small, without any regular shape, and arranged zig-zag. The hours of working, for moles, are at sun-rise, at the hour of nine in the morning, at noon, at three in the afternoon, and at sun-set. But it is at sun-rise, and at sun-setting, that they ply their work with the greatest briskness. And in times of drought, they do not throw up mole-hills, except at sun-setting. In winter their moments of working are when the earth is somewhat heated by gleams of sun-shine. The sense of seeing is exceedingly obtuse in the moles; but its hearing is exquisitely delicate and acute.

Mole-*Catcher*, a term applied to a person whose business is principally the catching and destruction of moles. See Mole.

Mole-*Catching*, the art of catching and clearing land of moles. It is stated in regard to the principles of destroying these animals, that it is difficult to take moles unless when they are at work. That the most favourable time for the mole-catcher is in the beginning of spring. And that it is in the meadows they should be, in this season, the most earnestly attacked. They are to be attacked at sun-rise, at the hour of nine in the morning, at noon, at three in the afternoon, or at sun-set. That it is better to commence an attack upon them at sun-rise, than at any other time in the day. And that the next most convenient hour is nine in the morning; because, if all the moles which are wished to be destroyed cannot be then taken, the operations may be renewed at those other hours in the day at which these animals are known to resume their work. In watching for a single mole, care must be taken to make no noise, and especially not to stamp nor beat upon the ground. One may, at any time, force a mole to come above ground, by pouring a sufficient quantity of water into its subterraneous recesses. And should a person happen to be near a mole-hill, when the mole happens to betray its presence by stirring the mould; let him then, with his hoe, break into the tunnelled passage between that and the next mole-hill; and let him, with a little earth, close up the passage at the aperture made with his hoe. The mole is now imprisoned between the mole-hill, and the place where its passage is broken into, and stopped up. If the earth of a mole-hill be freshed and newly raised, you may conclude that there is a mole within it. The same thing may be inferred of any number of fresh mole-hills within small distances of one another. Yet, however fresh the earth of any mole-hill, if there be in its centre a perpendicular hole of about two inches diameter; you may be sure that the mole is not within, but has left his residence in search of a better. And when you find an assemblage of mole-hills together, of which the earth is quite fresh; then, upon removing them all with the hoe, and laying open the passages communicating among them, you cannot fail to find the mole that works within. This labour might prove too tedious and troublesome. But it will become very simple, if the mole can be confined between two points not remote from each other. Nothing more will then remain to be done, but to open with the hoe the intermediate passage between these two points. And a mole may be reduced to confinement between two such points, by making a few slight openings in the length of the tunnelled passage, in which you desire to confine her. These openings interrupt her course; for she will not pass, till she shall have first repaired them. But when you break into the tunnelled passage of a mole, close the passage slightly with

with a little loose earth at both ends of the hole you have made.

It may be noticed, that in the practice of mole-catching on these principles, "the only instrument absolutely necessary to the mole-catcher is a hoe. But that it will be convenient that he have likewise at hand, a few pieces of straw, a few bits of paper, and a pitcher of water.

And thus prepared, "the first thing a mole-catcher should do on a farm or estate which he goes to free from moles, is to examine how those moles may be so confined, that he shall be able to attack them all at once; for by thus attacking them, he will the soonest accomplish his whole task."

In the plate of *Agriculture* (*Moles*), a representation is given of a meadow covered with mole-hills, as at *figs.* 1, 2, 3, 4, 5, 6, 7, which are taken from the work of a late French writer. And by surveying this meadow as a mole-catcher, he perceives a detached mole-hill, as *fig.* 1; and perceiving the earth composing it to be fresh, or newly thrown up, he concludes, then, that there is a mole beneath. The mole-hill is large; he thence knows the mole within it to be a male. And with respect to the two mole-hills, *fig.* 2, they are at no great distance one from another; of course he knows them to be the work of a single mole. They appear fresh; and he concludes the mole to be still busy within. They are small; he, on this account, supposes it to be a female that has made them.

And the three mole-hills, *fig.* 3, are near to one another; and, consequently, the work of a single mole. They are fresh; he of course knows the mole to be now at work within. They are large; and have therefore been thrown up by a male. The six mole-hills, *fig.* 4, are not distant from one another; they must have been all thrown up by one mole. They are fresh; the mole is still at work. They are small; and, therefore, raised by a female. The zig-zag covered ways, or imperfect mole-hills, as at *fig.* 5, are fresh; a young mole is beneath.

But the five mole-hills, as at *fig.* 6, are dry; they have been deserted. And the seven mole-hills at *fig.* 7. are yet fresh; but one of them, shewn at M, has a perpendicular hole opening at the top. The mole by which it was thrown up is hence known to be but just gone. By these observations he knows that there are in this meadow two male moles, two females, and a young one. And it is of consequence to know whether the moles be males or females, young or old. The males work quicker than the females; and are, therefore, to be more narrowly watched. The young ones, raising but a very little mould to cover them, as they move along at the surface, go also very quick; and should therefore be kept constantly in view, after they have once been discovered.

It may be observed, that in the operations for destroying them in the first case, as where a mole makes but one mole-hill, *fig.* 1, the mole-catcher removes this mole-hill with the hoe; and ascertains whether it has communication with any of the mole-hills adjacent. For this last purpose, he hems, or makes a slight noise, at the aperture or mouth of the internal passage from the demolished mole-hill. He at the same time applies his ear to listen what ensues within. If the mole-hill be without any communication with any other; the mole being nigh is frightened by the noise; he hears it stir; and it cannot escape him. With his hoe he lays open the tunnelled passage *a b*; and at *b* he finds the mole. But the creature, aware of its danger, may possibly have had time to descend deeper into the earth, by the perpendicular passage *b c*; he has then two methods for taking her; he either digs to *c*, and there finds his prey; or he pours in water at *b*, and the mole comes out of herself. On the other hand, if upon hemming he could not hear her stir; he concludes that this mole-hill communicates with others near it; and he proceeds in the following manner.

This is the second case, as that where a mole has thrown up two mole-hills A, B, *fig.* 2, he now makes an opening *d e*, more than nine inches long, in the direction of the tunnel which runs between the two mole-hills. With a little earth he closes the two ends *d*, *e*, of the tunnel. Within a few seconds, the mole, disagreeably affected by the air, and fearful of danger, comes to repair the breach, and is discovered by its working at *d*, or *e*. If it come to *d*, he knows that he shall find it between that point and the mole-hill A. And when it comes to *e*, he is sure of finding it between *e* and the mole-hill B. In either instance, he proceeds as was indicated in the first case; and lays open either that part of the tunnel which terminates at the mole-hill, or that which ends at B.

But in the third case, where the mole has thrown up three hillocks, C, D, E, *fig.* 3, he now makes the four apertures *f*, *g*, *h*, *i*. The mole will be soon discovered by its stirring the mould at *f*, at *g*, at *h*, or at *i*. If it work at *f*, it is confined between that point and the hillock C. If it be perceived to work at *i*, it is confined between the point *i*, and the hillock E. And if it work at *g*, or *h*, it is in the space between these two points.

And in these three suppositions, he operates as in the first case, by laying open that part of the passage within which the mole is confined. If the mole be shut up between *g* and *h*; and he does not choose to take the trouble of laying all that space open; he then removes the mole-hill D, and makes a third cut like the others. He watches for the working of the mole; and he then knows by the side this appears on, whether he shall find the animal between the third cut and the point *g*, or between that third cut and the point *h*.

Also in the fourth case, where a mole has made four or more mole-hills, *fig.* 4, he takes, for example, the six mole-hills F, G, H, I, K, L. He makes the cut *k l*. If the mole come to work at *k*, it is confined between that point and the mole-hill F. If, on the contrary, she come to *l*, she is confined between *l* and the mole-hill L. In either of these suppositions, he makes from K to F, or from *l* to L, the same means of operation as in the third case; that is, he proceeds just as if there were but three mole-hills.

But a different mode of operating in the second, third, and fourth cases, is this; he supposes, that when he has made the cut *d e*, *fig.* 2, the mole comes to work at *d*, and he observes it the moment it comes there. He knows that it must travel along *d e*, to repair the breach in its tunnel by an arch of earth, which it must raise from the bottom of the place laid open. If he remain there, without making a noise, he shall see it come to work. Then, to take this mole, he has only to put the end of his hoe behind it, before it comes to the point *e*. The earth which he had before put at the aperture, *d*, will hinder it to advance; the end of the hoe will prevent it from retiring; and he shall easily take it, by removing with his fingers that small portion of loose earth with which it is covered. Is it possible, even without an aperture, to know the moment a mole comes to work at it? Nothing more is, for this end, necessary, than to place there a chip of straw, bearing a bit of paper at its upper end. This small standard will be subverted, or at least shaken by the very first movement the mole shall make at the place where it stands. The shaking, or fall of the chip of straw, calls the mole-catcher to watch and take the animal within.

Also in the fifth case, where the mole comes not to work at at the cuts made firſt by the mole-catcher, he ſuppoſes, that if, after making the aperture *k l*, he finds that the mole continues to work at the mole-hill L; he is now ſure that it is between the point *l* and the mole-hill L, and his ſubſequent operations are the ſame as in the third caſe; that is, he muſt act as if there were but three mole-hills I, K, L.

In order to know whether a mole ſhall come during his abſence to work under a mole-hill, he ſoftly flattens the mole-hill with his foot; and if, on his return, he perceives a ſmall eminence to have been raiſed on the level, he can then have no doubt but the mole has been working there.

However, in the ſixth caſe, there is a different manner of operating from caſes ſecond, third, fourth, and fifth, where a perſon happens to be near a mole-hill at the moment when the mole breathes or blows at it. Should he be beſide the mole-hill L, *fig.* 4, at the moment when the mole comes to work there; he does not uſe the uncertain method of the gardeners, who remove the mole-hill with the ſpade; but he cuts at *m n*, the tunnel communicating between the mole-hill and the next one K. This is a certain means of confining the mole between the mole-hill and the point *m n*. When the mole is thus incloſed, he proceeds, as in the firſt caſe, and lays open the ſpace within which it is confined.

And in the ſeventh caſe, as when ſeveral freſh mole-hills are found near to ſome other mole-hills, old and dry, as *figs.* 4 and 6, which is more troubleſome than any other of the mole-catcher, it is doubtful whether the freſh mole-hills do or do not communicate by tunnels with the old and dry ones. It is neceſſary to begin by making cuts between the old and the new hillocks, that the mole, when attacked in the new, may not be able to eſcape to the old. One may then proceed, according to circumſtances, as in the foregoing caſes. When this happens to be the caſe, too many cuts cannot be made, unleſs a perſon is anxious to ſpare the ſurface of the ground. It is good, for inſtance, as in *figs.* 4 and 6, to make a cut in the direction from H to N, and another in the direction from H to O; as there may be a tunnel in either, or tunnels in both of theſe directions.

But on this, it is obſerved, that "if one were conſtantly to watch a ſingle mole, and not to proceed againſt any other, till after the firſt were taken; only a very few could be deſtroyed in one day. But when a farm is ſurveyed to diſcover the moles, all the freſh hillocks ſhould be greatly flattened with the foot, and all the neceſſary cuts made,—as of theſe too many cannot be made, unleſs a perſon is afraid of breaking the ſurface too much. Set up little ſtandards of ſtraw with paper ſtreamers. Then paſs about from one mole-hill to another, and proceed as directed above. If you thus proceed againſt ſeveral moles at once, you muſt exerciſe great vigilance; otherwiſe, while you are buſy with one mole, others may make a good paſſage acroſs the cuts; and then you will have to begin with them anew. A mole will be longer in repairing and croſſing one of the cuts, if a lump of hardened earth is put at the bottom. This precaution ſhould be always taken." This is conſidered by M. Dralet, the tranſlator of the above, as "of all the means hitherto employed for the extermination of moles, the eaſieſt and the ſureſt."

In the ſixth volume of the Agricultural Magazine, a writer, however, propoſes a more ſimple, eaſy, and effectual practice, and which is leſs troubleſome and expenſive. It is the invention of a common labourer, who clears nearly one half of the county of Glamorgan. His contrivance is compoſed entirely of oak, deal, or elm wood, but the firſt is the beſt, and common nails, and may be made by any carpenter or wheel-wright, and ſet to work by any common labourer. This is ſhewn at *fig.* 8, in the plate. A and B are two boards of oak, forming the ſides of the trap, eighteen inches long, five inches wide, and half an inch thick. C, the bottom of the trap, more fully explained in *fig.* 9. E, a piece of oak board, five inches long, two inches wide, half an inch thick, nailed on the top edges of the boards A and B, both to ſtrengthen the trap and to keep the ſides at a proper diſtance. A (*fig.* 9) is the trap with its bottom upwards. C, C, two pieces of oak board, five inches wide, four inches and a half long, half an inch thick. D, an aperture, nine inches long, four inches wide, made to receive the fall of the trap. L, a hole for a common clout-nail (forming the pivot of the fall) to turn in. And at *fig.* 10. is D, the fall of the trap, nine inches long from F to H, three quarters of an inch thick (the diſtance from F to G two inches and a half, or three inches), from G to H half an inch thick and four inches wide. G ſhews the hole for the clout-nail forming the pivot. M, the dotted lines, ſhews the manner in which the upper part of the fall D muſt be bevilled, to prevent its falling both ways. At *fig.* 11. is ſeen "the mole-pot, the uſes of which will be more fully explained afterwards, compoſed of four pieces of oak board, each five inches wide at the top, nine inches wide at the bottom, twelve inches long, one inch thick, or thereabouts, having two ears, as at K, K, with a hole in each large enough to carry a piece of ſmall rope or ſpun-yarn." And at *fig.* 12. is ſhewn a mole-trap ſet in the ſide of a ditch.

In the view of finding the runs or tunnels, "the farmer or his ſervant muſt carefully examine the ditches of each field, in order to diſcover where the moles have made their main tracks; which having once found, and the trap ſet thereon, he may reſt aſſured that every one paſſing through it will be inevitably deſtroyed; neither are their runs at all difficult to be found, as the only thing neceſſary to obſerve is, whereabouts they have broken out moſt on that part of the field the neareſt to the ditch, in the ſide of which he muſt then make an opening with a ſmall common ſpade, oppoſite to the neareſt place where they are obſerved to work moſt, in order to open the run. Should the firſt endeavour to ſtrike upon it prove unſucceſsful, he will not fail to find it by ſearching thereabouts, either a little higher or lower. In common fields and unincloſed lands a different method muſt be purſued; and as, of courſe, there are no ditches, the higher grounds and banks will be the certain and proper place to ſearch for their runs, which having once found, the workman muſt proceed in the following manner: Firſt, a hole muſt be cut out the length of the trap, as repreſented in *fig.* 12, in ſuch a manner that when it is inſerted, the run may enter each of its ends, as ſhewn by the dotted lines; and alſo a hole or well of ſuch a ſize that the mole-pot may be eaſily ſuſpended therein. Secondly, a ſmall clout-nail, of which he ſhould take ſeveral in his pocket; or ſhould he have forgotten to do ſo, a thorn out of the hedge muſt be thruſt into the hole *n*, *fig.* 9, which alſo communicates with the hole *n*, *fig.* 10, and will effectually prevent the fall from acting. Thirdly, a ſmall handful of fine earth, like that uſually thrown up by moles whilſt working, and which may be taken from one of their heaps, muſt be ſcattered all over the bottom of the trap ſo as to cover it, as well as both ends communicating with the run. Fourthly, a turf, ſomething longer and wider than the trap, muſt be cut off the head-land, both to ſerve as a cover to it, as is ſeen at P P P P, (*fig.* 12.), and as a certain mark by which it may be found with the greateſt eaſe: and laſtly, two pieces of ſpun-yarn muſt be faſtened, one to each ear of the mole-pot 11, *fig.* 4, by which it muſt be tied on the trap in ſuch a manner, that any weight put upon the fall D at 11 may be thrown to the bottom; the carpenter having previouſly taken care that the weight of the fall from F to G ſhall more than counterbalance that from G to H, ſo that no ſooner ſhall a mole be thrown into the pot than it will ſpontaneouſly reſume its former ſituation, and be on a level with the reſt of the bottom."

After "the trap with the fall has been faſtened up by the clout-nail at *n*, the fine earth ſtrewn over the bottom, the turf covered over the top, and the mole-pot properly ſuſpended, by being tied over the whole; nothing further will be required to be done to it for three or four days, (for the moles muſt be allowed to paſs freely along it for that time, as it will induce them to uſe their run without fear, and be the means of taking them with the greater certainty). The workman muſt now carefully examine his trap, and on gently lifting up the turf will plainly perceive their marks, (taking care, however, not to leave any opening for the light to enter), and pulling out the clout-nail at *n*, the trap will then be ſet fit for working, and the fall will throw them into the mole-pot, out of which it is impoſſible for them ever to eſcape." And farther, "ſhould the farmer have ſtrictly followed the above inſtructions, and notwithſtanding the moles ſtill continue to work about his land, he may be certain they have forſaken the run on which he has ſet his trap, and he muſt therefore ſearch for their new one." It is concluded that "the advantages ariſing from uſing traps of the above conſtruction are, that the materials are to be procured every where; they can be made by any common mechanic at a very ſmall expence, (the wood being uſed rough as it comes from the ſaw,) are very durable if made of oak; are not liable to get out of repair, and if they ſhould, can be mended moſt probably by a labourer; they catch the whole year, and do not require looking after more than three or four times in that period, and that will comparatively require ſo ſhort a time, that a workman may with eaſe look over all the traps on a very large farm; and ſuppoſing the fields to lie contiguous to each other, one trap for each ten acres would, on an average, be fully ſufficient."

It is ſtated, by the firſt writer noticed above, that mole-traps are either ſimple or complex. The ſimple mole-trap is a hollow cylinder of wood, white-iron, or pottery, thirteen or fourteen inches long, and in diameter a little larger than the tunnels of the mole. This cylinder is cloſed at one end, and has at the other a ſucker or valve preſſing againſt an exterior edging. When the mole comes to the extremity covered by the ſucker or valve, ſhe preſſes this back in order to continue her progreſs through the cylinder, and can return no more. Two of the traps may be united ſo as to form a double trap, having a valve at each end. By this the mole may be taken as ſhe enters, whatever ſide ſhe approach. It is added, that "the moſt remarkable of the complex traps uſed in Normandy, is a ſmall piece of board fixed in the ground by four iron pins with croſs points extending from them; and on theſe points the mole transfixes itſelf. It is very ſeldom that thoſe ſucceed who make uſe of theſe and other mole-traps: for they do not uſe the fit means to entice the creature to the ſnare. That method is, nevertheleſs, very ſimple. Nothing more is neceſſary than to make a few holes by which the air may enter the tunnel of the mole, and give her notice of the injury done to her work. It will be eaſy to him who has read the preceding information and directions, to employ ſuch mole-traps, in certain caſes, with infallible ſucceſs. He ſuppoſes, for inſtance, the two mole-hills A, B, (*fig.* 2.) and makes the aperture *d e*. If the mole ſtir the earth at *d*, he there preſents the valve of either the ſimple or the double mole-trap; and he is ſure of taking it. If, on the contrary, it preſents itſelf at *e*, he muſt there uſe the trap. He acts in the ſame way in every one of the caſes mentioned above. It may be eaſily believed, that there are ſome of thoſe caſes in which it will be convenient to uſe mole-traps. They are exceedingly uſeful when the mole-hills happen to be at conſiderable diſtances one from another, as in the end of winter. But, in the time of drought, and when the weather is very cold, the hillocks are ſo very near to one another, that the traps can be of little uſe.

But the common method of deſtroying moles is, however, by traps, made in the following manner: take a ſmall board, about three inches and a half broad and five inches long; on one ſide thereof raiſe two ſmall round hoops or arches, one at each end, like the two hoops or bails of a carrier's waggon, capacious enough for a mole to creep through eaſily: in the middle of the board make a hole about the bigneſs of a gooſe-quill, and have in readineſs to put into it a ſtick about two inches and a half long, fitted at one end to the hole and a little forked at the other. Cut alſo a hazel or other ſtick, about a yard or a yard and a half long, which will riſe with pretty ſtrong elaſticity when it is ſtuck into the ground; and to the end of this ſtick faſten a very ſtrong nooſe of ſtring or horſe-hair, made ſo as to ſlip eaſily. Have likewiſe in readineſs four ſmall hooked ſticks; then go to the furrow or paſſage of the mole, and after you have opened it fit in the little board with the bended hoops downward, ſo that when the mole paſſes that way it may go directly through the two ſemicircular hoops. But before you fix the board in this manner, put the hair ſtring through the hole in the middle of it; place the noose in a circular form, ſo as to make it anſwer to the two hoops; put the ſmall ſtick before mentioned gently into the hole in the middle of the board, ſo as juſt to ſtop the knot of the hair ſpring, without entering ſo far as abſolutely to tighten it. Then faſten the board down with four hooked ſticks, and cover it with earth. When the mole, paſſing in its furrow, comes into this trap, it will diſplace the ſmall ſtick that hangs perpendicularly downward, the knot will then be drawn through the hole, and the noose inſtantly ſtraightened by the riſing of the end of the hazel ſtick to which it is faſtened, will catch the mole round the neck or body and hold it faſt.

Moles, *Fumigating of.* This is a mode adopted in order "to ſuffocate the mole in its retreat, for which ſome adviſe to take a ſmall nut-ſhell, or any little vaſe, ſolid and of ſmall capacity, and in it to burn cedar root, or wax and ſulphur, with a portion of ſtraw, then to ſtop up every hole by which the ſmoke might iſſue out. The ſucceſs of theſe methods is very uncertain, and indeed none at all in the hands of any perſon not well acquainted with the artifices and haunts of the mole. Sometimes all the mole-hills in a garden or a meadow, whether freſh or dry, communicate by many different paſſages with one another, as has been ſhewn. In this caſe all theſe mole-hills muſt be preſſed down and cloſed up. But in doing this you will yourſelf preſerve the mole from the threatened ſuffocation. Suppoſe, for inſtance, that the mole which made the hillocks (*fig.* 4.) is to be ſuffocated, and that you put the combuſtible matters in at H. If the mole be at I or L, the ſmoke will be hindered from penetrating beyond I, by your ſhutting up the paſſage there; and your precaution to enſure the death of the mole will prove the very means of its eſcape. It is only by cuts in the paſſages that fumigation can be made effectual. To ſuffocate the mole of the hillocks (*fig.* 4.), make the breach *l k*: cloſe up its extremities; put in your combuſtible matters between *k* and F, and between *l* and L, after levelling the hillocks L, F. But you muſt firſt aſcertain whether the mole-

mole-hill, H, (*fig.* 4.) has any communication with thofe of *fig.* 6, and if it has, cut off that communication by other breaches," in the manner already defcribed.

There are fome other modes propofed for the deftruction of this animal, but they are much lefs certain than thofe which have been juft detailed.

Moles, *Poifoning of.* It may be noticed, that for this purpofe there are feveral recipes; fome propofe to throw into their retreats nuts, which have been pierced on one fide and boiled in a ftrong lixivium. Others boil fuch nuts in water, with a handful of hemlock, and ufe them as above. In fome countries people take the root of white hellebore, with the bark of dog's colewort pulverized and fifted; mix this with barley-meal: fteep the mixture in wine and milk; cut it in fmall pieces, then throw it into the mole-hills. In other countries it is ufual to take the green of a leek, or to put arfenic on the white, and bury this in the frefheft mole-hill that can be difcovered. Thefe poifons, it is obferved, are in general ufed injudicioufly. The mole rarely feeks its food at the furface where its hillocks are placed. It pufhes back the earth, as it works, to the extremity of its tunnel. That earth raifes the layer next above it; and by the continual repetition of this procefs, the mole-hill is at laft formed. The mole, while undifturbed, keeps always within its tunnel; and it is into the tunnel, therefore, that the poifoned bait ought always to be caft, inftead of being left in the hillock. In order to deftroy the mole which formed the mole-hills A, B, (*fig.* 2.) make a cut, *d e*, in the tunnel which communicates between them. Put the poifoned bait then into it, at either *d* or *e*, or even between them. The animal will come of courfe to repair the breach, will find the fubftance, eat it, and be deftroyed.

Mole-*Hill*, a term applied to a fmall mouldy heap of earth, thrown up by the mole on grafs or other lands. It has been obferved by a late writer, that "in the more rich and fertile foils, hills of this fort are frequently thrown up in great numbers, from their abounding more with the food of the fubterraneous animals that produce them. Meadows are often extenfively and ferioufly injured by them, on account of their depth of foft humid foil. Moles ufually refide, deftroy, and render ufelefs the grafs, not only of the very fpot where the hills are raifed, but likewife to fome extent immediately around them, as well as impeding the free courfe of the fcythe: for thefe reafons, the extermination of moles becomes an object of great confequence to grafs hufbandry. In the early fpring months, when fuch hills are in a tolerably dry and powdery ftate, no time fhould be loft in fpreading them out, and difperfing them, in as even and regular a manner as poffible, over the furface of the fward that adjoins them; as, when they remain long without being fcaled, they do confiderable injury to the grafs plants underneath them, by blanching and rendering them tender. This bufinefs may be very conveniently performed by a common iron-toothed garden rake. But it is invariably the beft method never to fuffer the animals to remain in the land, but to procure an expert mole-catcher to deftroy them, and thus wholly prevent the hills being thrown up." As foon as the hills have been difperfed over the land in the manner directed above, the operator fhould be careful in raking up all the fmall ftones, that may have been thrown out with the mould; as when left upon the ground, efpecially where it is to be mown, they prove a very difagreeable impediment to the fcythe. But before this is done, it is beneficial to make ufe of a bufh-harrow.

Mole-*Plough*, an implement intended for the purpofe of draining land, by forming a fort of pipe in it.

This plough was long ago invented by Mr. Adam Scott, and as fince improved, and made ufe of in the midland counties, is an implement which, in fuitable foils and fituations, as in parks, pleafure-grounds, and where much regard is had to the furface-appearance of the land, may be of confiderable benefit in forming temporary drains. It makes a drain, without opening the furface any more than merely for the paffage of a thin coulter, the mark of which foon difappears. This inftrument is chiefly employed in fuch grafs-lands as have a declination of furface, and where there are not many obftructions to contend with: but it may be ufed in other kinds of land, as on turnip grounds that are too wet for the fheep to feed them off, or where, on account of the wetnefs, the feed cannot be put into the earth. With this plough the drains fhould be made at the diftance of ten or fifteen feet, in ftraight lines, and alfo contrived fo as to difcharge themfelves into one large open furrow, or grip, at the bottom of the field. As it requires great ftrength to draw this implement, it can only be ufed where a good team is kept. It is fuggefted by an intelligent farmer, that in deep clayey foils it may be highly ufeful; but that, where there are beds of gravel or fand intervening, it cannot be employed with advantage. And it has been found ufeful in thin peaty foils.

This fort of plough is reprefented at *fig* 1, in *Plate Agriculture* (*Ploughs*), in which *a* is the beam; *b*, the coulter; and *c*, the cone which forms the drain. It has been lately improved, fo as to require much lefs force of draught, by having wheels placed before, and a roller behind. But a greater and more important improvement has been made on this tool by Mr. Lumbert. Mr. A. Young ftates, that "in a communication from his fon, inferted in the 36th volume of the Annals of Agriculture, mention is made of this plough having been greatly altered by Mr. Lumbert of Rilington Wick, near Stow, on the Wolds of Gloucefterfhire, who worked it by eight men turning windlaffes. This he takes to be the firft public notice of any fuch invention. Thomas Eftecourt, efq. M.P. for Cricklade, and a member of the Board of Agriculture, had, fince that period, feveral times mentioned the fame object to him. In March 1804, he had the goodnefs to inform him, that the plough was then working at Cricklade; and, upon his expreffing a wifh to fee it, obligingly propofed to write to Mr. Wells, furgeon at Cricklade, informing him of his intention, and requefting his writing to Mr. Lumbert, the inventor, to defire his prefence at the fame time. Thefe neceffary previous fteps being taken, he arrived at Cricklade, March 21ft, and had the fatisfaction to find that the plough was then at work within a mile of the town, whither he repaired with Mr. Wells and Mr. Lumbert. The field in which the machine was working belongs to Mr. Champernoun of Cricklade; the foil a very rich furface loam upon a clay bottom, which made it wet, and demanded the operation of draining. The ftate of the furface (though grafs) was fuch as would have been very materially injured, by fo many horfes as muft have been neceffary to draw the mole at the depth he found it working, which was from 17 to 18 inches. Eight women work it: and in refpect to the labour exerted, it is fufficient to note that Mr. Lumbert contracts for the work at three halfpence *per* perch, lug, or rod, of $5\frac{1}{2}$ yards; his foreman contracting with him for doing it at three farthings, the machine being found by the mafter, the man paying himfelf and the women out of that fum. The plough does, according to foil and circumftances, from 150 to 200 perches a-day: 300 have been done. At 200, three farthings a perch are 12*s.* 6*d.* *per diem*; the eight women at 8*d.* are 5*s.* 4*d.*; leaving

ing 7*s.* 2*d.* for the foreman's pay, and the reparation of the chain, the chief object in the repairs, as it breaks often, and wants the addition of a falſe link whenever that accident happens. He timed the motion of the plough for ſome rods, and found the average five yards in a minute. At this ſpeed, 490 perches would be done in nine hours; but the time of moving the windlaſs, frame, and anchor, is a large deduction, though he ſhould have conceived not ſufficient to reduce the performance to 200 perches. He could not but much admire the efficacy of the anchor and *ſcots*, in quickly fixing and preſerving the ſteadineſs of the machinery, in reſiſtance of ſo great a force as is neceſſary to move the mole deep buried in clay."

And it is added, that "the preſent conſtruction of the machine was the reſult of many experiments, in making them under divers variations. Mr. Lumbert ſpeaks of two circumſtances particularly, which coſt him much attention and many trials: the line of traction, and the due elevation of the beam. He has not comprehended why the beam ſhould be elevated (other circumſtances remaining the ſame); why any elevation further than parallel to the horizon ſhould be neceſſary, the parts connected forming one piece in either caſe. This queſtion, which is intimately connected with the ſtructure of all wheel-ploughs, and is found under great variations, from the elevated beam of the Norfolk plough to the very depreſſed poſition of the beam of the Hertford one, deſerves more attention than it has commonly met with. The line of ſurface being 1 : 2, and the tendency of the ſhare into the ground 1 : 3, ſhould the elevation of the beam be proportioned as 1 : 4? The line of traction, in Mr. Lumbert's plough, being to a little above 1, ſuppoſe his mole working at 5, he ſeems to have proportioned the elevation of his beam ſomewhat to the ſame angle above ground at 6, that is, at 22½ degrees. He found it neceſſary that the line of traction ſhould cut the centre of the front roller, but not drawing by it. If a line be drawn from the horſe's ſhoulder, while drawing, to the heel of the Norfolk plough, he has often found, when the ploughs *are ſaid* to go well, that ſuch line paſſes by the centre of the wheels; but the Norfolk plough is truly a wheel machine, the draught being to the carriage, and not to the plough itſelf: whereas Mr. Lumbert draws from the heel of his beam. The line of traction, however, in Mr. Lumbert's machine, is always varying: the angle is very acute, when the women begin to turn; but neceſſarily becomes leſs and leſs ſo, till the mole arrives at the windlaſs frame. The elevation of his beam throws a great weight on it, by counteracting the tendency of the mole into the ground. Quære, if this line of traction be not to the centre of the compound reſiſtance? If ſo, it explains the reaſon for his greater eaſe of draught; but it does not explain why he ſhould not have availed himſelf of high wheels in front, inſtead of a low roller, converting his machine into a true wheel-plough, and drawing from the carriage; the chain from the plough heel being fixed to the carriage, as that from the coulter (or near it) is in the common wheel-plough."

The ſame writer further ſtates, that "Mr. Lumbert has made this great improvement of the mole-plough about ſeven or eight years, and the ſucceſs attending it has been conſiderable. Mr. Poulton of Cricklade and Mr. Wells have uſed it, as well as Mr. Champernoun. Mr. Coxe at Water Eaton has drained, as he was informed, ſome hundreds of acres with it. Many have uſed it at Perton; nor had Mr. Adams heard of any failures. All known here have been on clay; but they have heard of its anſwering on leſs ſtiff bottoms. The drains run well after three years."

It is added, that "Mr. Lumbert, in their examination of the machine, deſired him to obſerve that the bottom of the mole was not at all bright, there being no wear there, while the upper parts were worn quite bright; and from this circumſtance he concludes, that any attention to keep froſts out of the ſlit made by the coulter and ſtandard is unneceſſary. He conceives that the force of preſſure, and conſequent plaſtering, is all on the upper ſide of the pipe, inſomuch that he is firmly perſuaded that the operation is chiefly at the bottom of the pipe, where the ſoil is left porous, on compariſon with the top of it: and he is ſo much of this opinion, that he conceives the water, which runs down by the ſlit, is more likely to be conducted over the pipe than to get into it." Mr. Young ſtates, that "he merely reports his remarks without a comment."

It is hinted, that "the improver goes to any part of the kingdom with his machine for draining of 1½*d. per* rod; but if to a diſtance, muſt have inſured work, in the proportion of 200 rods for every mile he travels going out. At any conſiderable diſtance, this amounts to ſo large a quantity, that, in many caſes, it would be adviſable for ſeveral neighbours to join for providing ſufficient employment. He ſells the tool complete at 50 guineas, having a patent. He can go 24 inches deep; and he has, on his own farm, drains that have ſtood well ſeven years. When the ditch of a field is not in ſuch a direction as ſuits for the conveyance of the water from the pipes made by the mole, or other circumſtances render it neceſſary to have a bottom main drain to take the water, his mode of making theſe *clay-drains*, as he calls them, is by digging to a certain depth with common ſpades; and at the bottom of the trench ſo opened he takes a ſpit, with a narrow ſpade that has a cutting edge. This tool opens a trench, which juſt receives a jointed wooden frame, with a chain at the end, by which it is drawn on by the application of a lever. This frame, fitting the ſpace left by the narrow ſpade, is covered with clay, rammed cloſe and firmly to it, being firſt wetted, that it may ſlide from this clay vault when drawn on by the lever: and from much experience he finds theſe drains perfectly ſafe and durable. Over the rammed clay mould, enough to fill to the ſurface is thrown in."

The writer alſo mentions, that in diſcourſing "with him on other applications of the power he exerts in drawing the mole, he informed him that Mr. Barker of Fairford has a water, that was ſo choked up with mud and weeds, that a duck could ſcarcely ſwim in it. He applied the windlaſs, frame, and chain, to drag out all; and with ſuch ſucceſs, that no other method would have cleanſed the water at ſo cheap a rate: ſome drag, ſcraper, or other contrivance, muſt of courſe be neceſſary for taking and retaining the mud," &c. And Mr. Young ſuppoſes, that "a very uſeful application of this power would be to the purpoſe of drawing turnips or cabbages from off wet land, which, by common carting, is attended with ſo much miſchief. He has ſeen temporary ſheds roughly erected, on the borders of turnip-fields in Suffolk, for ſtall-feeding beaſts: the addition of the windlaſs, to draw the turnips to ſuch ſheds, would be extremely important. Another application of this force, well deſerving attention, is, for drawing the machine which he has ſeen in the maritime part of Eſſex, wherewith croſs-roads are levelled. Where ruts are deep, and combs and quarters high, with other inequalities, this tool, a ſort of harrow, might be very cheaply uſed for effectually ſmoothing the whole, and improving the roads at a very ſmall expence." And as "much the moſt economical ſyſtem in which the thraſhing-mill can be applied is, that of a circular iron rail-way, whereon to draw the ſtacks to the mill, as he has fully explained in the 33d volume of the Annals: inſtead

ſtead of the application of the power of the wind or horſes to draw the ſtacks, the windlaſs and anchor of the mole-plough might be moſt cheaply applied. Another application of this power which he ſhall mention is, for the draught of ploughs and other machines, when comparatively tried: the force exerted would be more regular and ſteady than that of horſes, or even oxen; and the only attention particularly demanded would be to keep the chain parallel to the furrow, and at the right diſtance from it."

But Mr. Young ſuggeſts, that "in the operation of hollow draining itſelf, a moſt important deſideratum yet remains, and that is the drawing a plough that ſhall cut an open trench, for filling up with ſtraw, wood, or ſtone. Two ſuch ploughs have been invented: Mr. Arbuthnot's, a plate and explanation of which are to be ſeen in his "Eaſtern Tour;" and Mr. Makin's, which is kept in the Society's repoſitory in the Adelphi buildings. The trampling of ſo many horſes as theſe ploughs required, was the great objection to their uſe. This ſerious evil is done away in the windlaſs ſcheme; and he cannot but recommend to Mr. Lumbert's attention the improvement of one of thoſe ploughs, or the invention of another, for executing theſe drains by means of his windlaſs. He ſtates, that "in all ſorts of hollow draining, Mr. Lumbert is decidedly of opinion that the cuts ſhould be in the direction of, and with the ſlope of the land: not diagonally acroſs it, which is the common practice. In the latter method, the drains operate but on one ſide: cutting off the courſe of the water, as it deſcends, it drains the land only below the cuts; but if made with the ſlope, they operate equally on either ſide; and as he ſuppoſes the veins or pores of the ſoil, which conduct the water to act in every direction, provided the water itſelf is taken away, his cuts in the direction of the ſlope receive it laterally from every portion of the land between the drains, the deſcent from which to the bottom of the drain is greater than the angle of the deſcent of the natural ſurface of the field. It would not be eaſy to bring this opinion to the teſt of exact experiment; but a very ingenious farmer in Suffolk, Mr. Simpſon of Witneſham, near Ipſwich, has the ſame conviction, and has drained ſome hundreds of acres very ſucceſsfully upon this plan."

But the nature, uſe, and application of this implement may, however, be better underſtood from *fig.* 2, in *Plate Agriculture* (*Ploughs*), in which,

1. The beam.
2. The mole, to which ſegments for lengthening it ſcrew on at 3.
4. The roller at heel, on which it preſſes.
5. The chain, 50 to 60 yards long, which winds on to the two cylinders, 7, 7.
6. A pulley, around which the chain, 5, plays.
8, 8, 8, 8. Windlaſſes turned each by two women.
9. Stays, which entering the ground, aſſiſt in keeping the machine ſteady.
10. The anchor.

And the proportion and reſpective angles of all the parts may be meaſured by the ſcale which is given in the plate. See PLOUGH.

MOLE-*Traps*, the name of ſuch traps as are contrived for the purpoſe of taking and deſtroying moles. They are of ſeveral different kinds. See MOLE-*Catching*.

MOLE, *Mola*, or *Mola Carnea*, in *Phyſiology*, a miſ-ſhapen maſs of hard fleſh, ſometimes generated in the wombs of women, inſtead of a fœtus; called alſo a *falſe conception*. It is, however, a very rare production; what is called a mole by women being generally found on examination to be nothing more than coagulated blood. The following approaches neareſt to what the ancients conceived to be a mole, of any thing that has occurred to the writer of this article. A woman, about twenty-ſeven years of age, was delivered of a female fœtus, and its placenta, in which nothing uncommon was obſerved; and although the uterus remained of an unuſual ſize, yet the pains not recommencing, there was no ſuſpicion entertained but that its bulk was occaſioned by coagulated blood. On the third day the pains became violent, and this monſter was born. Its ſhape was ſpherical, but ſomewhat flattened. It meaſured in its largeſt diameter eight inches, and weighed about eighteen ounces. It received its nouriſhment by an umbilical cord, to which was attached a portion of membranes, and although no placenta was found, it is probable it had a ſmall one, and that it was incloſed in its own involucrum. It was completely covered with a cuticula, and a little above the part where the navel-ſtring terminated, there was a hairy ſcalp covering a bony prominence, ſomewhat reſembling the arch of the cranium. On diſſection it was found to be plentifully ſupplied with blood-veſſels, proceeding from the navel-ſtring, and branching through every part of it. It had a ſmall brain, and nerves paſſing from thence through the foramina of the bones; but no reſemblance of any thoracic or abdominal viſcera. The reſt of its bulk was made up of fat. This was inſerted, with the plate of the external appearance of the object, in the ſeventy-firſt volume of the Philoſophical Tranſactions.

MOLE, *Moles*, a maſſive work formed of large ſtones laid in the ſea by means of coffer-dams, extended either in a right line, or an arch of a circle, before a port; which it ſerves to cloſe; to defend the veſſels in it from the impetuoſity of the waves, and to prevent the paſſage of ſhips without leave.

Thus we ſay the mole of the harbour of Meſſina, &c.

MOLE is ſometimes alſo uſed to ſignify the harbour itſelf.

MOLE, *Moles*, among the Romans, was alſo uſed for a kind of mauſoleum, built in manner of a round tower on a ſquare baſe, inſulate, encompaſſed with columns, and covered with a dome.

The mole of the emperor Adrian, now the caſtle of St. Angelo, was the greateſt, and moſt ſtately of all the moles. It was crowned with a brazen pine-apple, in which was a golden urn containing the aſhes of the emperor.

MOLE, in *Zoology*. See TALPA, and the article MOLE, *ſupra*.

MOLE-*Cricket*, *Gryllotalpa*, in *Entomology*. See GRYLLUS.

MOLECULE, MOLECULA, in *Phyſics*, a little maſs or portion of any body.

The air, by reſpiration, inſinuating itſelf into the veins and arteries, endeavours by its elaſtic power to divide and break the molecules of the blood, which on their part reſiſt ſuch diviſion.

MOLEEAH, in *Geography*, a town of Bengal; 54 miles W.N.W. of Midnapour.

MOLENE, a ſmall iſland in the Engliſh channel, near the W. coaſt of France; ſix miles S.E. of Uſhant. N. lat. 48° 24′. W. long. 4° 52′.

MOLENES, a ſmall iſland in the Engliſh channel, near the coaſt of France; 13 miles W. of the iſland of Bas. N. lat. 48° 47′. E. long. 3° 33′.

MOLENPURG, a town of Auſtria; 16 miles S.W. of Crems.

MOLES CARNEA, in *Anatomy*, a name given by Veſalius, and others, to a muſcle called by Winſlow, Albinus, and others, the *complexus*. Spigelius calls it the *carnea moles trigemino adjuncta*.

MOLES *Carnea labia formans*, a name given by Fallopius to to the muscle called by Albinus *orbicularis oris*, and by Cowper *constrictor labiorum*.

MOLESTANDO. See Non *Molestando*.

MOLESWORTH, Robert, in *Biography*, viscount Molesworth of Ireland, descended from an ancient English family, was born at Dublin in 1656. Having received the elements of a good education, he was sent to complete his studies at Dublin college. He married, at an early age, the sister of the earl of Bellamont. When the prince of Orange came to England in 1688, Mr. Molesworth rendered himself conspicuous as a friend to liberty and the Protestant religion, for which he was afterwards attainted and his estate sequestered by king James's Irish parliament. The success of the Popish king, even in Ireland, was very short lived, and Mr. Molesworth was immediately noticed by king William, who raised him to the rank of privy-counsellor. In 1692 he was sent out envoy-extraordinary to the court of Denmark, where he resided three years. He had not, however, been very long in his situation before he found reason to be disgusted with the manners and habits of that newly enslaved country, and his eagerness to insist upon privileges which he conceived were his due in the high character of ambassador, gave offence, and he was forbidden to enter the court. Without the ceremony of taking leave, he withdrew to Flanders, on pretence of business, and thence returned to England, where he set about writing "An Account of Denmark." This work, written probably in resentment for the ill treatment he had met with, gave such an unfavourable account of the government and nation, that it was noticed by prince George of Denmark, consort to the princess Anne, afterwards queen of England, and a memorial was presented to king William, by the Danish envoy, complaining of the insult. It was undoubtedly one of the publications of that period which was most hostile to arbitrary power, and which exposed with the greatest freedom the arts by which public liberty was overthrown. Dr. King was employed to answer this work, in the performance of which, being furnished with facts by the Danish resident, he was enabled to detect some mistakes and misrepresentations: the book was however well received, and was translated into several foreign languages. For the author it procured the esteem and friendship of lord Shaftesbury, in unison with whose political principles he always acted. Mr. Molesworth was continued a member of the privy council till the latter part of the reign of queen Anne, when he was removed on account of a complaint from the clergy in convocation, to whose increasing influence he was always inimical. On the accession of George I. he was taken again into favour, and in 1716 was called to the house of lords in Ireland, by the title of viscount Molesworth. After this he spent his time chiefly in a literary retirement, connected with and much esteemed by several men of learning and liberal principles, among whom were Locke, Molyneux, and Toland. To the latter he was a warm friend and benefactor, though his own circumstances were narrow. Lord Molesworth died in 1725, at his seat near Dublin, in the sixty-ninth year of his age. Besides the work already referred to, he wrote an address to the house of commons for the encouragement of agriculture; and to his pen were ascribed several temporary publications in favour of the English constitution, and the general principles of liberty. One of his daughters, Mary, the wife of George Monk, esq. at her death, in 1715, left a collection of poems, which her father published, and dedicated to the princess of Wales, afterwards queen Caroline. Biog. Britan.

MOLEVETO, in *Geography*, a town of the island of Ceylon.

MOLFETTA, a town of Naples, in the province of Bari, on the coast of the Adriatic, the see of a bishop; eight miles E.S.E. of Trani. N. lat. 41° 18'. E. long. 16° 39'.

MOLIERE, John-Baptist Poquelin de, in *Biography*, the most celebrated of modern writers in comedy, was born at Paris in 1620. His father, who was valet de chambre upholsterer to the king, and kept a broker's shop, designed to bring him up to his own employment, and gave him a conformable education. The youth, without any advantages of education beyond those of mere reading and writing, imbibed a taste for literature, and was sent to the Jesuits' college as a day-scholar. His assiduity was soon observed; he became connected with Chapelle and Bernier, with whom he attended lectures in philosophy, under Gassendi. His father, with increasing years, became very infirm, and the business of the royal houshold was devolved on the son, and he attended Louis XIII. to Narbonne in 1641. On his return to Paris he resolved to devote himself to theatrical employments. He connected himself with a company of young persons, who acted in the suburbs of St. Germain, and assuming the name of Moliere, composed several little pieces of the comic kind, and performed his part on the stage. At length he joined La Bejart, a provincial actress, and they formed a company, which, in 1653, represented at Lyons his first regular comedy in verse, "L'Etourdi." This was followed by "Le Depit Amoureux," and "Les Precieuses ridicules," exhibited at Beziers, where Moliere was favourably received by the prince of Conti, who was chief of the states of Languedoc. He next visited Grenoble and Rouen, and from the latter came to Paris, under the protection of Gaston, duke of Orleans, who introduced him to Lewis XIV. He soon obtained permission to open a theatre in the metropolis, which was first in the old Louvre, and afterwards in the Palais Royal, and in the year 1665 he was placed in the service of the king, with a pension. He rose in reputation as a writer by the new pieces which he presented to the public, and became more and more perfect as he advanced in experience and observation. At mature age he married the daughter of the actress Bejart, who also followed the same profession, and he is said to have incurred very deservedly the same sort of ridicule as that which he bestows plentifully upon the poor husbands in his comedies. In friendship he was more happy, and he numbered among his intimates not only men of wit, but some of the greatest persons about the court. He died in consequence of his exertions in acting a principal part in his play, "Le Malade Imaginaire." He was labouring under a slight pulmonary complaint, and was strongly urged to postpone the representation: "What," says he, "will become of so many poor people who depend on it for the very means of subsistence. I should reproach myself for having neglected a single day to supply them with that of which they stand in need." He exerted himself with unusual spirit, and his efforts brought on the rupture of a blood-vessel, by which he was suffocated. This event happened in February, 1653, when he was only in the fifty-third year of his age. By almost the general consent of Europe, he is placed at the head of that genuine comedy which has for its subject the ridiculous in character and manners; and it is agreed that no one ever united more pleasantry in dialogue and incident, with more good sense and penetration in selecting just objects for comic satire. He is also regarded as the great reformer of the French theatre in respect to comedy, as Corneille was in respect to tragedy. His more serious compositions, and those written in verse, are by his countrymen esteemed his master-pieces, especially

especially the "Misanthrope" and the "Tartuffe." The latter, touching upon religious hypocrisy, excited a great clamour against him from the pretended devotees, who had interest to procure a prohibition of its second representation from the parliament. This temporary attack has not prevented the "Tartuffe" from retaining its place as one of the great ornaments of the French stage. Moliere had always a large portion of the philosophy of good sense, and rarely failed to discern the weak part of what he chose for the topic of his sarcasm. He had also a just sense of propriety in the conduct of life, and in serious humour he is always the friend of honour and integrity. His own character was, in many respects, estimable. He was kind, obliging, and generous. Nevertheless, after his death, the archbishop of Paris, Harlai, a man of loose morals, without, probably, half the good qualities of the actor, but desirous of pleasing the rigorists of the Roman church, refused him Christian burial, and the king's authority was requisite to procure him private interment in a chapel belonging to the church of St. Eustace. The bigotry of the mob, whom the priests had kept ignorant to make them engines in their own cause, impeded even this obscure ceremonial, and they could not be dispersed till money was given them for the purpose. "Such," says an able biographer, "was the treatment of a man who was an honour to his country, and who will ever rank among the principal ornaments of the age in which he lived! No one was more impressed by a sense of his merit than the great Conde, who, in reply to a wretched rhymer, that had brought him an epitaph on Moliere, "Would to heaven he had presented me with thine!" He is honoured with memorials by Boileau, Voltaire, and the king, who being asked to name the first writer that had appeared in his reign, named Moliere, without the smallest hesitation. His style in prose is perfectly natural and easy: in verse he has been accounted incorrect and careless. As an actor he excelled only in comedy: his voice was feeble and indistinct, but his strong features, animated by intelligence, rendered him the perfect representative of the characters, in his own pieces, which he took upon himself. His works have been a thousand times reprinted: the best edition is said to be that of Bret, at Paris, in six volumes, with commentaries. Moreri.

MOLIERES, Joseph-Prival de, a celebrated French priest and mathematician, who flourished in the eighteenth century, was born at Tarascon, in the county of Foix, in the year 1677. Owing to a tender and delicate constitution, he chose for himself a life of study, and became, in a short time, famous for his learning on divers topics, but particularly in the several branches of belles lettres and mathematics. His elder brother, who had obtained considerable rank in the army, having been slain in battle in 1695, M. Molieres' parents were desirous that he should settle in the world, but his love of study rendered their persuasions ineffectual. That he might put an end to all importunity on this head, he entered at once into the church, and was ordained priest in the year 1701. He afterwards entered in the congregation of the oratory, and taught the classics and philosophy with great success in several of their seminaries. Some years after this, having read and greatly admired the works of father Malebranche, he was anxious to become acquainted with their author; and for that purpose quitted the oratory and repaired to Paris. Here he attached himself closely to that philosopher, and during his stay in the metropolis, he presented several memoirs to the Academy of Sciences, and in 1721 he was admitted into it as an adjunct to the mechanical class. Two years afterwards he obtained the professorship of the College-royal, and in 1729 rose to the rank of associate in the Academy of Sciences. He had already published a work, entitled "Mathematical Lessons, &c.," in which the principles of algebra and arithmetical calculations are methodically laid down, and the theorems explained and demonstrated. After this, which was well received, he published four volumes of "Lectures on Natural Philosophy, containing the Elements of Physics determined solely by the Laws of Mechanics, &c." This was said to be a very whimsical performance, in which he endeavoured to unite the system of Descartes with the principles of Newton, and he attempted to rectify the ideas of the French, by the experiments of the English philosopher. In 1741 he published the first part of his "Elements of Geometry," intended as an introduction to his physical lectures. He was a very irritable man, which led him frequently into passions, of which one was the cause of his death in 1742. In other respects he was reckoned a very amiable character, but was apt to be so absent, or absorbed in his studies, as to appear almost wholly insensible to surrounding objects. His infirmity in this respect became known, and he was accordingly made the subject of depredations. A shoe-black, once finding him profoundly absorbed in a reverie, contrived to steal the silver buckles from his shoes, replacing them with iron ones. At another time, while at his studies, a villain broke into the room in which he was sitting, and demanded his money; Molieres, without rising from his studies, or giving any alarm, coolly shewed him where it was, requesting him, as a great favour, that he would not derange his papers. Moreri.

Molieres, in *Geography*, a town of France, in the department of the Lot, and chief place of a canton, in the district of Montauban; 10 miles N. of it. The place contains 2493, and the canton 6870 inhabitants, on a territory of $132\frac{1}{2}$ kiliometres, in seven communes.

MOLIETTA, a town of Naples, in Bari; eight miles E.S.E. of Trani.

MOLILLA, a town of Hindoostan, in Bednore; 10 miles E. of Bednore.

MOLIN, a town of Persia, in Khorasan; 16 miles N.W. of Zeuzan.

MOLINA, in *Biography*. See Molinists.

Molina, in *Geography*, a small town of Spain, in the province of Murcia, pleasantly situated on the borders of a valley, which is watered by the Sagara. It is surrounded by considerable plantations of all kinds of trees, and fertile rich gardens, embellished with oranges, lemons, olives, pomegranates, and palms. The streets are large, straight, airy, and pleasant: the number of inhabitants is about 3000. The parish church is a handsome structure, but deformed by bad paintings; eight miles N. of Murcia.

Molina, a town of Spain, and capital of a lordship in New Castile, situated on a river of the same name, which runs into the Tagus, 15 miles S.W. of it; 100 miles N.E. of Madrid. N. lat. 41° 8′. W. long. 2° 1′.

Molina, in *Botany*, Lamarck Dict. v. 4. 227. Cavan. Monadelph. 435. t. 263, so called by the writer last mentioned, in honour of John Ignatius Molina, author of a natural and civil history of Chili, from which Jussieu has adopted several genera, with most uncouth names. See Gærtnera.

MOLINÆA, so denominated by Commerson, according to Jussieu, in memory of Johannes Molinæus (Jean des Moulins,) to whose assistance Dalechamp had recourse in the composition of his laborious work, after John Bauhin had been driven away from Lyons by the bigotry of the Papists; his learning and excellent character having made him too conspicuous there for a Protestant, like his father at Paris.

(See

(See BAUHIN.) Commerfon, it feems, intended at the fame time to commemorate his friend Defmoulins, author of an arrangement of the plants about Clugni, publifhed in Durande's Flore de Bourgogne.—Juff. 248. Willd. Sp. Pl. v. 2. 329. Lamarck Illuftr. t. 305. (Trigonis; Jacq. Amer. 102? Juff. 248?)—Clafs and order, *Octandria Monogynia*. Nat. Ord. *Tribilatæ*, Linn. *Sapindi*, Juff. See CUPANIA, to which *Molinæa* and *Trigonis* are there referred by our excellent predeceffor, the Rev. Mr. Wood, on the authority of Mr. Dryander, or rather of Lamarck. From an examination of Commerfon's fpecimens, we have no doubt of the propriety of this meafure. We find an evident ftyle in *Molinæa*, though perhaps it may not be protruded till after impregnation; but this removes one of Willdenow's objections. As to the *arillus*, or tunic of the feed, Lamarck's plate, fig. *i*, feems to indicate one, though not perhaps fo remarkable as that in Plumier's Nov. Gen. t. 19. *Cupania*, being the oldeft name and unexceptionable, is neceffarily preferred to the above.

MOLINE', in *Heraldry*. A crofs moliné is that which turns round both ways at all extremities, though not fo wide or fharp as that faid to be anchored.

MOLINET, CLAUDE DU, in *Biography*, a learned French ecclefiaftic and antiquary in the feventeenth century, was born at Chalons, in Champagne, in the year 1620. Having been inftructed in the rudiments of learning at his native place, he was fent to Paris to go through his courfe of philofophy. Here he entered among the canons-regular of St. Genevieve of the order of St. Auguftine, and afterwards became attorney-general of that congregation. He might have been raifed to higher dignities, but his love of ftudy and retirement induced him to decline them. Medals and antiquities of various kinds were his favourite fubjects of purfuit, and having been attached to them from almoft his earlieft years, he had collected a confiderable cabinet, which he annexed to the library of St. Genevieve, together with other rarities and curiofities. He was employed by Lewis XIV. to arrange his cabinet of medals, and augment their numbers, as well as to purchafe agates and other precious ftones, of which father Molinet was reckoned an excellent judge. He added more than 800 medals to the royal collection, and was amply and nobly remunerated by his fovereign's liberality, of which the library at St. Genevieve fupplied abundant evidence; for the improvement of that inftitution was the prime object to which all the fruits of his labours were devoted. He died in 1687, at the age of fixty-feven. He is known as an author by learned notes to an edition of the letters of Stephen, bifhop of Tournay; "Hiftoria Summorum Pontificum a Martino V. ad Innocentium XI. per eorum Numifmata;" "The Cabinet of the Library of St. Genevieve;" "Reflections on the Origin of Secular Canons, and on the Antiquity of Canons-Regular;" and other works which difplay much learning, and will afford gratification to antiquarians. Moreri.

MOLINEUX's HARBOUR, in *Geography*, a bay on the S.E. coaft of Tavai-Poenammoo, the fouthern ifland of New Zealand. S. lat. 46° 24'. W. long. 189° 50'.

MOLINISTS, in *Ecclefiaftical Hiftory*, a fect in the Romifh church who followed the doctrine and fentiments of the Jefuit Molina, relating to fufficient and efficacious grace. Lewis Molina, after whofe name this fect was called, was a Spanifh Jefuit, and profeffor of divinity in the univerfity of Ebora, in Portugal. In the year 1588, he publifhed a book, to fhew that the operations of divine grace were entirely confiftent with the freedom of human will; and he introduced a new kind of hypothefis to remove the difficulties attending the doctrines of predeftination and liberty, and to reconcile the jarring opinions of Auguftinians, Thomifts, Semi-Pelagians, and other contentious divines. Molina affirmed, that the decree of predeftination to eternal glory was founded upon a previous knowledge and confideration of the merits of the elect; that the grace from whofe operation thefe merits are derived, is not efficacious by its own intrinfic power only, but alfo by the confent of our own will, and becaufe it is adminiftered in thofe circumftances, in which the Deity, by that branch of his knowledge, which is called *fcientia media*, forefees that it will be efficacious. The kind of prefcience, denominated in the fchools *fcientia media*, is that foreknowledge of future contingents, that arifes from an acquaintance with the nature and faculties of rational beings, of the circumftances in which they fhall be placed, of the objects that fhall be prefented to them, and of the influence which thefe circumftances and objects muft have on their actions.

The great antagonifts of the Molinifts were the Janfenifts.

MOLINO, in *Geography*, a town of Naples, in Abruzzo Ultra; 13 miles S.S.E. of Aquila.

MOLINOS, in *Biography*. See QUIETISTS.

MOLINOSISTS, in *Ecclefiaftical Hiftory*, a fect among the Romanifts, who adhere to the doctrines of Molinos. Thefe are the fame with what are otherwife called Quietifts.

MOLISE, in *Geography*, a city of Naples, which, though not the capital, gives name to the county or diftrict to which it belongs; 48 miles N.N.E. from Naples. N. lat. 41° 39'. E. long. 14° 25'.

MOLISE, *County of*, a province of Naples, having N. Abruzzo Citra, E. Capitanata, S. Lavora, and W. thofe which were denominated the ftates of the church. Of all the provinces of Naples, this is the fmalleft, being about 30 miles long, and 24 wide. It is fertile in corn, wine, and faffron, and affords plenty of game and filk. The capital is Campo-baffo.

MOLIVO, a fea-port town on the N.W. coaft of the ifland of Metelin, or Mitylene, built on rocks of bafaltes, precifely on the fpot formerly occupied by Methymna: it is commanded by a caftle almoft in ruins: its population may be eftimated at 2 or 3000 inhabitants, as well Turks as Greeks; its territory is formed of a plain of moderate extent, very fertile, and furrounded by volcanic mountains: its productions confift principally of oil, corn, and barley; it furnifhes a little wine and various fruits; and alfo cotton and feveral kitchen-garden plants; 20 miles N.N.W. of Caftro.

MOLL, a town of France, in the department of the Two Nethes, and chief place of a canton, in the diftrict of Turnhoul; 10 miles from Harenthals. The place contains 3694, and the canton 15,679 inhabitants, on a territory of 265 kiliometres, in five communes.

MOLLARU, a town of Hindooftan, in the circar of Rajamundry; 45 miles N.E. of Rajamundry.

MOLLE, in *Botany*, Cluf. Exot. 322. Tourn. Inft. 661, a barbarous name, of Peruvian origin. See SCHINUS.

MOLLE, in *Geography*, a town of Norway, in the province of Drontheim. N. lat. 62° 48'. E. long. 7° 36'.

MOLLE, in *Ichthyology*, the name of a fmall fpecies of whiting, common in the Mediterranean, and in the markets of Rome, Venice, &c. and called by authors the *afellus omnium minimus*, and the *merlangus*. It is a fpecies of *Gadus*; which fee.

MOLLE, Ital., *Mol*, Fr., *Mollis*, Lat. In the primitive fcale of Guido, the found B, when flat in the hexachord of F, was called B *molle*, fweet, foft, compared with B in the hexachord

hexachord of G, when it was called B-*durum*, harſh, and B-*quadro*, ſquare, from the form of the ♮, which was made like a Gothic B, or rather ♮ for half; a character ſtill retained by the Germans for B natural. In ſolmiſation, B-*durum* implies more than B ♮, and B *molle*, B ♭.

MOLLER, Henry, in *Biography*, a learned German Lutheran divine in the ſixteenth century, was born at Hamburgh in the year 1530. He officiated ſome time as paſtor to a church in the landgraviate of Heſſe with great reputation, and was honoured with the degree of doctor of divinity. He was much celebrated for his ſkill in biblical literature, and he particularly excelled in the knowledge of the Hebrew and Chaldee languages. During fourteen years he filled the chair of profeſſor of the Greek and the Oriental languages in the univerſity of Wirtemberg, of which he was probably deprived for refuſing ſubmiſſion to the famous "Form of Concord." He died at Hamburgh in 1589, in the ſixtieth year of his age. He was author of "Commentaries" on the book of Pſalms, and the prophecy of Iſaiah. He was likewiſe known as a poet. Moreri.

MOLLERUSA, in *Geography*, a town of Spain, in Catalonia; 10 miles E.N.E. of Lerida.

MOLLIDON, a town of Hindooſtan, on the Dooab; 18 miles N.N.W. of Etaya.

MOLLIENS-Vidame, a town of France, in the department of the Somme, and chief place of a canton, in the diſtrict of Amiens. The place contains 836, and the canton 12,456 inhabitants, on a territory of 232½ kiliometres, in 29 communes.

MOLLINARI, Simone, in *Biography*, was maeſtro di capella del Duomo at Genoa, and publiſhed, in 1605, "Concerti Eccleſiaſtici," as they are called; but theſe, which are in Dr. Aldrich's Collection of Muſic in Chriſt-church, Oxon, were only maſſes and motets, accompanied by inſtruments, which, about this time, became very common in Italy.

MOLLIS Portio. See Portio.

MOLLITIES Ossium. This curious and extraordinary diſeaſe may be defined to be a morbid ſoftneſs and flexibility of the bones, ariſing from a deficiency of the phoſphat of lime in their ſtructure. Whether their firmneſs and ſtability are loſt, in conſequence of this matter being too abundantly abſorbed, or of its not being duly and ſufficiently ſecreted, is a queſtion which we cannot undertake to reſolve. Some writers treat of the mollities oſſium with rickets; but although it is true, that, in both theſe diſeaſes, the bones loſe their natural ſolidity and proper ſhape, it appears to us that the two affections deſerve a marked diſtinction, inaſmuch as rachitis is an affection peculiar to childhood, and the bones only change their ſhape gradually; whereas the mollities oſſium has frequently been obſerved to afflict adults, and occaſion ſuch a ſoftneſs of the bones, that, in the extreme ſtage of the diſeaſe, they may be at once bent in any direction whatſoever.

The following caſe, drawn up by Mr. Gooch, will ſerve to impreſs the reader with an idea of the diſorder: "Mary Hayes, of Stoke-Holy-Croſs, near Norwich, in Norfolk, was born January 11, 1718, had never been married, and always lived a regular, temperate life. Her father was unhealthy, but it is not known to what diſeaſe he was ſubject; her mother was healthy, and ſhe herſelf was always looked upon as a ſtrong healthy girl, till about fifteen years of age, when ſhe fell into the green ſickneſs, and took various medicines to no purpoſe. She had no other complaints till October, 1748, when ſhe was ſeized with pains, univerſally attended with feveriſh ſymptoms; and thus ſhe continued ſome weeks, after which the pain was chiefly confined to her legs and thighs, but not increaſed by external preſſure.

"She broke her leg in June, 1749, as ſhe was walking from her bed to her chair, without falling down, and heard the bones ſnap. The fracture was properly treated by one of the ableſt ſurgeons, and due regard had to her indiſpoſition. No callus was generated; but in a few months the bones grew flexible, from the knee to the ankle. Thoſe of the other leg and thigh were viſibly affected ſoon afterwards, in the like manner; and both legs and thighs then became œdematous, and ſubject to be excoriated, diſcharging a thin yellow ichor. About this time," ſays Mr. Gooch, "I firſt ſaw her with the ſurgeon who had the care of her.

"The winter after breaking her leg ſhe had ſymptoms of the ſcurvy, and bled much at the gums.

"Many eminent phyſicians preſcribed for her, but without any effect, unleſs the regularity of her menſtruation, for the laſt eighteen months, be aſcribed to chalybeate medicines, which were part of their preſcriptions; though the ſame kind of medicines were formerly preſcribed, and long continued, without having that effect, even when ſhe was in a condition to take exerciſe.

"About a year before her death ſhe was removed to the pariſh ſhe belonged to, where I had an opportunity of viſiting her often, and obſerving the progreſs of her diſeaſe. She told me ſhe had found but little alteration of her complaints in general, for ſome time paſt, and thought her appetite and digeſtion rather mended. She breathed with difficulty, and her thorax appeared ſo much ſtraightened, as neceſſarily impeded the expanſion of the lungs. Her ſpine was much diſtorted, and any motion of the vertebræ of the loins excited extreme pain. Her legs and thighs being quite uſeleſs, ſhe was confined to her bed in a ſitting poſture. The bones ſhe reſted upon, having loſt their ſolidity, were much ſpread, and the ends of her fingers and thumbs, by frequent efforts to raiſe herſelf, were become very broad, with a curvature of their phalanges. *She now meaſured but four feet, though before this diſeaſe ſhe was five feet and a half high, and well ſhaped.*

"From this time," ſays Mr. Gooch, "I obſerved the flexibility of her bones became gradually more general, and the difficulty of breathing increaſed, with a waſting of her fleſh. For the laſt four months of her life ſhe had a total ſuppreſſion of the menſtrual diſcharge, and a great tendency in her legs to mortify, which had long been anaſarcous, and excoriated almoſt all over. She retained her ſenſes perfectly to the laſt, and but a few minutes before ſhe died, talked concerning her miſerable condition and approaching end, in a very rational and compoſed manner, with her nurſe, who perceived no ſigns of the change which was juſt at hand; then reclined her head, and expired inſtantly without a groan.

"Two days after her death, which happened on Feb. 6, 1753, her limbs being firſt well ſtretched out, ſhe was meaſured, *and found wanting, in her natural ſtature, two feet and two inches!* I opened the abdomen and thorax, removing the ſternum entirely, with ſome portion of the ribs, in order to gain at once a full view of thoſe cavities, and to obſerve how the viſcera contained in them had obſtructed each other in their reſpective functions, as well as to inſpect the ſtate of them. The heart and lungs were ſound, but flaccid, and much confined in their motion, to which the enormous ſize of the liver contributed in ſome meaſure, extending quite acroſs the abdomen, and bearing hard againſt the diaphragm, &c. The lungs did not adhere to the pleura, nor was the liver ſcirrhous; it was faulty only in its bulk. The meſentery was ſound, except one large ſcirrhous gland in it. The ſpleen was extremely ſmall. Nothing elſe was found obſervable in theſe cavities.

"All

"All her bones, except her teeth, were more or less affected, and scarcely any would resist the knife. Those of the head, thorax, spine, and pelvis, were nearly of the same degree of softness. Those of the lower extremities were much more dissolved than those of the upper, or of any other part. They were changed into a *parenchymous* substance, like soft dark-coloured liver, without the least offensive smell. I cut through the whole length, without turning the edge of the knife, and found less resistance than firm muscular flesh would have made, meeting only here and there with bony laminæ, as thin as any egg-shell.

"Those bones were most dissolved, which, in their natural state, are most compact, and contain most marrow in their cavities, &c."

Mr. Gooch further acquaints us, that the periosteum was rather thicker than ordinary; the cartilages thinner, but no where in a state of dissolution like the bones. He shewed specimens of the dissolved bones to sir John Pringle, in London, and then sent them to Dr. Hunter, who occasionally exhibited them in his anatomical lectures.

Mr. Gooch also sent some of the same substance to an ingenious chemist, desiring him to analyse it; the latter "could discover neither acid nor alkali prevailing in it; but that it contained near seven-eighths of an oleaginous substance, with a small portion of earth."

July 1753, Mr. Gooch saw a similar case to this in a woman, aged twenty-five, in the workhouse at Norwich, under the care of Mr. Swift, an ingenious man, and a very able surgeon. In this example, the ribs, having become exceedingly soft, "fell (to use Mr. Gooch's words) with the sternum flat upon the lungs," and obstructed respiration to such a degree, that when this gentleman saw her, she lay panting for life. In the other case, of which the narrative is given above, the ribs and sternum turned outwards, and the respiration was not quite so much obstructed.

Cases of the mollities ossium are recorded in the Philosophical Transactions; Mém. de l'Acad. Royale des Sciences; Act. Hafniens; German. Ephem. Forestus and Saviard have also detailed cases of the same disease; and a most remarkable example was published by Morand, at Paris, in 1752.

The causes of this singular disorder have hitherto baffled investigation. In the famous case of Madame Supiot, the patient had been in the habit of eating an extraordinary quantity of salt, and this circumstance was immediately suspected as the cause of the disease; yet, in other cases, the immoderate use of salt could not fall into suspicion, and Madame Supiot herself certainly continued to grow worse and worse, long after she had relinquished the custom of taking so much salt with her victuals. We are, therefore, justified in concluding that the eating of this substance had nothing to do with the production of the disease. Were salt capable of having this effect, sailors and others, who live so much on salted provisions, ought frequently to be afflicted with mollities ossium; yet this does not appear to be the fact.

With regard to the treatment, it does not appear that any successful method has been discovered. The deficiency of the phosphat of lime in the structure of the affected bones, has led to the suggestion of exhibiting this substance as a medicine. This may easily be done; but how to make the secerning arteries deposit it in the bones is a more baffling consideration. We know of no cases, in short, exemplifying the efficacy of this plan, though it is both rational and free from danger.

Madder, from its known property of tinging the bones red, has been supposed to have a particular action on the osseous system; but, says Boyer, it is now well ascertained, that it has no greater effect in rickets (which is a disease at all events analogous to mollities) than any other bitter plant. Malad. des Os, tom. ii.

MOLLUGO, in *Botany*, a name in Pliny, book xxvi. chap. 10, which he indicates as belonging to a plant rough both in foliage and flavour. Linnæus retains it for a genus of a smooth and tender habit, to which, if derived from *mollis*, it would be most suitable.—Linn. Gen. 42. Schreb. 58. Willd. Sp. Pl. v. 1. 491. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 1. 184. Juss. 300. Lamarck Illustr. t. 52. Michaux Boreali-Amer. v. 1. 77. Gærtn. t. 130.—Class and order, *Triandria Trigynia*. Nat. Ord. *Caryophylleæ*, Linn. Juss.

Gen. Ch. *Cal.* Perianth inferior, of five oblong, slightly spreading, permanent leaves, internally coloured. *Cor.* none. *Stam.* Filaments three, bristle-shaped, shorter than the calyx, approaching the pistil; anthers vertical, oblong, cloven at the base. *Pist.* Germen superior, ovate, with three furrows; styles three, very short; stigmas obtuse. *Peric.* Capsule ovate, corrugated, of three membranous pellucid valves, and three cells; the partitions from the middle of each valve. *Seeds* numerous, roundish-kidney-shaped, polished.

Eff. Ch. Calyx of five leaves. Corolla none. Capsule of three cells and three valves. Seeds numerous.

1. M. *oppositifolia*. Opposite-leaved Mollugo. Linn. Sp. Pl. 131. (M. n. 52; Linn. Zeyl. 21. Jeonpala; Herm. Zeyl. 4. Alsine spergulæ facie Bengalensis, foliis angustis ad genicula binis, flosculis autem plurimis ad caulem radiatis, semine minutissimo fulvo; Pluk. Phyt. t. 75. f. 6.)—Leaves opposite, lanceolate. Branches alternate. Flower-stalks lateral, several together, single-flowered. Native of Ceylon. Linnæus describes it as "an annual *herb*, with long, diffuse, smooth, alternate *branches*. *Leaves* opposite, lanceolate, smooth, running down into *footstalks*. *Flower-stalks* several, axillary, equal, capillary, single-flowered. *Calyx* of five leaves."—Plukenet's figure, quoted at the suggestion of Burmann, answers pretty well to this description; and though it has the aspect of an *Hedyotis*, the inferior calyx, proper to *Mollugo*, is sufficiently indicated. According to Hermann this herb is eaten in sallads by the vulgar.

2. M. *stricta*. Close-leaved Mollugo. Linn. Sp. Pl. 131. Burm. Ind. 31. t. 5. f. 3. (Alsine multifolia floribunda glabra, ex sinu Bengalensi, foliis subrotundis, flore majore; Pluk. Almagest. 21. t. 257. f. 2.)—Leaves about four together, lanceolate. Flowers in panicled clusters, drooping. Stem erect, angular.—Native of Java and Bengal. *Root* fibrous, annual. *Stems* several, from two to twelve inches high, erect, slender, angular, smooth, bent at the lower joints, leafy. *Leaves* three, four, or more, at each joint, lanceolate, entire, smooth, of a pale glaucous green, tapering at the base into a sort of footstalk; in starved plants broader and shorter. *Stipulas* in pairs, small, membranous, roundish. *Flowers* very small, whitish, in long, slender, almost capillary, smooth clusters, collected into slight panicles; the partial stalks bent downward. *Capsule* roundish, very thin and membranous. *Seeds* almost black.

3. M. *hirta*. Hairy Mollugo. Thunb. Prodr. 24.—Decumbent. Leaves four together, obovate, hairy. Native of the Cape of Good Hope. Annual. Of this we have no further knowledge.

4. M. *pentaphylla*. Five-leaved Mollugo. Linn. Sp. Pl. 131. (Alsine ramosa procumbens quadrifolia, ad radicem polyphylla; Burm. Zeyl. 13. t. 8. f. 1.)—Leaves obovate; those of the stem four or five at a joint. Panicles cymose, somewhat racemose.—Native of various parts of the East Indies. This differs from *M. stricta* in having numerous

 stems

ſtems ſpreading circularly, nearly proſtrate, and obovate *leaves*. The *flowers* are twice as large, with a tawny hue, at leaſt when dried, and compoſe more denſe, level-topped, forked or cymoſe *panicles*, whoſe branches are ſcarcely racemoſe, and by no means elongated.

5. M. *nudicaulis*. Naked-leaved Mollugo. (Alſine foliis ad radicem poſitis; Burm. Zeyl. 14. t. 8. f. 2.)—Leaves obovate, all radical. Stems panicled, forked, naked. Flowers four-cleft. Native of Ceylon; *Burmann;* of Sierra Leone; *Afzelius*. Linnæus confounded this with the laſt, not perceiving that Burmann had figured two very different plants in his *tab*. 8, without numbering them; and he cites t. 8. f. 1, 2. This by an error of the preſs is become 12, which Willdenow copies. Burmann refers to a wrong ſynonym in Sloane, but he deſcribes the preſent ſpecies very well, as having all the *leaves* at the root, with very long, radical, *flower-ſtalks*, and four-cleft *flowers*, all which circumſtances diſtinguiſh it from the laſt.

6. M. *Spergula*. Spurrey Mollugo. Linn. Sp. Pl. 131. Burm. Ind. 31, t. 5. f. 4 (Pharnaceum Mollugo; Linn. Mant. 561. Willd. Sp. Pl. v. 1. 1508; but not Linn. Sp. Pl. 389, which is well figured in Herm. Lugd.-Bat. t. 21, and from which it appears, by his Mant. 562, Linnæus meant to diſtinguiſh the preſent ſpecies, intending probably to have called it *P. Spergula*, *P. Mollugo* being an error of the pen in p. 561.)—Leaves obovate, rough-edged, four or five together. Branches alternate, hairy at one ſide. Stalks axillary, ſingle-flowered.—Native of the Eaſt Indies. *Stems* procumbent, alternately branched, leafy, round, ſmooth, except a hairy lateral line. *Leaves* four or five at each joint, obovate, ſpreading, from two lines to half an inch long, rough or toothed at the edge; on ſhort, often woolly, *foot-ſtalks*. *Flower-ſtalks* axillary, ſolitary to each leaf, ſimple, ſingle-flowered, the length of the leaf. Linnæus deſcribes minute, linear, cloven *petals*, and five barren filaments, alternate with the five fertile ones, all which is hoſtile to the character of *Mollugo;* and removes this ſpecies to *Pharnaceum* at leaſt, if not elſewhere. We merely deſcribe it here to correct the above errors, and as being what he really meant for *M. Spergula*.

7. M. *verticillata*. Whorled Mollugo. Linn. Sp. Pl. 131. Willd. n. 5. (M. Spergula; Linn. Syſt. Nat. ed. 10. v. 2. 881. Alſine ſpergula mariana, latiori folio, floribus ad nodos, pediculis curtis circa caulem inſidentibus, calyculis elegantèr punctatis; Pluk. Mant. 9. t. 332. f. 4. A. erecta pentaphylla, flore albo; Burm. Zeyl. 13. t. 7. A. procumbens, gallii facie; Ehret. Pict. t. 6. f. 3.)—Leaves whorled, ſpatulate, unequal. Branches alternate, ſmooth. Flower-ſtalks ſhorter than the leaves, ſingle-flowered.—Native of Virginia. Cultivated in the Engliſh gardens in 1748, when Ehret delineated it. This ſpecies is a hardy annual, flowering from June to Auguſt. The *ſtems* are proſtrate, ſmooth, much branched, and widely ſpreading. *Leaves* obovate, acute, entire, ſmooth, tapering into a footſtalk; their length from half to one and a half inch. *Flower-ſtalks* ſeveral together, lateral, not axillary, capillary, deflexed, much ſhorter than the leaves. *Seeds* very prominent through the capſule, marked with dorſal furrows.

The botanical hiſtory of this genus is ſo confuſed, that though we have cleared it up in ſome degree, with the neceſſary aſſiſtance of the Linnæan herbarium, we are by no means certain that nothing more remains to be done. The ſpecies require to be confronted throughout with thoſe of *Pharnaceum*, a genus ſcarcely differing but in number of ſtamens, the moſt trivial of all poſſible characters in this tribe. See PHARNACEUM. S.

MOLLUSCA, in *Natural Hiſtory*, the name of the ſecond order of the Linnæan claſs of Vermes; and it includes animals that are naked; and furniſhed with tentacula or arms: for the moſt part they are inhabitants of the ſea; and by their phoſphoreſcent quality illuminate the dark abyſs of the waters. (See LUMINOUS *Animals*.) This order, which compriſes ſimple animals furniſhed with limbs, is ſeparated into diſtinct diviſions, claſſed according to the ſituation of the mouth, and the ſtructure of the body; thus:

In diviſion A the mouth is placed *above;* this diviſion includes the following genera:

Actinia,	Mammaria,
Aſcidia,	Pedicellaria,
Clava,	Salpa.
Dagyſia,	

In diviſion B the mouth is placed *before;* and in this are the

Derris and Pterotrachea.

In diviſion C the mouth is placed *before;* and the body has a lateral perforation. In this there are four genera, *viz*. the

Doris,	Limax,
Laplyſia,	Tethys.

In diviſion D the mouth is *before;* but the body is ſurrounded with feelers on the fore-part. There are two genera only, *viz*.

Itolothuria Terebella.

In diviſion E the mouth is *before;* and the body furniſhed with arms. Of theſe there are ſeven genera, *viz*.

Clio,	Scyllæa,
Lernæa,	Sepia,
Lobaria,	Triton.
Onchidium,	

In diviſion F the mouth is *before;* and the body furniſhed with peduncles or feet. In this there are the following five genera:

Amphitrite,	Nereis,
Aphrodite,	Spio.
Nais,	

In the laſt diviſion G, the mouth is placed *beneath;* and generally central. There are five genera in this, *viz*.

Aſterias,	Meduſa,
Echinus,	Phyſſophora.
Lucernaria,	

See VERMES.

MOLLUSCUM, in *Medicine*, an appellation applied by Dr. Willan to a ſingular cutaneous diſeaſe, of which there are not many caſes recorded. It conſiſts of numerous ſoft tubercles, containing an atheromatous matter, which are of various ſizes, from that of a vetch to that of a pigeon's egg, and of different forms, ſome being ſeſſile, and ſome attached by a neck. It is not uncommon to meet with one or two of theſe molluſca; but the ſingularity above alluded to is, that they ſometimes grow all over the ſurface of the body, and that without any diſorder of the general habit. They have no tendency to ulceration or ſuppuration, but continue permanent through life, having apparently no natural termination. The knife or ligature might be employed for the removal of thoſe which are attached by a peduncle; but the great number of theſe, independently of thoſe which are ſeſſile, deters from the attempt.

MOLMAN, in our *Old Writers*, a man ſubject to do ſervice. It is applied to the ſervants in a monaſtery.

MOLMA-

MOLMASECA, in *Geography*, a town of Spain, in the province of Leon; 20 miles W. of Aftorga.

MOLMUTIN, or MOLMUTIAN *laws*, the laws of Dunwallo Molmutius XVI. king of the Britons, who is faid to have begun his reign four hundred and forty years before the incarnation.

He was the firft who publifhed any laws in this land; and they continued famous therein till the time of William the Conqueror.

MOLNPATTY, in *Geography*, a town of the ifland of Ceylon; 18 miles N.W. of Trincomalee.

MOLOCH, in *Mythology*, the chief and peculiar deity of the Ammonites, who are faid, by Voffius and others, to have worfhipped the fun under this appellation, and to have facrificed their children to him. In the fcripture it is frequently afferted that the "Ammonites paffed their feed through fire unto Moloch." As to the meaning of this expreffion there is a confiderable difagreement among ancient and modern authors. The Jewifh writers very generally maintain, that the children were merely carried or led between two fires, by way of purification; whereas the Chriftian writers have been of opinion, that they actually burnt their children by way of facrifice to this grim idol. Near Jerufalem there was a place in which this horrid cuftom was obferved; it was called the valley of the fons of Hinnom, fo named, as it is faid, from the fhrieks of the children that were facrificed; and alfo Topheth, from a Hebrew word "toph," fignifying a drum or tabret, which they ufed, among other inftruments, to drown the dreadful outcries of the unhappy victims. The Canaanites in general were, in the days of Mofes, become incorrigible idolaters, and they are accufed of offering human facrifices to Moloch. See the paffage above cited from Levit. xviii. 21. From them this deteftable worfhip was tranfmitted to their defcendants the Phœnicians; and as the Carthaginians were a colony that came from Phœnicia, the firft gods of Carthage were the fame as thofe who were adored at Tyre and Sidon. The latter people are known to have worfhipped Saturn, and Saturn was the fame with Moloch, to whom they facrificed their children. Moloch was reprefented among the Ammonites under the monftrous figure of a man and a calf. About the feet of the ftatue were conftructed feveral furnaces, into which they threw the children whom they offered up to that god, and their cries were drowned, as we have already obferved, by drums and other mufical inftruments. Who this Moloch was, has been a fubject of various conjectures. Some fay that he was the fame as Priapus; others affert that he was the fun; but the moft common opinion has been, that he was the fame with Saturn; and as Saturn is thought to have been Abraham, it has been concluded that the worfhip of Moloch was formed upon the imperfect accounts which the pagans had collected concerning that ancient patriarch; and that all the circumftances of the facrifices offered to Moloch were expreffive of Abraham's adventures.

MOLOCHATH, in *Ancient Geography*. See MULUCHA.

MOLOCHI, in *Geography*, a town of Naples, in Calabria Ultra; three miles N.E. of Oppido.

MOLOCHITES, in *Natural Hiftory*. See MALACHITES.

MOLODIVE, in *Geography*, a town of the ifland of Ceylon, on a tongue of land feparated by a narrow channel from the E. coaft; 46 miles N. of Trincomalee.

MOLOGA, a town of Ruffia, in the government of Jaroflavl, at the union of the river Mologa with the Volga; 60 miles N.W. of Jaroflavl. N. lat. 58°. E. long. 38° 32'.

MOLOPS, a word ufed by fome medical writers to exprefs the purple fpots which appear upon the fkin in malignant fevers.

MOLOS, in *Geography*, a town of Arabia, in the province of Yemen; 16 miles N.N.E. of Jerim.

MOLOSSES, MOLASSES, or *Melaffes*, that grofs, yet fluid matter remaining of fugar, after refining, and which no boiling will bring to a confiftence more folid than that of fyrup; hence alfo called *fyrup of fugar*.

In the manufacture of fugar in the Weft Indies, the moloffes, not improperly called the treacle of fugar, is obtained by the following procefs. The curing-houfe, which is a large airy building, is provided with a capacious moloffes ciftern, the fides of which are floped and lined with tarras or boards. Over this ciftern there is a frame of maffy joift work without boarding. On the joifts of this frame empty hogfheads without headings are ranged. In the bottoms of thefe hogfheads eight or ten holes are bored, through each of which the ftalk of a plantain leaf is thruft, fix or eight inches below the joifts, and which is long enough to ftand upright above the top of the hogfhead. Into thefe hogfheads, the mafs from the cooler is put, which is called *potting*; and the moloffes drains through the fpongy ftalk and drops into the ciftern, from which it is occafionally taken for diftillation. For other particulars, fee the article SUGAR; and particularly the method of *claying* fugar.

The term *molaffes* has been ufed to denote the fediment of one kind of fugar called *chypre*, or brown fugar, which is the refufe of other fugars not to be whitened, or reduced into loaves. (See SUGAR.) Moloffes have been much ufed in Holland among poor people, for the preparation of tobacco, and alfo inftead of fugar.

MOLOSSES, *Artificial*. There has been found a method of making moloffes from apples, without the addition of fugar. The apple that fucceeds beft in this operation is the fummer-fweeting of a middle fize, pleafant to the tafte, and fo full of juice, that feven bufhels will yield a barrel of cyder. The manner of making it is this: the apples are to be ground and preffed, then the juice is to be boiled in a large copper till three quarters of it be evaporated: this will be done with a moderate fire in about fix hours, with the quantity of juice above mentioned; by this time it will be of the confiftence and tafte as well as the colour of moloffes.

This new moloffes ferves to all the purpofes of the common kind, and is of great ufe in preferving cyder. Two quarts of it put into a barrel of racked cyder, will preferve it, and give it an agreeable colour.

The invention of this kind of moloffes was owing to Mr. Chandler, of Woodftock, in New England, who living at a diftance from the fea, and where the common moloffes was very dear and fcarce, provided this for the fupply of his own family, and foon made the practice general among the people of the neighbourhood. It is to be obferved, that this fort of apple, the fweeting, is of great ufe in making cyder, one of the very beft kinds we know being made of it. The people in New England alfo feed their hogs with the fallings of their orchards of thefe apples; and the confequence of this is, that their pork is the fineft in the world. Phil. Tranf Nº 374. p. 230.

MOLOSSES *Spirit*, a very clean and pure fpirit, much ufed in England, and made from moloffes or common treacle diffolved in water, and fermented in the fame manner as malt or the common malt-fpirit. If fome particular art is not ufed in the making of this, it will not prove fo vinous as the malt-fpirit, but more flat and lefs pungent and acid, though otherwife much cleaner tafted, as its effential oil is of a lefs naufeous flavour. Whence if good frefh wine leys, abounding in in tartar, be duly fermented in the solution made thin for that purpose, the spirit will by that means become much more vinous and brisk, and approach more to the nature of the foreign spirits.

After the first distilling of molosses spirits from the wash into low wines, it is to be rectified, and in the succeeding rectifications proper additions are to be made. Alkaline salts, so common in the rectifying of the malt-spirits, must be avoided in this case, as not at all suiting this spirit, and the neutral ones only must be used, such as sandiver, common decrepitated salt, sal enixum Paracelsi, and the like; but upon the whole nothing so considerable is to be expected from these salts, as from a careful rectification in balneo Mariæ, without any other admixture; by this alone repeated two or three times with fresh water each time, the spirit will at once be made fit for the nicest uses.

Where the molosses spirit is brought to the common proof-strength, if it be found not to have enough of the vinosity in it, it will be very proper to add to it some good spiritus nitri dulcis; and if the spirit be clean worked, it may by this addition alone be made to pass on ordinary judgments for French brandy.

When newly distilled, this spirit, like all others, is colourless, and limpid as water; but our distillers always give it the same sort of yellow tinge, which the foreign spirits are found to obtain from the casks in which they are sent over. They have many ways of giving this colour extempore; but the two most in use are, either by an extract of oak-wood, or by burnt sugar.

Molosses spirit being occasionally dearer than that of malt, it is frequently met with basely adulterated with a mixture of that spirit, and indeed seldom is to be bought without some dash of it. Many have a way of mixing malt in the fermenting liquor; by this the yield of the whole is greatly increased, and the maker may assure the buyer that the spirit is pure as it ran from the worm.

England is the principal place where this spirit is made at this time: it was at one time prepared in great quantities in France, especially on the river Loire; but it has been forbidden there under a severe penalty. In Holland also they have it not, on account of the high duty laid upon treacle in favour of their own sugar-bakers.

We meet with very little of molosses spirit reduced to the strength of alcohol or spirit of wine, though, when rectified to this state in a proper manner, it is very little inferior to the real alcohol of wine, the name of which is so well known among us, though the thing itself is perhaps never seen here. All that we call spirit of wine being no other than malt spirit reduced to an imperfect alcohol, or a spirit almost totally inflammable.

Great quantities of molosses spirit are used in the adulterating of brandy, rum, and arrack; and great quantities are used alone in the making of cherry-brandy and other drams by infusion, in all which many prefer it even to the foreign spirits.

In most of the nice cases in our compound distillery, the molosses spirit supplies the place of a pure and clean malt-spirit, which we have not yet the way of producing in the large way to advantage. Our cinnamon, citron, and other fine cordial waters, are made with it; for the malt spirit would give these a very disagreeable flavour.

There is also another use to which this spirit serves extremely well, and in which even a foreign spirit that has any remarkable flavour will not do so well; this is the making of the extemporaneous wine, which some people are so fond of. See *Extemporaneous* WINE.

It gives a yellow stain to the hands, or other substances dipped into it: and may therefore be of use in dyeing. It is possible also, that the vinegar-makers may find use for it in their way; but the most advantageous of all its uses is to the distiller himself, a quantity of it added to new treacle intended for fermentation will be of great use in the process, and increase very considerably the quantity of spirit; but the proportion in regard to the new matter must not be too great. Shaw's Essay on Distillery.

For the method of extracting spirits from molosses in the West Indies, see the article RUM.

MOLOSSIS, in *Ancient Geography*, an inland province of the ancient kingdom of Epirus; which, according to Scylax, was only 40 stadia, or furlongs, in compass. It derived its name from Molossus, the son of Pyrrhus and Andromache, and contained the following cities, *viz.* Dodona, (which see,) Passaron, Tecmon, Phylace, and Horreum. See EPIRUS.

MOLOSSUS, in the *Greek* and *Latin Poetry*, a foot consisting of three long syllables, as *audiri, contabant, virtutem.* It takes its name either from a dance in use among the people called Molossi, or Epirotæ; or from the temple of Jupiter Molossus, where odes were sung in which this foot had a great share; or else because the march of the Molossi, when they went to the combat, was composed of these feet, or had their cadence. The same foot was also called among the ancients, *Vertumnus, extensipes, hippius, & canius.* Dion. iii. p. 475.

MOLRAUZEPOLLAM, in *Geography*, a town of Hindoostan, in the Carnatic; 10 miles N.W. of Madras.

MÖLSEN, or *Hohen* MÖLSEN, a town of Saxony, in Thuringia; 28 miles N.E. of Weimar. N. lat. 51° 10′. E. long. 12° 5′.

MOLSHEIM, a town of France, in the department of the Lower Rhine, and chief place of a canton, in the district of Strasburg; 10 miles W.S.W. of Strasburg. The place contains 2534, and the canton 16,072 inhabitants, on a territory of $167\frac{1}{2}$ kiliometres, in 18 communes. N. lat. 48° 32′. E. long. 7° 34′.

MOLTA, or MOLTURA, a duty or toll paid by vassals to the lord for grinding their corn at his mill.

MOLTCHANA PIATSKIA, in *Geography*, a town of Russia, in the government of Tobolsk, on the Oby; 80 miles S.S.E. of Narim.

MOLTCHANOVKA, a town of Russia, in the government of Tobolsk, on the Oby; 92 miles S.S.E. of Narim.

MOLTEN GREASE, in the *Manege*. See GREASE.

MOLTER, in *Rural Economy*, the toll taken at a mill. See MOULTER.

MOLTIFAO, in *Geography*, a town of Corsica; 15 miles N. of Corte.

MOLTING, or MOULTING, the falling off or change of hair, feathers, skins, horns, or other parts of animals, happening in some annually, in others only at certain stages of their life. See MOULTING.

The generality of beasts molt in the spring.

The molting of a hawk is called *mewing.*

The molting of a deer is the quitting of his horns in February or March.

The molting of a serpent is putting off his skin. See EXUVIÆ.

MOLTON, SOUTH, in *Geography*, an ancient market and borough town in the hundred of the same name, and county of Devon, England, is situated on an eminence near the western banks of the river Moule, at the distance of 29 miles from Exeter, and 182 from London. Previously to the Norman conquest

conquest it formed part of the royal demesnes. It then came into the possession of private persons; and in the reign of Richard II. reverted to the crown. It was afterwards purchased by the burgesses: and the civil government is now vested in a mayor, eighteen capital burgesses, a recorder, town clerk, and two serjeants at mace. The town was represented in parliament in the thirtieth year of Edward I.; but no return has been made since that period. It is also remarkable for having been constituted an episcopal see, by an act passed the twenty-sixth of Henry VIII.; but it does not appear that any bishop was ordained. The parish church is a spacious structure, and contains several monuments. The guildhall is a convenient fabric; and the market place is extensive and well built. The number of houses was, in the year 1801, returned to parliament as 572, occupied by 2753 persons: of these many derive employment from the manufacture of serges, shalloons, and felts; and in obtaining lime from the various kilns in the neighbourhood. Provision is made for the education of the children of the more respectable natives, by a well-regulated free-school, founded in 1614, and of those of an inferior class by a charity-school: in the former the late judge Buller acquired the rudiments of that extensive legal knowledge, by which he afterwards became so distinguished. The town has the privilege of six annual fairs, and a weekly market on Saturday.

South Molton was the birth-place of the late Rev. Samuel Badcock, who acquired considerable literary reputation by his critiques on the authenticity of Chatterton's poems, and on other publications. He died in 1788, aged 41.

Between the towns of South Molton and Chumleigh, the Roman station Termolus is supposed to have been situated. It has been conjectured to have been near the junction of the rivers Taw and Mole; but antiquaries have not been able to identify the precise spot. The vicinity affords many remnants of Roman antiquity. Beauties of England and Wales, vol. iv.

MOLUCCA Balm, in *Botany*. See Moluccella.

Molucca *Bean*. See Bean.

Molucca *Nuts*. See Guilandina and Bean.

Molucca *Islands*, in *Geography*, islands in the East Indian sea, first discovered by the Portuguese in the year 1510. Strictly speaking, this appellation comprehends only the five following islands, *viz*. Ternat, Tidore, Motir, Makian, and Bakian or Batchian; but since the kings of the Moluccas have possessed territory in Gilolo, and other adjacent isles, and as the term *Molucca* islands is considered as synonimous with that of *Spice* islands, the appellation has been extended. (See Spice *Islands*.) The Moluccas, properly so called, having been discovered by the Portuguese, afforded to the Spaniards an inducement to make their first circumnavigation under the conduct of Magellan, a Portuguese commander. These two nations for some time contested the right of possessing these islands, till at length they were surrendered to the Portuguese, and from them they were wrested in 1607 by the Dutch. The opulent commerce in these seas was also claimed by the English; and in 1619 a treaty was signed, which declared the Moluccas, as well as Amboyna and Banda, common to both, so that the English were to have ⅓d of the produce and the Dutch ⅔ds: whilst each of these powers contributed its respective proportion for defending the islands from invaders. But a most atrocious plot was soon framed and carried into execution by the Dutch for rendering themselves independent of all competitors. As each of the islands will be described under its proper appellation, we shall not enlarge here.

MOLUCCELLA, in *Botany*, called *Molucca* by Tournefort, because it was supposed to grow in the Molucca islands. The name, as Linnæus has altered it, may be tolerated, but it is none of his best.—Linn. Gen. 296. Schreb. 392. Willd. Sp. Pl. v. 3. 128. Mart. Mill. Dict. v. 3. Sm. Prod. Fl. Græc. v. 1. 415. Ait. Hort. Kew. ed. 2. v. 3. 410. Juss. 115. Lamarck Illustr. t. 510. Gærtn. t. 66. (Molucca; Tournef. t. 88.)—Class and order, *Didynamia Gymnospermia*. Nat. Ord. *Verticillatæ*, Linn. *Labiatæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, very large, turbinate, gradually terminating in a very wide, bell-shaped, toothed or spinous, incurved, permanent limb. *Cor.* of one petal, ringent, smaller than the calyx; tube and throat short; upper lip erect, concave, undivided; lower cloven into three segments, of which the middle one is most prominent and emarginate. *Stam.* Filaments four, under the upper lip, two of them shorter; anthers simple. *Pist.* Germen superior, four-cleft; style in size and situation like the stamens; stigma cloven. *Peric.* Capsule none. *Fruit* top-shaped, truncated, in the bottom of the open calyx. *Seeds* four, convex on one side, angulated on the other, broader upwards, truncated.

Obs. *M. spinosa* has the calyx with seven long spines; *M. lævis* has five small ones; and the calyx of *M. frutescens* is furnished with twelve spreading spines. In some species the calyx is longer than the corolla, in others shorter.

Ess. Ch. Calyx bell-shaped, dilated, much wider than the corolla, spinous.

1. M. *spinosa*. Linn. Sp. Pl. 821. Fl. Græc. t. 567, unpublished. (Molucca spinosa; Ger. em. 691.)—Upper lip of the calyx lanceolate, with a very long point; lower rounded, with seven spines. Leaves on stalks, ovate, palmate and cut.—A native of the Levant, and gathered by Dr. Sibthorp on mount Parnassus. It flowers in July and August.—*Root* annual. *Stem* about four feet high, erect, smooth, square, purplish, branched at the bottom. *Leaves* opposite, on longish stalks, strongly veined, smooth, dark green, palmate and cut. *Flowers* ten or twelve in a whorl, remarkable for the large pyramidal, upper tooth of their calyx, and the many radiating spines of the lower border. *Corolla* white, its upper lip hairy; palate streaked with purple.

2. M. *lævis*. Linn. Sp. Pl. 821. Fl. Græc. t. 566, unpublished. (Melissa Molucca lævis; Ger. em. 691.)—Calyx bell-shaped, slightly five-toothed; teeth equal, minutely spinous. Leaves on longish stalks, roundish or ovate, toothed.—Native of Syria, and found by Dr. Sibthorp between Smyrna and Bursa. Time of flowering like the last. *Root* annual. *Stems* about three feet high, branched, smooth, square, variegated with purple. *Branches* opposite, smooth. *Leaves* on long stalks, roundish, deeply notched or toothed, smooth, light green. *Flowers* axillary, about six in a whorl, the numerous whorls crowded together into a long spike, conspicuous for the rounded, reticulated calyxes which become tawny by age. *Corolla* white with a lilac tinge, shorter than the calyx.

3. M. *tuberosa*. Willd. n. 3. Pallas. It. v. 3. app. n. 101. t. T.—Calyx funnel-shaped, five-toothed; teeth equal, pointed. Stem-leaves nearly sessile, oblong wedge-shaped, toothed.—Native of muddy places, on hills in the south of Tartary, flowering in May and fruiting in July.—*Root* perennial, large, composed of two or three ovate knobs, occasionally simple, like a radish, and somewhat bitter. *Stem* erect, branched, jointed, divaricated, square, smooth, hairy at the joints. *Radical-leaves* on long rough stalks, ovate, deeply notched; those of the stem almost sessile, wedge-shaped, veined, nearly smooth. *Flowers* about three or four

four in a whorl, forming a loose spike. *Corolla* bright yellow, twice as long as the calyx.

4. M. *persica*. Willd. n. 4. Burm. Ind. 128. t. 38. f. 2.—Calyx funnel-shaped, five-toothed. Leaves sessile, wedge-shaped, serrated and spinous.—A native of Persia. Willdenow says that Linnæus confounded this species very erroneously with the following, *M. frutescens*, with which however it by no means agrees, except in habit. *Stem* simple, erect, very smooth, hoary, jointed, furnished with simple, long, unequal spines at each joint, generally from five to twelve in number. *Leaves* wedge-shaped, entire at the base, serrated at the end; the serratures terminating in downy spines. *Flowers* in dense whorls. Spinous teeth of the *calyx* minute. *Corolla* twice the length of the calyx. From Burmann's figure.

5. M. *frutescens*. Linn. Sp. Pl. 821. Fl. Græc. t. 568, unpublished. Allion. Pedem. n. 122. t. 2. f. 2.—Calyx funnel-shaped, five-toothed; teeth spinous. Leaves on short stalks, elliptical, obtuse, slightly five-toothed.—Found by Sherard in Italy, and by Dr. Sibthorp in the isle of Cyprus. *Stem* shrubby, much branched, round or nearly so, with downy branches. Spines at each joint four, awl-shaped, recurved. *Leaves* ovate, downy, on short stalks. *Flowers* axillary, solitary, their stalks about as long as the leaf-stalks. *Calyx* tubular, with five, broad, spinous teeth, nearly equal. *Corolla* scarcely exceeding the calyx, white, with purple streaks on the lower lip. We have separated the last species, which grows in Persia, from this, although professor Martyn is of opinion that they are the same plant; comparison, however, of Dr. Sibthorp's drawing with Burmann's figure shews them to be sufficiently distinct.

6. M. *grandiflora*. Willd. n. 6. (M. diacanthophylla; Pallas. Nov. Act. Petrop. v. 10. 380. t. 11.—"Calyx funnel-shaped, five-cleft, its segments pointed. Leaves sessile, in three, deep, cut segments."—Native of Tartary. We have seen neither specimen nor figure of this. Willdenow describes the *corolla* as longer than the *calyx*, its upper lip hairy and cloven.

Moluccella, in *Gardening*, comprehends plants of the herbaceous annual exotic kind, of which the species cultivated are; the smooth Molucca balm (M. lævis); and the prickly Molucca balm (M. spinosa).

Method of Culture.—These plants may be increased by sowing the seeds in the early autumn on a mild hot-bed, or in pots plunged into it, and when the plants have attained a little growth be planted in small pots, and placed under a hot-bed frame in winter, where they may have free air in mild weather by taking off the glasses, being carefully covered in frosty weather, keeping them pretty dry, otherwise they are apt to rot. In the spring the plants may be turned out of the pots, with the earth about their roots, and planted in a warm border, defended from strong winds, giving them a little water to settle the earth to their roots; after which they require no other care but to be kept clean from weeds, and be supported with stakes as there may be occasion.

These plants afford ornament and variety in the borders among other tender annual kinds.

MOLUCHES, in *Geography*, a tribe of Patagonians inhabiting the western part of the country. The dead among them are buried in square pits, in a sitting posture, with their weapons and drinking utensils; and an old matron annually opens the grave to cleanse and clothe the skeletons. Around are those of the slain horses, supported with props. The language of the Moluches is more copious and elegant than could have been expected, the verbs having three numbers, and as many tenses as the Greek. See Patagonia.

MOLUTA Arma. See Arma.

MOLWITZ, in *Geography*, a town of Silesia, in the principality of Brieg; three miles from Brieg.

MOLY, in *Botany*. See Allium.

This plant is supposed to have been wild rue, whose root is black, and the flower white, whence Ovid (Met. l. 14.) says:

> "Pacifer huic dederat florem Cyllenius album,
> Moly vocant superi, nigra radice tenetur."

According to Homer, Mercury gave this plant to Ulysses, by which he had evaded Circe's charms, the meaning of which is said to be, that he was thus taught to recover himself from his remissness, and to give counsel to his companions to quit so dangerous an abode. This plant, so difficult to be found, according to Homer, is the prudence which Ulysses exerted in extricating his soldiers from the seat of voluptuousness; and it may be supposed that all the transformations which Homer, Ovid, and the other poets say this princess wrought, were rather the effects of her charms and beauty than of her magic, though Horace (1 Epist. 2. 23.) leads us to understand, that they were the potions which she administered that produced these wonderful effects.

MOLYBDÆNA, Leadwort, a name given by some authors to the great toothwort, or dentillaria of Rondeletius. See Toothwort.

MOLYBDENUM, in *Chemistry*, a simple oxydable body and a metal. It is obtained from a blueish-black substance, which, till the experiments of Scheele, was confounded with plumbago. Like the latter substance, it has considerable lustre, feels as if it were greasy, and soils the fingers, but not to the same degree with plumbago.

Scheele found this substance to consist of sulphur and a white powder, which possessed acid properties, and which he denominated the *acid of molybdena*.

Bergman was the first who suspected this acid to be the oxyd of a metal. He accordingly requested Hielm in the year 1782 to make some experiments with a view to determine this fact. This experimentalist mixed the acid of this metal with linseed oil into the form of paste. This was exposed in a close crucible, lined with charcoal, to a very strong heat. By this means he succeeded in reducing the metal.

In order to obtain it in greater purity, he first roasted the ore to expel the sulphur, which reduced it to the state of powder. This powder being made very fine, he next dissolved it in ammonia, filtered the solution, and then evaporated it to dryness. By boiling this residuum with nitric acid he obtained a white powder, which was the molybdic acid. This being mixed with oil, and treated as before, afforded the metal in small grains.

This metal is so very infusible, that it has hitherto not been obtained but in small granulated bits. On this account we know very little of its physical properties. Its metallic nature, however, has been clearly made out, by the additional labours of Pelletier, Heyer, and others.

It is said to be of a greyish-white colour, possessing metallic lustre. Its specific gravity is supposed to be about seven.

We are indebted to Mr. Hatchett for some experiments upon the oxyds of this metal. He found it capable of four stages of oxydation; namely, the black, the blue, and the green oxyds, besides the white, which is the acid. These different oxyds, it appears, have been obtained by abstracting oxygen from the acid. The black is procured by heating the acid in contact with carbon, and the blue by a longer continuation of the same process. The latter is also obtained

 MOL

tained by immerfing a plate of tin into a folution of the acid.

The acid is obtained by diftilling nitric acid two or three times from any of the oxyds of this metal. The proportions of oxygen in molybdenum have not been afcertained, and till then we cannot, with much certainty, rely upon the number of its oxyds.

Molybdenum combines with fulphur. Indeed its native ore is a fulphuret. It is fingular that we have no accurate analyfis of the native fulphuret, as it might lead to fome knowledge of its other compounds. It readily combines with fulphur, and forms a fubftance fimilar to the native fulphuret.

If the acid be heated with fulphur in a clofe veffel, fuch as a retort, part of the fulphur combines with the oxygen and forms fulphurous acid; the remainder combines either with a leffer oxyd, or with the metal forming a fulphuret. Molybdenum combines with phofphorus, but the compound has not been examined.

Hielm, who firft reduced this metal, has fucceeded in alloying it with many of the other metals. He combined it with gold, platinium, filver, copper, iron, tin, nickel, zinc, lead, and fome others. None of thefe alloys, however, appear to be important, they are almoft all of them brittle.

MOLYBDIA, in *Natural Hiftory*, the name of a genus of cryftals. The word is derived from the Greek μολυβδος, *lead;* and expreffes cryftals altered in their figure by particles of that metal. The cryftals of this genus are of a cubic form, or compofed of fix fides, at right angles, like a dye. Of this genus there are three known fpecies.

MOLYBDIC Acid, in *Chemiftry*. This fubftance, to which we have already alluded, is arranged among the reft of the acids. Scheele, as has appeared under the account of the metal, was the difcoverer of this acid. We are indebted for additional facts relative to this fubftance, to Hatchett and Bucholz. It may be prepared by boiling nitro-muriatic acid upon the fulphuret for fome time; or, by diftilling this acid repeatedly from it, a white powder will be formed, mixed with fulphuric acid. This latter, being wafhed away, will leave the molybdic acid tolerably pure. Another method has been given by Bucholz. He directs the ore to be reduced to fine powder, and roafted at a red heat, gradually lowering the temperature, and ftirring it frequently, to keep the powder from adhering. This powder is of a grey colour, and contains a confiderable portion of the acid oxyd. This is digefted with foda or ammonia, which takes up the molybdic acid. It is remarkable, that molybdats of potafh and foda are colourlefs. May not the colour above-mentioned arife from abftraction of oxygen? For thefe facts we are indebted to Mr. Hatchett.

This acid forms infoluble falts with many of the metals. Hence it precipitates mercury, copper, lead, &c. from their folutions.

Tin filings change this acid into the blue oxyd, by abftracting fome of its oxygen.

Bucholz has attempted the analyfis of this acid. He digefted 100 grains of molybdenum with nitric acid, till the whole was converted into molybdic acid, which weighed 140 grains. He, therefore, concluded that the acid confifts of 100 of the metals, and 40 of oxygen, which gives in the 100, 67.1 of metal, and 32.9 oxygen. If the acid be the fourth oxyd of molybdenum, we may form fome idea of the other oxyds, and the reft of the compounds of molybdenum. If we take the acid at 33 *per cent.* of oxygen, and put the weight of the atom of molybdenum equal x, then

$\frac{x}{4 \times 7} = \frac{67}{33}$, and $x = 57$ nearly.

Hence for the protoxyd $\frac{57 + 7}{14} = \frac{100}{11}$, or 11 *per cent.* nearly. The fecond oxyd $\frac{57 + 2 \times 7}{14} = \frac{100}{20}$, or nearly 20 *per cent.* From thefe data, the third will contain 27 *per cent.* of oxygen. From the fame reafoning, taking the atom of fulphur at 13, the firft fulphuret will contain from 18 to 19 *per cent.* of fulphur.

MOLYBDOMANTIA, Μολυβδομαντεια, in *Antiquity*, a fpecies of divination, by obferving the motions, figures, &c. of melted lead.

MOLYN, Peter, in *Biography*. See Tempesta.

MOLYNEUX, William, an excellent mathematician and aftronomer, was born at Dublin in the year 1656. As his conftitution was naturally very tender, he was not fent to fchool, but inftructed in the elementary parts of learning by a private tutor at home. At the age of fifteen he was entered at Trinity college, in his native city, where he diftinguifhed himfelf for the vigour of his abilities, and the exemplarinefs of his manners; and having made a remarkable progrefs in academical learning, he was admitted to the degree of B. A. From Dublin college he went to London, and was entered a ftudent of the Middle Temple in 1675. Here he fpent three years, and obtained as much law as was neceffary for a gentleman who did not intend to follow it as a profeffion. The bent of his genius led him to devote much of his time to mathematical and philofophical purfuits, and he returned to his native country in 1678, where he married, and continued to profecute fuch branches of natural and experimental philofophy as were moft agreeable to his tafte. Being much attached to the principles of aftronomy, he began, in 1681, to make obfervations, and commenced a literary correfpondence with Mr. Flamftead, the aftronomer-royal of London. Shortly after this, he projected the defign of eftablifhing a Philofophical Society in Dublin, in imitation of the Royal Society, that had been but a few years eftablifhed in London under the aufpices of the king. Sir William Petty accepted the office of prefident, and our author was appointed the firft fecretary. The meetings of the fociety were held weekly, and by means of them Mr. Molyneux's fcientific reputation became widely extended, and procured him the efteem of perfons of the higheft rank, and, among others, of the duke of Ormond, then lord-lieutenant of Ireland, to whofe influence he was chiefly indebted for his appointment, jointly with fir William Robinfon, to the offices of furveyor-general of the king's buildings and works, and chief engineer. In 1685, he was elected fellow of the Royal Society at London, and in the fame year, for the purpofe of improving himfelf in the art of engineering, he obtained an appointment to view the moft confiderable fortreffes in Flanders. In the courfe of his tour he was introduced to Caffini, and the other celebrated aftronomers, in the places through which he paffed. Upon his return, in 1686, he publifhed his "Sciothericum Telefcopium, or A new Contrivance of adapting a Telefcope to an horizontal Dial, for obferving the Moment of Time by Day or Night." In 1687, when fir Ifaac Newton's "Principia" firft appeared, he expreffed his aftonifhment at fuch an effort of human intellect, at the fame time modeftly doubting if he fhould be able to comprehend all its parts. He was, perhaps,

haps, one of the first who was anxious to apply the principles, discovered in the book, to the practical purposes of religion: "One observation," says he, "is truly to be wondered at, and that is, the *sesquialtera ratio* between the periods and distances of the planets, and that not only among the primary erratics, but even among the lesser sets of dancers.—It is, in my opinion, an amazing thought to consider how universally this great law runs through the whole frame of nature, and agrees to bodies at such vast distances, and that seem to have no tie or respect to each other. It is to me, beyond exception, the strongest argument that can be drawn from the frame of the universe, for the proof of a God, to see one law so fixed and inviolable among those vast and distant *Chori*, who certainly could not therefore be put into this posture and motion by chance, but by an omnipotent intelligent Being." In 1688, owing to the confusion that existed at that period, the Philosophical Society of Dublin was broken up and dispersed; after Mr. Molyneux had distinguished himself by the communication of several papers upon curious subjects, some of which were sent to the Royal Society at London, and printed in their Transactions. During the following year, he, in common with a number of other Protestants, withdrew from the disturbances in Ireland into England. Mr. Molyneux, after a short residence in the metropolis, settled with his family at Chester, where he employed himself in arranging and correcting the materials which he had before prepared for his Dioptrics. The work was published in 1692, under the title of "Dioptrica Nova, A Treatise on Dioptrics, in Two Parts, &c." He gave it the title *Nova*, because it was almost entirely new, very little being taken from other writers, and because it was the first book that had appeared in English upon the subject. It contains several generally useful propositions for practice, demonstrated in a clear and easy manner, and the history of the discoveries made by several optical instruments. In the preface, the author notices the "Essay on the Human Understanding," which, he says, "has rectified more received mistakes, and delivered more profound truths, established upon experience and observation, for the direction of man's mind in the prosecution of knowledge, than are to be met with in all the volumes of the ancients." This compliment proved introductory to an acquaintance between the two philosophers, and a mutual correspondence was carried on by them as long as Mr. Molyneux lived, to whom, it is believed, many improvements in the second edition of Mr. Locke's work are to be attributed. When tranquillity was restored to Ireland, Mr. Molyneux returned, and was elected one of the representatives for the city of Dublin, in the parliament that was convened in 1692. In the following parliament, in 1695, he was chosen representative for the university, and held that seat during the remainder of his life. He was likewise nominated by the lord-lieutenant one of the commissioners of the forfeited estates, with a salary of 500*l. per annum*; but he declined the office, considering it to be an invidious employment. He was a zealous friend to the linen manufactory, and was at all times an open and avowed advocate for the freedom and independence of his country, and in this character he published "The Case of Ireland, stated in relation to its being bound by Acts of Parliament made in England," which is said to contain the substance of all that can be advanced on this very interesting subject, written with great clearness and strength of reasoning. The book was drawn up with great caution; nevertheless, a complaint was preferred against it to the house of commons, who thought proper to address his majesty on the occasion, asserting the dependency and subordination of Ireland to the kingdom of England. Mr. Molyneux, previously to the publication, had asked the opinion of Mr. Locke concerning the fundamental principle upon which his argument was founded; but this excellent man, instead of answering the letter of his friend, urged him to come to England, that they might talk over the subject together. To this he assented, and spent five of the happiest weeks in his life with Mr. Locke. When they separated, it was with an intention to renew the meeting in the following spring; but ere that arrived, death had deprived the world of Mr. Molyneux, who died in October, 1698, in the forty-third year of his age. He wrote several papers, that are inserted in the Philosophical Transactions, from vol. xiv. to xxix. Many of his letters are preserved in the collection of "Familiar Letters between Mr. Locke and several of his Friends." Biog. Brit.

Molyneux, Samuel, the only descendant of the preceding, was born at Chester in the year 1689. He was educated according to the plan laid down by the friend of his father, Mr. Locke. The progress of the child was very rapid, so that he knew more at the age of six or seven, than most children do at double that age. On the death of his father, the care of his education devolved upon an uncle, Dr. Thomas Molyneux, an eminent physician at Dublin, and a friend also of Mr. Locke, who executed the trust reposed on him with honour and fidelity. The young man, improving all the advantages bestowed upon him, became one of the most polished and accomplished gentlemen of his age, and was appointed secretary to the prince of Wales, afterwards king George II. As he was possessed of an ample fortune, he pursued, with great ardour, the sciences of astronomy and optics, and projected many schemes for their advancement. He applied himself to find out a convenient method of manufacturing specula for sir Isaac Newton's reflecting telescope, in which his chief design was to reduce the method of making these instruments to a sort of certainty, in order that the difficulty in constructing them, and the danger of miscarrying, might no longer discourage any workman from attempting to make them for public sale. With the assistance of Mr. Bradley, the Savilian professor of astronomy at Oxford, he succeeded so well, that the whole process, being communicated to a skilful optician, the construction of these telescopes was, afterwards, executed with great readiness and dispatch. His zeal for the improvement of his favourite sciences, induced Mr. Molyneux not only to collect and consider what had been written and practised by others, but also to procure a complete apparatus for the purpose of making new experiments. In the midst of these avocations, which were honourable to him as a philosopher, he was appointed one of the lords commissioners of the admiralty, by which means he became so involved in public affairs, that he had no leisure to promote the interests of philosophy and science. He accordingly gave all his papers to Dr. Robert Smith, professor of astronomy at Cambridge, whom he invited to make use of his house and instruments, in order to finish what he had left incomplete. By the death of Mr. Molyneux, which happened soon after this, the professor was precluded from the benefit of this invitation: he, however, supplied what was unfinished by our ingenious author from Huygens and others, and published the whole in his "Complete Treatise on Optics." Mr. Molyneux married lady Elizabeth, sister to the earl of Essex, but had no children. Biog. Brit.

MOLZA, Francisco Maria, a distinguished character among the Italian literati, was born in 1489, at Modena. From

From a very early age he was conspicuous for the readiness and avidity with which he imbibed classical literature: to his knowledge of the Greek and Roman languages, he added that of Hebrew. At the age of sixteen, he was sent to Rome to pursue his studies, but unfortunately he met with bad company, and entered upon a licentious course, which influenced the fortunes of the remainder of his life. To reclaim him, he was married to a Modenese young lady of noble descent, when he had scarcely attained to man's estate, with whom he lived till she had borne him four children. In 1576, he returned to Rome, where he spent almost all the remainder of his life. Study and pleasure seem alternately to have occupied all his thoughts. Among the many objects of his transitory attachments, is mentioned Furnia, a Roman courtezan, of whom he was so much enamoured, that it has been said he assumed the surname of Furnius on her account; but as his own mother's family name was De Forni, he probably derived the additional appellation from that. By these amours, he did serious injury to his reputation, and was once brought into the most imminent danger from the hand of an assassin; and he finally contracted a disease, the consequence of illicit connections, which brought him, as it has thousands, and tens of thousands of the votaries to pleasure, to a miserable end. From the year 1529 to 1535, Molza was at Rome in the court of cardinal Ippolito de Medici; after whose death, and the elevation of Paul to the popedom, he removed to that of cardinal Farnese. The profligacy of his conduct was no obstacle to an intimacy with many men of letters, such as Bembo, Sadoleto, Colocci, &c., and he was regarded as one of the principal ornaments of the literary academies then flourishing in that capital. His compositions were chiefly poems both in Italian and Latin, and on topics of all kinds, moral and serious, sportive and amorous, in all which he excelled. His elegies are excellent imitations of Tibullus. He was reckoned a powerful orator, and his epistles are graceful and elegant. He died, as we have already hinted, under the most excruciating sufferings, in 1544. Of his works, many were published separately, but no edition of the whole collectively appeared till that of Bergamo, in 1749, to which an account of his life is prefixed by Serassi.

Molza, Tarquinia, daughter of Camillo, the eldest son of the subject of the foregoing article, was born at Modena in 1542. She was instructed in the classics, in Hebrew, and in the belles lettres, and made great progress in every thing which she undertook: she became an adept in some of the abstruser branches of science, and was a proficient in music; but with all these, she was distinguished by the graces and amiable qualities of her sex. She was married, in 1560, to Paul Porrino, but never had any children; and after his death, in 1578, she passed her life in literary retirement at Modena, where she died in 1617. She distinguished herself by her writings, consisting of Latin and Italian poems, and translations from Plato, and other classics. Her remains were printed in the Bergamo edition of her grandfather's works. This lady was the subject of numerous eulogies from contemporary writers; but the most extraordinary honour that she received, was that of being presented with the citizenship of Rome, by the senate and people of that city, in a patent reciting her singular merits, and conferring upon her the title of *Unica*. The honour is extended to the whole noble family of Molza.

MOM, in *Geography*, a town of Arabia, in the province of Hedsjas; 5 miles N. of Mecca.

MOMAPANE Lake, a lake of Canada; 160 miles N. of Quebec. N. lat. 49° 40′. W. long. 71°.

MOMARACKPOUR, a town of Hindoostan, in Bahar; 21 miles N.W. of Chuprah. N. lat. 25° 59′. E. long. 84° 38′.—Also, a town of Hindoostan, in Allahabad; 30 miles N. of Gazypour.

MOMBAÇA, or Mombaza, a kingdom of Africa, near the coast of the Indian sea, south of Melinda, of unknown extent. The soil is very fertile, and produces rice, millet, and other grain, fruit-trees, and vegetables of various kinds: great numbers of cattle and of poultry are bred in this country; and it abounds with excellent springs of fresh water. The climate is temperate, and the air is healthy. The capital, formerly on a peninsula, has been insulated by cutting a canal across the isthmus. The houses are stone, cemented with mortar, and covered with paintings and other ornaments; the streets, though narrow, are straight, and the houses are contiguous, and terraced on the tops. The city is defended by a citadel, which served the Portuguese for a place of retreat, from which, however, they were expelled by an Arabian scheick in 1631; but they regained their possessions in 1729. Before the city is a commodious bay, being both spacious and affording deep water. From this port a considerable commerce is carried on with the neighbouring countries. The inhabitants are various in their complexion; but their dress is after the Arabian fashion. They differ also with regard to religion, as Christians, Mahometans and idolaters, are intermixed; but they are said to be more civil and hospitable to strangers than any others on the same coast. S. lat. 3° 30′.

MOMBEIRA, a river of Africa, in Benguela, which runs into the Atlantic, S. lat. 15° 15′.

MOMBEL, a town of France, in the department of Mont Blanc; 10 miles W.N.W. of Chambery.

MOMBELTRAN, a town of Spain, in Old Castile; 27 miles S.S.W. of Avila.

MOMBRIZO, Bonini, in *Biography*, an Italian man of letters in the 15th century, was born at Milan, and became professor of eloquence in that city. He was author of several works, which were well received, and among others some Latin poems, particularly one "On the Sufferings of Jesus Christ." His chief performance is entitled "Sanctuarium, sive acta vitæ Sanctorum," in two volumes. For this, it is generally admitted, that ecclesiastical historians are under great obligations to him, as he has drawn from obscurity many important and valuable facts, which, without his researches, would have been lost to the world. Of this work, subsequent writers have availed themselves; but a perfect copy of it is now exceedingly rare, and greatly sought for by curious collectors. Moreri.

MOMDSONA, in *Geography*, a town of Thibet; 9 miles S. of Lassa.

MOMEGASTRO, a town of Spain, in Aragon; 12 miles E. of Balbastro.

MOMELSDORF, a town of the duchy of Wurzburg; 9 miles N.W. of Ebern.

MOMENT, in *Time*, the most minute and indivisible part of duration; or what we otherwise call an *instant*.

A moment ought not to be conceived as the least part of time, but as a termination or limit of time. Maclaurin's Fluxions, vol. i. p. 245.

Moments, in the new doctrine of infinites, denote the infinitely small parts of quantity.

Moments are the same with what we otherwise call *infinitesimals*, and *differences*; being the momentary increments, or decrements of quantity, considered as in a continual flux. Moments are the generative principles of magnitude: they have no determined magnitude of their own; but are only inceptive of it.

Hence, as it is the same thing, if, in lieu of these moments,

 the

the velocities of their increases and decreases be made use of, or the finite quantities proportionable to such velocities; the method of proceeding, which considers the motions, changes, or fluxions of quantities, is denominated, by sir Isaac Newton, the method of fluxions.

Leibnitz, and most foreigners, considering these infinitely small parts, or infinitesimals, as the differences of two quantities; and thereby endeavouring to find the differences of quantities, *i. e.* some moments, or quantities infinitely small, which being taken an infinite number of times, shall equal given quantities; call these moments, *differences*; and the method of procedure the *differential calculus*. See Calculus *Differentialis*.

Moment, *Momentum*, in *Mechanics*, is the same with *impetus*; or the quantity of motion in a moving body. See Force.

Momentum is sometimes also used simply for the motion itself. Moment is frequently defined by the *vis insita*, or the power by which moving bodies continually change place. In comparing the motion of bodies, the ratio of their momenta is always compounded of the quantity of matter, and the celerity of the moving body; so that the moment of any such body may be considered as a rectangle under the quantity of matter, and the celerity.

And since it is certain, that all equal rectangles have their sides reciprocally proportionable; therefore, if the moments of any moving bodies be equal, the quantity of matter in one to that of the other, will be reciprocally as the celerity of the latter to the celerity of the former; and, on the contrary, if the quantities of matter be reciprocally proportionable to the celerities, the moments or quantities in each will be equal.

The moment, also, of any moving body may be considered as the aggregate or sum of all the moments of the parts of that body; and, therefore, where the magnitudes and number of particles are the same, and where they are moved with the same celerity, there will be the same moments of the wholes.

MOMENTARY Motion. See Quantity.

MOMFLOT, in *Geography*. See Monfalout.

MOMORDICA, in *Botany*, a name of whose derivation we find no satisfactory account. Linnæus deduces it from *mordeo*, to bite, because, he says, "the seeds seem to have been bitten." But this applies rather to the pulpy fruit, which, in the original species, cracks and flies asunder irregularly, so as to have that appearance. The name was first given to this plant by Castor Durante, and appears to be Italian, having originally belonged to some sort of *Geranium*. —Linn. Gen. 506. Schreb. 662. Willd. Sp. Pl. v. 4. 601. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 1. v. 3. 380. Juss. 395. Tourn. t. 29, 30. Lamarck Illustr. t. 794. Gærtn. t. 88.—Class and order, *Monoecia Syngenesia*; or rather *Monoecia Polyadelphia*; see Sm. Intr. to Botany, 478. Nat. Ord. *Cucurbitaceæ*, Linn. Juss.

Gen. Ch. Male, *Cal.* Perianth of one leaf, concave, in five lanceolate spreading segments. *Cor.* in five deep divisions, united to the calyx, but larger and more spreading, veiny and rugose. *Stam.* Filaments three, awl-shaped, short; anthers on two of the filaments double, or cloven, with two appendages at each side; on the third filament simple, with appendages on one side only, and consisting of a compressed body, with a pollen-bearing line once reflexed.

Female on the same plant. *Cal.* Perianth like that of the male, superior, deciduous. *Cor.* as in the male. *Stam.* Filaments three, very short, without anthers. *Pist.* Germen inferior, large; style one, cylindrical, columnar, three-cleft; stigmas three, tumid, oblong, directed outwards. *Peric.* Berry spongy, oblong, separating elastically, of three cells, with soft, membranous, distant partitions. *Seeds* several, compressed.

Eff. Ch. Male, Calyx five-cleft. Corolla deeply five-cleft. Filaments three.

Female, Calyx five-cleft. Corolla deeply five-cleft. Style three-cleft. Berry separating elastically.

1. M. *Balsamina*. Common, or Male, Balsam-apple. Linn. Sp. Pl. 1433. Lamarck Dict. v. 4. 237. Zorn Pl. Med. t. 45. (Balsamina mas; Ger. em. 362. B. mas, fructu puniceo, and Momordica fructu luteo-rubescente; Besl. Eyst. autumn. ord. 1. t. 4. f. 2, 3.)—Fruit roundish-ovate, pointed, angulated and tubercular. Bractea heart-shaped, toothed, above the middle of the flower-stalk. Leaves smooth, five-lobed, palmate, deeply toothed.—Native of the East Indies. A very tender annual in our gardens, kept occasionally for curiosity merely, notwithstanding its reputed vulnerary or balsamic virtues, from whence the specific name arose. The ripe fruit, infused in olive oil, said to possess a tonic and healing quality, is now out of use. The *stems* are long, weak, slender, smooth, leafy, supported by long, simple, spiral, capillary *tendrils*, opposite to each leaf-stalk. *Leaves* alternate, stalked, about two inches wide, of a bright shining green, naked, finely dotted, cut half way down into five, scarcely seven, broad, spreading lobes, with broad, sharp capillary-pointed teeth. *Flowers* large, yellow, on axillary, solitary, simple stalks, twice the length of the leaf-stalks, and bearing at the top a rounded *bractea*. *Fruit* about two inches long and one broad, orange-coloured, or almost scarlet, splitting at one side when ripe, and discharging its seeds with some force through the cleft, by means of the elasticity of its coat.

2. M. *Charantia*. Hairy Balsam-apple. Linn. Sp. Pl. 1433. I. Mill. Illustr. t. 83. (Balsamina cucumerina indica, fructu majore flavescente; Comm. Hort. v. 1. 103. t. 54. Amara indica; Rumph. Amb. book 10. 410. t. 151.) —Fruit oblong, taper-pointed, angulated and tubercular. Bractea heart-shaped, entire, below the middle of the flower-stalk. Leaves seven-lobed, palmate, bluntly toothed, somewhat hairy.—Native of the East Indies. Cultivated by Miller in 1731. It differs from the former in having a much longer *fruit*, more pointed at each end; *leaves* usually more deeply palmate, with broader more shallow teeth, their veins very hairy beneath; *flower-stalks* elongated, rather hairy, bearing their *bractea*, which is entire, in their lower part.

3. M. *muricata*. Muricated Balsam-apple. Willd. n. 3. (M. Charantia β; Linn. Sp. Pl. 1433. Lamarck Dict. v. 4. 239. M. zeylanica; Mill. Dict. ed. 8. n. 3. Pavel; Rheede Malab. v. 8. 18. t. 10.)—"Fruit oblong, muricated, taper-pointed. Bractea heart-shaped, nearly entire, below the middle of the flower-stalk. Leaves seven-lobed, palmate, toothed, pointed."—Native of the East Indies. The *leaves* of this are nearly smooth, less deeply lobed and toothed, with taper points. *Fruit* only an inch and half long, not furrowed, but beset with numerous sharp prominent points.

4. M. *senegalensis*. African Balsam-apple. Lamarck Dict. v. 4. 239. Willd. n. 4.—"Fruit ovate, acute, tubercular. Bractea heart shaped, entire, near the base of the flower-stalk. Leaves seven-lobed, deeply palmate, somewhat toothed, and rather hairy.—Gathered by M. Roussillon in Senegal. *Lamarck.* More hairy or downy than *M. Charantia*, the *leaves* smaller, more deeply lobed; *flower-stalks* generally longer; *fruit* shorter, being oval, and not above an inch long, warty; *flowers* small. *Lamarck.*

5. M. *operculata*. Covered Balsam-apple. Linn. Sp. Pl. 1433. Ait. Hort. Kew. ed. 1. v. 3. 499. Willd. n. 5. (M. ame-

(M. americana, fructu reticulato ficco; Comm. Rar. 22. t. 22.)—Fruit elliptical, angular, sharply tuberculated, with a beaked lid. Leaves five-lobed, toothed.—Native of the West Indies. Sent to Kew, in 1787, by Mr. Alex Anderson. It is annual like the rest, and flowers from June to September in the stove. The *leaves* are finely downy, with five shallow spreading lobes. *Tendrils* divided. *Fruit* ovate, or obovate, an inch and half long, its angles armed with pointed tubercles, its top a taper deciduous lid, leaving a small orifice, through which the seeds escape, the rest of the fruit when old becoming dry and reticulated.

6. M. *Luffa*. Egyptian Balsam-apple. Linn. Sp. Pl. 1433. (Cucumis ægyptius reticulatus, seu Luffa arabum; Vesling. Ægypt. 48. t. 50, 51. Petola; Rumph. Amb. book 10. 405. t. 147.)—Fruit oblong, somewhat cylindrical, furrowed, smooth; reticulated within. Male flowers corymbose. Bractea heart-shaped, entire, at the base of each partial stalk. Leaves rough, five-lobed, toothed.—Native of the East Indies. Cultivated near Cairo by the Arabs, (who call it *Luffa*,) rather, as it appears, for curiosity than use, the fruit not being eatable. This has the herbage more like some sort of Melon than the rest of the species. The *leaves* are rough with minute tubercles. *Tendrils* many-cleft. *Male flowers* numerous, pale yellow with orange streaks, in a downy corymbus, with small smooth *bracteas*. At the bottom of their long common stalk stands a solitary stalked *female flower*, whose long germen is clothed with dense down. The *stamens* are truly polyadelphous, with large sinuous anthers. *Fruit* a span long, swelling upwards, smooth, displaying, when the skin is removed, a most elegant reticulated structure, in which the seeds are lodged.—*Luffa fœtida*, Cav. Ic. v. 1. 7. t. 9, 10, is evidently nearly allied to this plant, but its stamens are said to be all separate. The angles of the fruit moreover seem to be sharper, and its coat thicker, opening by a lid, as in the last. The tendrils and inflorescence agree with *M. Luffa*, but, as Cavanilles observes, the two plants require to be compared in a living state, especially their stamens. See LUFFA.

7. M. *cylindrica*. Cylindrical Balsam-apple. Linn. Sp. Pl. 1433. Willd. n. 7.—Fruit cylindrical, very long. Bractea heart-shaped, entire, at the base of the flower-stalk. Leaves heart-shaped, angular, toothed.—Native of Ceylon and China. Of this we find no figure. The Linnæan specimen has an angular *stem*. *Tendrils* simple, very long. *Leaves* heart-shaped, finely toothed, rough, angular rather than lobed, on rough stalks. *Flowers* small, with very hairy stalks and calyx. *Fruit*, according to Linnæus, a foot long, rather hairy. *Seeds* black. *Flowers* yellow.—This seems by Willdenow to be cultivated in Germany, but we have it not.

8. M. *trifoliata*. Three-leaved Balsam-apple. Linn. Sp. Pl. 1434. Willd. n. 8. (Poppya sylvestris; Rumph. Amb. book 9. 414 t. 152. f. 2.)—Fruit ovate, prickly. Leaves ternate, toothed.—Native of the East Indies. Distinguished by its ternate *leaves*, which are smooth on the upper side; the leaflets all equally stalked. *Fruit* red, the size and shape of a hen's egg, rough with small prickly protuberances.

9. M. *pedata*. Pedate Balsam-apple. Linn. Sp. Pl. 1434. (M. fructu striato lævi, vulgò Caigua; Feuill. Peruv. v. 1. 754. t. 41.)—Fruit ovate, striated. Leaves pedate, serrated.—Native of Peru. We have never seen this but in the garden of the Marquis Hippolito Durazzo, at Genoa, in 1787. Feuillée says the Peruvians eat the fruit in their soups, its cooling qualities being peculiarly welcome in that hot climate. The *leaves* are dark green, rough with callous tubercles, and remarkable for being pedate; their lobes are pinnatifid, rather than serrated, in our specimen. *Flowers* small, greenish-yellow; the *male* ones umbellate; *female* solitary, at the base of their common stalk. *Calyx* with long, narrow, acute segments. *Germen* rough. *Fruit*, according to Feuillée, about four inches long, greenish-white, spongy, with a sharpish taste. He represents the *tendrils* as of two or three branches; in our's they are simple. This, with the deeply cut *leaves*, and their callous roughness, not mentioned in his prolix description, makes us suspect our's may be a distinct species. There is no specimen in the herbarium of Linnæus, as he merely copied Feuillée.

10. M. *lanata*. Woolly Balsam-apple. Thunb. Prodr. 13. Willd. n. 10.—"Leaves ternate, pinnatifid, rough. Fruit woolly."—Native of the Cape of Good Hope.

11. M. *echinata*. Bristly Balsam-apple. Muhlenb. MSS. Willd. n. 11. (Sicyos lobata; Michaux. Boreal-Amer. v. 2. 217.)—Fruit with four seeds, roundish, beset with long bristles. Leaves heart-shaped, roughish, with five sharp angular lobes, obscurely toothed.—Native of Pennsylvania, towards the river Ohio. We have specimens from the Rev. Dr. Muhlenberg. The *stem* is deeply furrowed, smooth. *Tendrils* long, divided, not many-cleft. *Leaves* on long stalks, opposite to each tendril, of a pentagonal figure, with five divaricated, pointed, distantly toothed lobes; heart-shaped at the base, where there is also a small additional lobe, or dilatation, at each side. Both surfaces of the *leaves* are rough with extremely minute prickles, especially on the ribs and veins, in our specimens, though Michaux and Willdenow describe them as smooth. *Flowers* small; the males very numerous, in axillary downy panicles, from two to six inches long: females solitary, stalked, at the base of the stalk of the panicle. *Germen* globose, beset with long weak prickles. *Fruit* roundish, the size of a gooseberry, likewise prickly, with only four seeds.

12. M. *dioica*. Dioecious Balsam-apple. Roxb. in Willd. n. 12.—"Fruit elliptical, muricated. Flowers dioecious. Leaves heart-shaped, pointed, toothed."—Native of the East Indies.—*Stem* angular, climbing. *Leaves* heart-shaped, undivided, pointed, toothed, smooth on both sides, two inches long. *Tendrils* simple. *Flowers* dioecious; the female ones axillary, solitary. *Fruit* the size of the first species, elliptical, very thickly beset with sharp tubercles. *Willdenow.*

13. M. *spicata*. Spiked Balsam-apple. Linn. MSS.—Leaves heart-shaped, slightly three-lobed, wavy, rough. Male flowers in long loose spikes, with fan-shaped, rough, toothed bracteas; female axillary solitary. Germen elliptical, rough.—Of this we find a specimen in the herbarium of the younger Linnæus, under the above name, but without any indication of its native country. The *stem* is furrowed, slightly prickly. *Tendrils*, as far as we can judge, simple. *Leaves* on long rough stalks, opposite to the tendrils, heart-shaped, with three or five slight angular lobes, wavy, rough with minute callous tubercles, the veins hispid. *Male flowers* in lax, simple, solitary, axillary, long-stalked spikes, each flower accompanied by a large, sessile, fan-shaped, rough *bractea*, toothed at the summit; *female* solitary, on a short axillary stalk; its *germen* elliptical, furrowed, hispid; *calyx* with a very long tube.—The male inflorescence marks this as a very distinct species, that seems not to be any where described.

14. M. *Elaterium*. Squirting Balsam-apple or Squirting Cucumber. Linn. Sp. Pl. 1434. Bulliard t. 81. (Cucumis sylvestris; Camer. Epit. 946. C. asininus; Ger. em. 912.)—Fruit elliptical, hispid, elastic at the base. Leaves heart-shaped, wavy, rough. Tendrils none.—Native of waste ground in the south of Europe. It is a hardy annual,

annual, now and then allowed a place in curious gardens for the ſake of its fruit, which, to the ſurpriſe of thoſe who touch it unawares, ſtarts from its ſtalk with a violent ſpring, ſquirting out the ſeeds by the orifice. The *herb* is a rank, ſpreading, rough and hairy, rather glaucous, weed, with round thick branches, deſtitute of tendrils. *Flowers* dull yellow; the males but few together in an axillary cluſter, accompanied at the bottom by one female bloſſom. *Fruit* pendulous, elliptical, blunt at each end, about two inches long, green, rough with innumerable ſmall briſtles, of a thick coriaceous texture, without valves.—The extract of this fruit, known by the name of ELATERIUM, (ſee that article,) is a violent and dangerous purge.

MOMORDICA, in *Gardening*, contains plants of the annual trailing and perennial kinds, of which the ſpecies cultivated are, the common momordica, or male balſam apple (M. balſamina); the hairy momordica (M. charantia); the Egyptian momordica (M. luffa); and the elaſtic momordica (M. elaterium).

Method of Culture.—All theſe plants may be increaſed by ſowing the ſeeds of the firſt three ſorts upon a moderate hot-bed, in the early ſpring months, as about March; and when the plants have had a little growth, let them be pricked out into another hot-bed, freſh air being given in fine weather, and water occaſionally; or they may be let remain in the firſt hot-bed till they have acquired ſufficient growth, and have four or five leaves, when they ſhould be removed into the hot-bed where they are to remain, one or two plants being put into each light, due ſhade and water being given till freſh rooted. They afterwards demand the ſame management as the cucumber kind, the branches being ſuffered to extend themſelves in the ſame manner. When thus managed, and properly treated, in reſpect to air and water, they produce fruit and ripe ſeeds in the latter end of ſummer, when it muſt be immediately gathered, to prevent its being diſperſed. The plants may likewiſe be ſet in pots, and placed in the hot-houſe, their vines or ſtems being ſupported by ſticks, in which mode they have a much better appearance and effect.

The fourth ſort may be ſown or ſuffered to ſcatter, where the plants are to remain, or on beds of fine mould in the autumn, the plants being afterwards thinned out, or removed into rows in an open ſituation, three or four feet apart, and as many diſtant in them, requiring only the further culture of being kept clean from weeds. Where the ſoil is dry, they often continue three or four years.

All the ſorts afford ornament, the firſt three ſorts in the ſtove, and the laſt in the open borders. The fruit of the laſt alſo affords a medicinal ſubſtance by inſpiſſation.

MOMORDICA, *Stinking*. See BRYONIA.

MOMOT, in *Ornithology*. See RAMPHASTOS *Momota*, and MOMOTUS.

MOMOT *Pheaſant* of Latham. See PHASIANUS *Motmot*.

MOMOTUS, in *Natural Hiſtory*, a genus of birds of the order Picæ, of which there is but a ſingle ſpecies: the generic character is, bill ſtrong, ſlightly curved, ſerrate at the edges; noſtrils feathered; tail wedged; feet greſſorial.

Species.

BRASILIENSIS, or Braſilian Momot. Green; front blueiſh-green; hind-head violet; crown black. This bird, remarkable for the beauty of its plumage, is a native of South America, and ſeems to be chiefly found in Braſil, whence it derives its name. It was firſt deſcribed by Hernandez, in his Hiſtory of Mexico; who ſays, "It is the ſize of a dove, and has ſcarlet eyes, with a black pupil; a crooked blackiſh bill, almoſt three inches long, ſharp-pointed, with the lower mandible ſhorteſt, and the upper ſerrated; the head is blue like that of the peacock; the legs and feet brown, and the reſt of the bird green; and what is extraordinary, is, that the tail has one quill longer than the reſt, and feathered only at the end." This deſcription was regarded by Ray as very inaccurate, and in his edition of Willoughby's Ornithology, he ſays, "This is, I dare ſay, more ſtrange than true, for the tails of all birds, I ever yet ſaw, have their feathers growing by pairs, that is, two of a ſort, on each ſide." Edwards, about half a century ago, deſcribed it as a ſpecies of Roller, and named it the "Saw-billed Roller." According to this naturaliſt, "It is ſhort-legged in proportion, and not long-winged; the bill is pretty ſtraight, moderately bending downwards at the point, toothed on the edges like a ſaw; the upper mandible duſky, the lower fleſh-coloured towards its baſis; the noſtrils are covered with ſmall black feathers, and ſome black briſtles pointing forward round the upper mandible; the upper part, and the ſides of the bill are encompaſſed with black, from which run black lines through the eyes, and broader black liſts, mixed with a little blue, from the corners of the mouth down the ſides of the neck; the top of the head is of an ultramarine blue, though next the bill inclining to ſea-green; in the middle of this blue ſpace, on the crown of the head, is a black ſpot; it has alſo a ſpot of black feathers, edged with blue, on the fore part of the neck, a little below the throat; otherwiſe the whole underſide, from the bill to the covert-feathers beneath the tail, is of an olive or greeniſh buff colour." Other naturaliſts have given deſcriptions rather different. Linnæus conſidered it as a ſpecies of the Ramphaſtos, or Toucan genus, and denominated it "RAMPHASTOS *Momota*;" but Dr. Latham inſtituted for it a ſeparate genus, the ſtructure of the feet forbidding it to be aſſociated with the Toucans, which have ſcanſorial or climbing feet, having the toes placed two forwards and two backwards, as the parrot genus. Edwards had noticed as a great ſingularity in this bird, that the two long tail-feathers ſeem as if they were ſtripped of their webs on each ſide for an inch ſpace, a little within their tips; but Latham ſays, "That though the tail, in many ſpecimens, exhibited the very remarkable particularity deſcribed by Edwards, yet in its truly natural, or perfectly complete ſtate, the two middle feathers are entirely webbed throughout their whole length." The momotus is nearly equal in ſize to a magpie, meaſuring about eighteen inches in length. It is ſaid to be a bird of ſolitary habits, frequenting thick woods, and is ſeen ſingly. It makes its neſt on the ground, ſometimes in the deſerted hole of an armadillo, or other quadruped; it is compoſed of dry graſs and ſtalks, and it lays commonly two eggs.

In Gmelin's laſt edition of Linnæus, there is a variety mentioned, and deſcribed as variegated with green, tawny, blue, and cinereous. The body above olive green, beneath ruſty; head large; crown blue, black in the middle; bill black, ſcarcely two inches long; the legs are black, and the claws hooked.

This bird feeds on inſects and raw fleſh, the fragments of which it macerates in water; when taken it ſtrikes violently with the bill; the voice is harſh, weak, and tremulous. Shaw, Latham. Gmelin's edit. of Linnæus.

MOMPOX, or *Santa Cruz de Mompox*, in *Geography*, a town of South America, in the province of Carthagena, on the left bank of the Magdalena; 110 miles S.S.E. of Carthagena. Mompox, which is a very commercial port, has a royal cuſtom-houſe, and a handſome quay of conſiderable height, as the river riſes regularly 12 or 13 feet in the beginning of December. N. lat. 9° 19'. W. long. 74° 11'.

MOMUS, in *Mythology*, was, according to Heſiod, the ſon

M O N

fon of Night and Sleep, and was fuppofed both by the Greeks and Romans to be the god of buffoonery and jefts. Satirical to excefs, he made even the gods, and Jupiter himfelf, the objects of his moft pungent raillery. None of the ancients have exhibited him in his true and lively colours more appropriately than Lucian. Momus is faid to have derived his name from the free and bold manner in which he cenfured the vices and defects of others; Μωμος in Greek implying cenfure. It was he who found fault with the gods, becaufe, in the formation of man, they had not made a little hole or window in his breaft, that one might have feen into his heart what were his thoughts: though Vitruvius afcribes this reflection to Socrates.

MONA, in *Geography*, or LA GUENON, a fmall ifland in the Weft Indies, between Hifpaniola and Porto Rico. N. lat. 18° 10′. W. long. 68° 28′.

MONA, in *Ancient Geography*, an ifland of Great Britain, now called Anglefea, the ancient feat of the Druids; which was firft attempted by Suetonius Paulinus, and afterwards reduced by Agricola. In the Britifh tongue it was called Môn, and when conquered by the Englifh, Anglefey, that is, Englifh ifland. See ANGLESEY.

MONACHUS, in *Zoology*, a fpecies of *Phoca*; which fee.

MONACHUS, in *Ornithology*, a fpecies of *Vultur*; which fee.

MONACO, in *Geography*, was, before the French revolution, a fmall principality of Italy, fituated on the coaft of the Mediterranean, between the county of Nice and the Genoefe territory, and about four or five Italian miles in circuit. The chief line of the Grimaldi, who had governed this principality for 800 years fucceffively, failed in 1731; but the eldeft daughter of Antony Grimaldi, having been, in 1715, declared heirefs of the principality, was married to Francis Leonorus, count de Torrigny; and the fruit of this marriage was Honoratus Camillus Leonorus, who adopted the name and arms of Grimaldi. Monaco is now united to France.

MONACO, a town of France, and principal place of a diftrict, in the department of the Maritime Alps, late capital of the principality above-mentioned, and the refidence of the duke. It is a fmall town, with narrow ftreets, fituated on a rock near the fea: it is fortified and has a garrifon and a good harbour, and poffeffes a right of compelling all fhips that pafs by to put in and pay toll; 6 miles N.E. of Nice. The place contains 1130, and the canton 3730 inhabitants, on a territory of $37\frac{1}{2}$ kiliometres, in 4 communes. N. lat. 43° 43′. E. long. 7° 22′.

MONACONDA, a town of Hindooftan, in Tellingana; 8 miles W.S.W. of Warangole.

MONAD, in the *Philofophy* of Leibnitz, is a fimple fubftance without parts. The exiftence of monads muft be admitted, fince without thefe no compound or aggregate of fimple fubftances could exift. Thefe fimple fubftances are properly called monads, becaufe, as unity is the fountain and origin of numbers, and comprehends all their powers, fo fimple fubftances are the matter of which all corporeal maffes are formed. Since monads have no parts, they have neither extenfion, figure, nor divifibility. They are the true atoms of nature, and elements of things, incapable of deftruction, except by the power of God. Each monad differs from every other; for it is impoffible that any two things fhould be found in nature perfectly alike. Monads have an internal principle of variation, by which they are continually varying in a certain manner; and hence arifes a plurality of properties and relations. This perpetually varying ftate, which involves and reprefents multitude in unity, is perception, which is not, however, to be confounded with confcioufnefs. The action of the eternal principle of monads, by which a tranfition is made from one perception to another, may be called appetite. The perception and appetite of monads are not to be explained mechanically by figure and motion, becaufe they are affections of a fimple fubftance without parts. In monads, therefore, nothing is found but perception and appetite; and in this refpect all monads may be faid to partake of the nature of foul; although that term is more properly applied to thofe living beings, which have diftinct perception united with memory. The prefent ftate of monads arifes from the paft, and perception from perception, as motion from motion. Monads are, in a ftate of perception, fimilar to that of a mind in a ftupor, which has a perpetual fucceffion of minute and indiftinct perceptions. God alone, fays Leibnitz, is primitive unity, or fimple original fubftance, from whom are produced all created or derived monads. Thefe owe their exiftence to the effufion of the rays of divinity, limited in their effects by the finite capacity of the creatures who receive them. Creatures have not proceeded neceffarily from the divine effence, but have been created, according to the plan of the divine underftanding, by the energy of the divine will and power; and their continued prefervation is a continual creation.

Monads have univerfally an influence on each other, and are reciprocally active and paffive. They are active, in proportion as their perceptions are diftinct; paffive, as they are confufed. In fimple fubftances, the influence of one monad upon another is not mechanical, but ideal, and is not effected without the intervention of the Deity, who directs them according to the ideas of his own intellect. From the univerfal influence of all creatures upon each individual, and of each upon all, it follows, that every fimple fubftance receives an impreffion or image of all the reft, and becomes, as it were, a perpetual living mirror of the univerfe. As the fame city viewed from different places appears different, and is optically multiplied; fo it happens, that in confequence of the infinite multitude of fimple fubftances in nature, pictures of the univerfe are multiplied without end, according to the different points of fight of different monads. By thefe means, all poffible variety, and, confequently, all poffible perfection, is produced in the univerfe. Since there is in nature a univerfal *plenum*, the motion of any body or compofition of monads muft affect every other body by means of intervening bodies; and every prefent motion will have a neceffary connection with every other future motion; whence he who fees all things can read in the prefent whatever will happen in any future time or diftant place. Although each created monad reflects the whole univerfe, that monad which is the animating principle of any body, affects that body more diftinctly than all others. As the whole body reflects the whole univerfe by the connection of all matter *in pleno*, fo alfo the foul reflects the whole univerfe, while it reflects that organized body, by which it is in a peculiar manner perceived, and with which it feems a living animal. Since matter is not only infinitely divifible, but is actually divided without limit, every portion of matter may be conceived to be a world of living creatures; and every part of a living body to be itfelf full of all other living bodies. All bodies are like rivers, perpetually flowing; fome parts entering, and others paffing away. The foul changes its body, not inftantaneoufly, but by degrees, fo that, ftrictly fpeaking, there is no fuch thing as death, or a ftate in which the foul is feparated from the body. In conception, no new animal is produced; but a pre-exifting animal is difpofed to a transformation, by which it paffes into another fpecies. In death, though the machine in part perifhes, the animal itfelf remains indeftructible.

From

From this concise statement of Leibnitz's system, as it respects monads, it will be easily perceived, that his monads approach nearer to the permanent intelligent natures, called by Pythagoras numbers, and by Plato ideas, than to the solid and indivisible atoms of Epicurus. Brucker's Philos. by Enfield, vol. ii. See LEIBNITZIAN *Philosophy*.

MONADELPHIA, in *Botany*, from μονος, *one*, and αδελφος, *a brother*, the 16th class of the Linnæan artificial, or sexual, system, consisting of plants whose filaments are united into one parcel, or set. This union is more or less complete. In the Mallow tribe, the combined filaments make a long tube, crowned at its summit by the anthers, which, from its resemblance to a column, has obtained the name of *columniferæ* for such flowers. In the Geranium family the union is much more slight; while in some genera, as *Oxalis*, it is but partial, or confined to certain species only. The late professor Cavanilles, of Madrid, undertook an illustration of the class *Monadelphia*, in several quarto dissertations, with plates, which make all together two rather thick volumes. In this work he has referred to the class in question a vast number of genera, never before suspected to belong to it, and which unquestionably want its true character. This character consists in an actual union, or immediate coalescence, of the filaments themselves into one body; whereas many of the plants considered by Cavanilles as monadelphous, are so merely through the medium of a tubular nectary, or of some other body, which is no part of the stamens. This is totally inadmissible, for we might just as well refer to this class, every plant whose filaments are connected by insertion into a corolla, or calyx, of one piece.

The class *Monadelphia* is not in itself a natural one, though it embraces some tribes that are natural combinations, as the *Columniferæ* and *Gerania*. Its orders are distinguished by the number of stamens, easily determined at their upper part, bearing the anthers, where they are always, for a considerable distance, separate and distinct. These orders are eight, *Triandria, Pentandria, Heptandria, Octandria, Decandria, Endecandria, Dodecandria*, and *Polyandria*; of which the last, comprising the *Columniferæ*, and some other noble plants, is the most numerous and important.

MONADELPHIA is also the name of an order of the 21st and 22d classes (*Monoecia* and *Dioecia*) of the Linnæan system, founded on the same character as the class so denominated. This order in the 21st class is chiefly formed of the Fir, or coniferous, tribe, and of some of the natural order of *Euphorbiæ* of Jussieu; in the 22d also it contains some of the allies of the Fir, with a very few genera besides. Professor Willdenow has removed the Gourd or Cucumber tribe to the *Monoecia Monadelphia*, justly perceiving that they were inaccurately referred to *Monadelphia Syngenesia* by Linnæus; an order which, as far as is hitherto known, has no existence in nature. Their anthers in fact are quite distinct, their filaments only being more or less combined. But this combination is not into one set, except perhaps in *Sicyos* and *Sechium*. The rest of this tribe are by no means monadelphous, but polyadelphous, their five stamens being united by their filaments into three sets. See MOMORDICA.

MONADNOCK, GREAT, in *Geography*, a mountain of America, in Cheshire county, New Hampshire, between the towns of Jeffrey and Dublin. The foot of the hill is 1395 feet, and its summit 3254 feet, above the level of the sea. Its base is five miles in diameter from N. to S., and three from E. to W. On the sides are some appearances of subterraneous fires.

MONADNOCK, *Upper Great*, a high mountain in Canaan, in the N.E. corner of the state of Vermont.

MONAGHAN, a county of Ireland, in the province of Ulster. It is rather of an oblong form, having its greatest extent from north to south, and being very narrow, except in one part, where it stretches between the counties of Fermanagh and Cavan, which form its western boundary. On the north it runs into the county of Tyrone in an angular direction, being separated from it on the north-east by the river Blackwater. The county of Armagh lies on the east of it, that of Louth on the south-east, and that of Meath on the south. The length of this county is 30 miles (38 English) from north to south; its greatest breadth is 19 miles (24 English), but in most parts it does not exceed 10, and is not always so much. The area is 179,600 Irish plantation equal to 288,500 English acres; and in square miles 280 Irish or 450 English. This is the statement of Dr. Beaufort and sir Charles Coote. Mr. Wakefield, for what reason he does not state, says the area is 509 English miles. The whole is divided into 21 parishes, of which 20 had churches when Dr. Beaufort published, all in the diocese of Clogher. The population is stated by Dr. Beaufort at 118,000 for 21,523 houses; but the general increase since the publication of his work is sufficient ground for considering it too low an estimate.

Monaghan has a large proportion of bog, and a great number of small lakes, which, together with its being exposed to the north-westerly winds, render it very damp, though it is far from being unwholesome. On the north-west the Sliebh-Baught mountains divide it from Tyrone; and on the east the Fews mountains are the boundary. In most parts of the county the surface is hilly, but no part is inaccessible to the plough. The turf bogs, supplying abundance of fuel, are of great value, and have been reckoned one cause of its great population, in which it is inferior to no county in Ireland, Dublin and Armagh alone excepted. The soil is in general deep clay, which is particularly favourable for flax, and this is the principal crop. In 1809 three thousand two hundred acres were sown with flax, a greater number in proportion to the extent than in any county except Armagh. Potatoes and oats are successfully cultivated, but there is very little wheat; and the small farms into which the land is divided do not answer for grazing or dairy husbandry. The lower classes are sensible of the value of vegetables, which are raised very abundantly in their little gardens; and with similar encouragement to that given by lord Hardwicke on his estate in Cambridgeshire, these gardens would contribute in a still greater degree to the comfort of the proprietors. The linen manufacture is the great object of the people, and is productive of its usual happy effects, though it is not favourable to improved agriculture. The Slieb-Baught mountains, which extend into this county from Tyrone, form an uninterrupted ridge of high land, the highest part of which is called Cairnmore. These have, in general, neither a fruitful soil, nor any natural beauties to recommend them, being an uninteresting waste, and almost always wet and moory. There are parts, however, which have beds of the richest limestone, and abundance of marle, particularly on the eastern side of Cairnmore. This mountain is famous for its millstone quarry. Those most valued consist of a red and very hard grit or sandstone, the grain of which is close. There is also a soft whitish sandstone, which is more easily procured, but which soon wastes away. In this neighbourhood is also a fine kind of potters' clay, which is carried to the pottery at Dundalk, and is used in making the best thin glazed ware. Indications of coal have also been observed here, and in other parts of the county. Crieve, which is south of the town of Ballibay, is the highest ground in Monaghan. The stone here is of a very hard

hard quality, of a colour between blue and dark green, and is found to anſwer very well for building. It is called *whinſtone*, and ſeems to be a kind of greenſtone. Crieve abounds with lead ore of the richeſt quality. On the ſummit of this mountain is a lake covering about fifty acres, which is very deep, and is principally ſupplied from ſprings. This lake ſerves as a reſervoir for ſupplying a number of bleach-mills, fourteen of them being worked by the ſtream flowing from it. The conſequence of theſe eſtabliſhments has been the reclaiming of a conſiderable part of the mountain, notwithſtanding the badneſs of the ſoil; ſo that what was regarded a few years ago as a waſte with nothing to recommend it, has, in conſequence of the application of a ſtream of water to the prevailing manufacture, become a moſt thriving and valuable diſtrict. It has been already mentioned, that Monaghan abounds with ſmall lakes which might be turned to the ſupply of a canal extending through it from lough Neagh to lough Erne, which ſeems to be practicable without very great expence, ſhould the improvement of the country render it deſirable. The number of theſe lakes is 184, of which 30 are conſiderable ſheets of water. Lough Barrac, near Caſtle Blayney, and the lake of Kilcrow at Coote Hill, principally deſerve notice for their extent and beauty. The rivers are numerous, but inconſiderable. Of Monaghan, the county town, an account will be given in the next article. Clones, Carrickmacroſs, Caſtle Blayney, and Ballibay, have been noticed in preceding volumes under their reſpective heads. As none of them are boroughs ſince the Union, Monaghan is repreſented in parliament by only two members, who are, according to Mr. Wakefield, returned by no individual prevailing intereſt.

In the hiſtory of Ireland we do not find any matter of moment relating to this county until the reign of James I., when 500,000 acres in Ulſter were eſcheated to the crown under the charge of the proprietors being diſaffected to the king's government, which forfeiture included almoſt the whole of Monaghan. A great part of theſe lands was ſoon after aſſigned to Britiſh adventurers, moſtly Scotch; but conſiderable eſtates were left, according to ſir John Davis's ſtatement, to ſeveral of the name of M'Mahon, which had been the prevailing family in it. Theſe were probably forfeited at a ſubſequent period, as the name of M'Mahon does not occur in the liſt of the preſent proprietors given by ſir Charles Coote. "The rent rolls of large eſtates," ſays the writer laſt named, "will be found from near 20,000*l.* to 1,000*l. per annum*, and a very conſiderable part is held in grants from 20*l.* to 500*l. per annum*. The large eſtates are in no inſtance reſided on by the immediate proprietors, but the leſſer ones are almoſt uniformly otherwiſe, and are held in grants from the crown, ſince the Scotch colony was introduced here; and alſo a conſiderable ſhare of theſe lands comprehended gifts to Cromwell's ſoldiers, many of whoſe poſterity now enjoy ſo ſmall a tract, as does not yield above 20*l.* annual income. I ſuppoſe taking the large farms in Monaghan they would not average 25 acres; nor could the ſmall ones, which are far more numerous, average ſix acres, ſo that ten may be the mean rate of the whole county." "The largeſt eſtates," according to Mr. Wakefield, "exhibit the moſt wretched cultivation; fields without hedge-rows, and encloſed only by earthen banks or dykes; land running to waſte, which, with great truth, may be compared to its inhabitants, that is, loſing its ſtrength for want of proper nouriſhment, and exiſting in a ſtate of the utmoſt poverty." It would be eaſy to enlarge upon the evils ariſing from non-reſident landlords, rack-rents paid to middle men, and a conſequent wretched ſyſtem of agriculture; but to do ſo in this place would not be likely to contribute to amendment, and the remarks would not belong to this more than to many other counties. Beaufort's Memoir. Sir C. Coote's Statiſtical Survey. Wakefield's Account of Ireland.

Monaghan, a market and poſt-town of Ireland, and the ſhire-town of the county of Monaghan, deſcribed in the preceding article. Before the Union it was a borough, but is not now repreſented. It is 62 miles N.N.W. from Dublin. N. lat. 54° 16'. W. long. 6° 49'.

MONAH, a town of Hindooſtan, in Baramaul; eight miles N. of Namacul.

MONAHAN, a townſhip of America, in York county, Pennſylvania.

MONAINCHA, in *Eccleſiaſtical Antiquities*, the name of a celebrated old monaſtery in Ireland, which belonged to the Culdees, and is mentioned by Cambrenſis. It is ſituated in the bog of Monela, in the county of Tipperary; three miles S.E. from Roſcrea. Archdall. Ledwich.

MONAMBASCHAGATT, a town of Africa, on the river Camarones.

MONANDRIA, in *Botany*, from μονος, *one*, and ανηρ, *a man*, the firſt claſs of the Linnæan ſexual, or artificial, ſyſtem, characterized by having one ſtamen only, in the ſame flower with the piſtil. It conſiſts of two orders, diſtinguiſhed by the number of their ſtyles, or ſeſſile ſtigmas; like all the orders of the firſt 13 claſſes of this ſyſtem. Some few ſpecies of *Valeriana*, a naturally triandrous genus, are monandrous.

The character of this claſs is in general eaſy and obvious, but a difference of opinion exiſts among botaniſts, concerning ſome genera which Linnæus has referred to it. Theſe are of the natural order of *Scitamineæ*, in ſeveral of which order the two lobes of the anther are ſeparated by the breadth of the filament, which is in them unuſually great. But that theſe two lobes do really conſtitute one anther only, is evident from other genera of the ſame natural order, in which, the filament being but of the ordinary ſlender dimenſions, the two lobes are brought cloſely together. There are other inſtances of a ſimilar diſtance between the two lobes of an anther, as in *Berberis*.

Monandria is likewiſe the name of an order of the claſs *Gynandria*, as well as of the *Monoecia* and *Dioecia*. Reſpecting the two laſt, every body is agreed, but the firſt has been eſtabliſhed ſince the time of Linnæus, and conſiſts of all the known *Orchideæ*, except *Cypripedium*, which that great botaniſt conſidered as having two anthers, but which prove, on a correct inveſtigation, and eſpecially by the analogy of the *Scitamineæ*, to have really but one. See Orchideæ and Scitamineæ.

Some ſpecies of *Salix*, conſidered as monandrous, are perhaps more truly monadelphous, their anther being certainly double, and their filaments two, united into one from the bottom to the very ſummit. In other ſpecies this union is but partial, and theſe are univerſally deemed monadelphous.

MONANTHUEIL, Henry de, in *Biography*, or, when latinized, *Monantholius*, a French phyſician and mathematician, was born of a noble family, poſſeſſed of an eſtate of the ſame name, in the Vermandois, about the year 1536. His birth place was Rheims; but he received his education in the college of Preſla, at Paris, under the direction of the celebrated Ramus, whoſe doctrines he afterwards defended. He then transferred his ſtudies to the college royal, where he applied with ardour both to mathematics and medicine, and received the degree of doctor in the latter ſcience. He held the office of dean of the faculty of medicine for two ſucceſſive years, 1578 and 1579. His mathematical acquirements had obtained for him the appointment of profeſſor in 1576, which

which he fulfilled with so much distinction, as to gain the honour of numbering among his auditors the celebrated James Augustus de Thou, the learned Peter de Lamoignon, and other eminent characters. He continued to perform the duties of this professorship with undiminished zeal and reputation, for a period of thirty years; while at the same time he did not neglect those of his medical office. He was extremely active in maintaining the privileges of the faculty, and successfully exposed the impositions of a noted empiric of his day, named La Riviere, who was exiled from Paris by an arrêt of parliament. He was on terms of intimate friendship with William du Vair, keeper of the seals; and was the Musæus, on whom that gentleman bestowed so high an eulogium in his discourse "On Constancy." He was distinguished by his steady loyalty during the trouble of the *league*, and pronounced the first public panegyric on king Henry IV., when his majesty obtained the possession of Paris from the hands of that faction. He died in the year 1606, highly respected for every quality that could adorn the man and the scholar. He was author of the following works: "Liber de Angulo Contactus, adversus Jacobum Peletarium," 1581;—"Oratio, quale esse deberet Collegium Professorum Regiorum," 1595;—"Ludus Jatro-mathematicus, Musis factus," 1597;—"Commentarii in Librum Aristotelis de Mechanicis," with the Greek text, and a new Latin version, 1599;—"De Puncto, primo Geometriæ principio, Liber," 1600;—"Problematis omnium quæ à 1200 annis inventa sunt nobilissimi Demonstratio," 1600. And he left in an unfinished state a large mathematical work, entitled "Hepatecnon Mathematicum," on which he had been long occupied. Gen. Biog. Eloy Dict. Hist.

MONARCHICI, in *Church History*, heretics towards the end of the second century, who allowed but one person in the godhead, and maintained that the father, the creator of all things, had united himself to the human nature of Christ; whence they were called Monarchians; and they also taught that the father was crucified; on this account they were denominated Patripassians.

MONARCHY, μοναρχια, a large state governed by one; or a state where the supreme power is lodged in the hands of a single person.

The word comes from the Greek μοναρχης, *one who governs alone*; formed of μονος, *solus*, and αρχη, *imperium, government*.

Of the three forms of government, *viz.* democracy, aristocracy, and monarchy, the last is the most powerful, all the sinews of government being knit together, and united in the hand of the prince; but then there is imminent danger of his employing that strength to improvident or oppressive purposes. As a democracy is the best calculated to direct the end of a law, and an aristocracy to invent the means by which that end shall be obtained, a monarchy is most fit for carrying those means into execution.

Honour, says Montesquieu, which aspires to preferments and distinguishing titles, is the prevailing principle in monarchies; this sets all the parts of the body politic in motion; by its very action it connects them, and thus each individual advances the public good, while he only thinks of promoting his own particular interest; this principle gives life, not only to the whole body politic, but to the laws, and even to the virtues themselves. This principle is altogether unknown in despotic governments; of which fear is the principle.

As honour is the principle of a monarchical government, systems of education and of legislation should be formed and conducted with a constant regard to this principle. The nobility should be rendered respectable and hereditary, and their lands should have privileges annexed to them as well as their persons. The laws should also favour all kinds of commerce, consistent with the constitution of the government, that the subjects may be able, without ruining themselves, to satisfy the continual cravings of the prince and his court. Some fixed regulation should also be established, that the manner of collecting the taxes may not be more burdensome than the taxes themselves.

Monarchy has a great advantage over a despotic government. As it naturally requires there should be several orders belonging to the constitution under the prince, the state is more fixed, the constitution more steady, and the person of him that governs more secure. We may also add, that as people who live under a good government, are happier than those who, without rule or leaders, wander about the forests; so monarchs who live under the fundamental laws of their country, are far happier than despotic princes, who have nothing to regulate either their own, or their subjects' hearts. In monarchies, where honour alone predominates, the prince's rewards would consist only of marks of distinction, if the distinctions established by honour were not annexed to a luxury which is necessarily attended with wants; the prince therefore is obliged to confer honours that lead to wealth; and it is a general rule, that great rewards, in monarchies and republics, are a sign of their decline; because they are a proof of their principles being corrupted, and that the idea of honour has no longer the same force in monarchy, nor the title of citizen the same force in a republic. The very worst Roman emperors were those who were most profuse in their largesses, *viz.* Caligula, Claudius, Nero, Otho, Vitellius, Commodus, Heliogabalus, and Caracalla. The best, such as Augustus, Vespasian, Antoninus Pius, Marcus Aurelius, and Pertinax, were economists. Under good emperors the state resumed its principles; all other treasures were supplied by that of honour. In a republic presents are odious, because virtue does not need them. In monarchies honour is a much stronger incentive than presents. But in a despotic government, where there is neither honour nor virtue, people cannot be determined to act but through hopes of the conveniences of life. In monarchical governments, Montesquieu is of opinion, that the laws ought not to oblige a subject to accept of a public employment; nor should a subject be obliged to accept of a post in the army inferior to what he held before, because honour, true or false, will never bear with what it calls degrading itself; nor should civil and military employments be conferred on the same person; nor is venality of public employments improper, as he thinks, in monarchies. He adds, that in monarchies there should be no censors, because being founded on honour, it is in the nature of honour to have the whole universe for a censor. In monarchies, the administration of justice, which decides not only in regard to life and property, but likewise to honour, demands very scrupulous inquiries. In monarchies, it is a great inconvenience for the ministers of the prince to be judges. Our author thinks, that luxury is extremely proper for monarchies, and that under this government there ought to be no sumptuary laws. Republics, he says, end with luxury, and monarchies with poverty. As democracies are destroyed when the people despoil the senate, magistrates, and judges of their functions; so monarchies are corrupted when the prince insensibly deprives societies of their prerogatives, or cities of their privileges. In the first case the multitude usurp a despotic power; in the second it is usurped by a single person. Monarchy is destroyed, when a prince thinks he shews a greater exertion of power in changing, than in conforming to the uses of things; when he deprives some of his

his subjects of their hereditary employments, to bestow them arbitrarily upon others, and when he is fonder of being guided by his fancy than by his judgment. It is destroyed, when the prince, directing every thing to himself, calls the state to his capital, the capital to his court, and the court to his own person. Monarchy is destroyed, in fine, when the prince mistakes his authority, his situation, and the love of his people; and when he is not fully persuaded, that a monarch ought to think himself secure, as a despotic prince ought to think himself in danger. Montesq. Sp. of Laws, vol. i. passim.

The most ancient monarchy was that of the Assyrians, which was founded soon after the deluge, in the year 2059 B.C. We usually reckon four grand or universal monarchies; the Assyrian, Persian, Grecian, and Roman: though St. Augustine makes them but two, *viz.* those of Babylon and Rome. Belus is placed at the head of the series of Assyrian kings who reigned at Babylon, and is by profane authors esteemed the founder of it, and by some the same whom the scriptures call Nimrod. The principal Assyrian kings after Belus were Ninus, who built Nineveh, and removed the seat of empire to it; Semiramis, who, disguising her sex, took possession of the kingdom instead of her son, and was killed and succeeded by her son Ninyas; and Sardanapalus, the last of the Assyrian monarchs, and more effeminate than a woman. With him terminated the ancient monarchy of Assyria, in the year 820 B.C. After his death, the Assyrian empire was split into three separate kingdoms; *viz.* the Median, Assyrian, and Babylonian. The first king or prefect of the Median kingdom was Arbaces; and this kingdom lasted till the time of Astyages, who was subdued and divested of his kingdom by Cyrus. The first king of the new Assyrian kingdom was Phul, who began his reign in the year 777 B.C., and this kingdom was united to that of Babylon under Assaradinus, 680 B.C. The Babylonian kingdom commenced under Nabonassar, 747 B.C., and after being united to that of Assyria, was again separated, 667 B.C., Saosduchinus being its first king, and Ninus II. king of Assyria. These monarchies continued separate until the year 606 B.C., when Assyria was united to Media. The Babylonian kingdom terminated by the conquest of Cyrus, 538 B.C. In the time of Cyrus, there arose a new and second monarchy, called the Persian; which stood upwards of two hundred years, from Cyrus, whose reign began 559 B.C., to Darius Codomannus, who was conquered by Alexander, 331 B.C., and the empire translated to the Greeks. The first monarch was Cyrus, founder of the empire; the second Cambyses, the son of Cyrus. 3. Smerdis. 4. Darius, the son of Hystaspes, who began his reign 521 B.C. 5. Xerxes, who succeeded Darius, 485 B.C. 6. Artaxerxes Longimanus, who commenced his reign 464 B.C. 7. Xerxes II., who began his reign 425 B.C. 8. Ochus, or Darius, called Nothus, 424 B.C. 9. Artaxerxes Mnemon, 404 B.C. 10. Artaxerxes Ochus, 358 B.C. 11. Arses, 337 B.C. 12. Darius Codomannus, 335 B.C., who was defeated by Alexander the Great, and deprived of his kingdom and life about 331 B.C.; the dominion of Persia after his death was translated to the Greeks. The third monarchy was the Grecian. As Alexander when he died did not declare who should succeed him, there started up as many kings as there were commanders. At first they governed the provinces, that were divided among them, under the title of viceroys; but when the family of Alexander the Great was extinct, they took upon them the name of kings. Hence, in process of time, the whole empire of Alexander produced four distinct kingdoms; *viz.* 1. The Macedonian, the kings of which, after Alexander, were Philip, called Aridæus, 323 B.C., Cassander, 316 B.C., Antipater and Alexander, 298 B.C., Demetrius Poliorcetes, 294 B.C., Pyrrhus, 287 B.C., Lysimachus, 286 B.C., Ptolemy, called Ceraunus, 280 B.C., Meleager, 279 B.C., Antipater the Etesian, 278 B.C., Antigonus Gonatas, 277 B.C., Demetrius, 243 B.C., Antigonus Doson, 232 B.C., Philip, 221 B.C., and Perseus, 179 B.C., under whom the Macedonian kingdom was reduced to the form of a Roman province. 2. The Asiatic kingdom, which, upon the death of Alexander, fell to Antigonus, 311 B.C., comprehending that country now called Natolia, together with some other regions, beyond Mount Taurus. From this kingdom proceeded three lesser ones; *viz.* that of Pergamus, whose first king was Philetærus the Eunuch, 283 B.C., and whose last king, Attalus, called Philometor, in the year 132 B.C., appointed the Roman people to be his heir: Pontus, reduced by the Romans into the form of a province, when they had subdued the last king, Mithridates; and the Syrian. 3. The Syrian, to which that of Babylon was united, of whose twenty-two kings the most celebrated were Seleucus Nicator, founder of the kingdom, 312 B.C., Antiochus Deus, 261 B.C., Antiochus the Great, 223 B.C., Antiochus Epiphanes, 175 B.C., Tigranes, 83 B.C., and Antiochus Asiaticus, 69 B.C., who was conquered by the Romans under Pompey; and Syria was reduced into the form of a Roman province, 65 B.C. 4. The Egyptian, which was formed by the Greeks in Egypt, and flourished near two hundred and forty years under twelve kings; the principal of whom were Ptolemy Lagus, its founder, 323 B.C., Ptolemy Philadelphus, 284 B.C. founder of the Alexandrian library; and queen Cleopatra, who was overcome by Augustus; in consequence of which Egypt was added to the dominion of the Romans, 30 B.C. The fourth monarchy was the Roman, which lasted two hundred and forty-four years, from the building of the city, until the time when the royal power was abrogated. The kings of Rome were Romulus its founder, Numa Pompilius, Tullus Hostilius, Ancus Martius, Tarquinius Priscus, Servius Tullius, and Tarquin the Proud, who was banished, and with whom terminated the regal power. Holberg's Introd. to Univ. Hist. by Dr. Sharp, p. 85, &c.

There seems, in reality, no necessity to make the Medes, Persians, and Greeks, succeed to the whole power of the Assyrians, to multiply the number of the monarchies: it was the same empire still, and the several changes that happened in it, did not constitute different monarchies. Thus the Roman empire was successively governed by princes of different nations, yet without any new monarchy being formed thereby. Rome, therefore, may be said to have immediately succeeded Babylon in the empire of the world. See Empire.

Of monarchies some are *absolute* and *despotic*, where the will of the monarch is uncontrollable, as Denmark, &c.; others are *limited*, where the prince's authority is restrained by laws, and part of the supreme power lodged in other hands; as in England. See Government.

Some monarchies, again, are *hereditary*, where the succession devolves immediately from father to son; and others are *elective*, where, on the death of the monarch, his successor is appointed by election.

According to Hobbes, monarchy, as well as aristocracy, derives all its authority from the people, who transfer all their right, *v. gr.* the supreme power, by a plurality of suffrages, &c. to some one person called a monarch; so that whatever the people could have done before this translation, may be now rightfully done by him to whom the

the tranſlation is made. This done, the people are no longer to be looked upon as a body, but a diſſolved multitude; becauſe they were only one by virtue of the ſupreme power, which they have now transferred to another.

Nor can the monarch, according to this author, oblige himſelf by any covenants, to any perſon, for the authority he has received; becauſe he receives the power from the people, which, as ſoon as that is done, ceaſes to be a body; and the body ceaſing, the obligation to the body ceaſes of courſe. The people, therefore, are obliged to pay obedience to the monarch, by virtue of thoſe covenants, whereby they mutually oblige themſelves to what the people, as a body, enjoin to be done.

He argues, farther, that as a monarch cannot be obliged by any covenants; ſo neither can he do any injury to his ſubjects; an injury being nothing elſe but a breach of covenant; and where there is no covenant, there can be no breach of one. De Cive, c. 8. See HOBBISM.

Fifth-MONARCHY *Men*, in the *Eccleſiaſtical Hiſtory of England*, were a ſet of wrong-headed and turbulent enthuſiaſts who roſe in the time of Cromwell, and who expected Chriſt's ſudden appearance upon earth to eſtabliſh a new kingdom: and, acting in conſequence of this illuſion, aimed at the ſubverſion of all human government. Burnet's Hiſt. of his Own Times, vol. i. p. 67.

MONARDA, in *Botany*, named in honour of Nicholas Monardes, a Spaniſh phyſician and botaniſt who lived at Seville towards the cloſe of the ſixteenth century, and who publiſhed various treatiſes relating to the natural productions, and eſpecially to the *Materia Medica*, of the new world.—Linn. Gen. 16. Schreb. 22. Willd. Sp. Pl. v. 1. 124. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 1. 50. Vahl. Enum. v. 1. 217. Michaux. Boreal-Amer. v. 1. 16. Juſſ. 111. Lamarck Illuſtr. t. 19. Gærtn. t. 66.—Claſs and order, *Diandria Monogynia.* Nat. Ord. *Verticillatæ*, Linn. *Labiatæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, tubular, cylindrical, ſtriated, permanent, with a five-toothed, equal mouth. *Cor.* unequal; tube cylindrical, longer than the calyx; limb ringent: upper lip ſtraight, narrow, linear, undivided; lower reflexed, broader, cloven into three ſegments, of which the middle one is longer, narrower, and emarginate; its ſides obtuſe. *Stam.* Filaments two, briſtle-ſhaped, as long as the upper lip, by which they are embraced; anthers compreſſed, truncated at the top, convex and ſtraight at the lower part. *Piſt.* Germen ſuperior, four-cleft; ſtyle thread-ſhaped, parallel to the ſtamens; ſtigma cloven, acute. *Peric.* none. *Seeds* four, roundiſh, lying at the bottom of the calyx.

Obſ. *M. didyma* has four ſtamens, two of which are abortive.

Eſſ. Ch. Corolla unequal, its upper lip linear, and incloſing the filament. Seeds four.

1. M. *fiſtuloſa.* Purple or Crimſon Canada Monarda. Linn. Sp. Pl. 32. J. Miller. Illuſtr. t. 3. (M. fiſtuloſa, *var;* Curt. Mag. t. 145.)—Leaves oblong-lanceolate, pointed, hairy, flat. Stems obtuſely angular.—Native of Canada as well as other parts of North America, cultivated by Mr. John Tradeſcant in 1656. It flowers from June to Auguſt.—*Root* perennial, ſtrongly fibrous and ſpreading. *Stems* nearly three feet high, obtuſely angular, hairy, branched at the upper part. *Leaves* oppoſite, on ſhort ſtalks, broad at the baſe, but ſharply pointed at the end, hairy and toothed. *Flowers* in one or two terminal, denſe whorls, of a beautiful deep crimſon colour.—The whole herb is remarkable for its fragrance as well as beauty, and is not unfrequently cultivated in our gardens. The variety figured by Curtis, and quoted above, is larger and more ſhowy than the original ſpecies, its bloſſoms far ſurpaſſing that in ſize and brilliancy of colour. The floral leaves alſo are richly tinted with lilac or purple.—Upon comparing Curtis's figure with the Linnæan Herbarium, it appears that this variety of *fiſtuloſa* is what Linnæus has called *M. mollis* in the third volume of the *Amœnitates Academicæ*, p. 399.—It may be propagated by parting its roots.

2. M. *oblongata.* Long-leaved Monarda. Willd. n. 2. Ait. Hort. Kew. ed. 2. v. 1. 51.—Leaves oblong-lanceolate, rounded and ſomewhat contracted at the baſe, hairy, flat.—Native of North America, and cultivated in 1761, by Mr. James Gordon. It flowers from July to September.—There is no figure of this ſpecies, but, from a ſpecimen in Dr. Smith's herbarium, we find that it chiefly differs from the preceding in having its *leaves* more oblong, and more attenuated, though not actually tapering, at the baſe; they are alſo more hairy on the under ſide. The *calyx* is ſhorter and more hairy at the margin. The *flowers* alſo are ſmaller.

3. M. *didyma.* Scarlet Monarda, or Oſwego-Tea. Linn. Sp. Pl. 33. Curt. Mag. t. 546. (M. coccinea; Michaux. Boreal-Amer. v. 1. 16.)—Leaves ovate, ſmooth. Whorls of flowers capitate, with two imperfect, additional ſtamens. Stem acutely angular.—Native of rills on the mountains of North America; introduced into this country by Peter Collinſon, before 1752. It flowers from June to Auguſt.—*Root* perennial. *Stems* about two feet high, ſquare, acutely angular, branched ſo as to become buſhy towards the top. *Leaves* oppoſite, on ſhort ſtalks, toothed and fringed at the edge, when bruiſed, emitting a grateful, refreſhing ſmell, which, independently of the beauty of the plant, would entitle it to a place in every garden. *Flowers* much like thoſe of *M. fiſtuloſa* in habit, but larger, and of a rich ſcarlet hue; moſt of them furniſhed with two additional abortive ſtamens, whence the ſpecific name.—This increaſes greatly by throwing out radical ſhoots, which may be tranſplanted.

4. M. *rugoſa.* White Monarda. Willd. n. 4. Ait. Hort. Kew. ed. 2. v. 1. 51.—Leaves ovato-lanceolate, heart-ſhaped, ſmooth, rugoſe.—Native of North America; cultivated in 1761, by Mr. James Gordon; flowering from July to September.—This ſpecies is adopted by Vahl and Martyn from Aiton, but as we are unacquainted with any ſpecimen or figure, we can only give profeſſor Willdenow's deſcription, who ſays that it is very nearly allied to the following ſpecies, *M. clinopodia*, but that its *leaves* are longer, ſmooth, and ſomewhat rugoſe like thoſe of many ſpecies of *Salvia*. The *flowers* alſo are white.

5. M. *clinopodia.* Wild Baſil-leaved Monarda. Linn. Sp. Pl. 32.—Leaves ovato-lanceolate, ſmooth, rounded and unequal at the baſe.—Native of Virginia; cultivated by Mr. William Malcolm in 1771. It flowers in July.—*Root* creeping. *Stems* about two feet high, ſquare, rather acutely angular, branched. *Leaves* oppoſite, remarkably ſmooth, attenuated, remotely ſerrated; the floral ones narrower, and coloured at the baſe. *Flowers* capitate, terminal, of a pale colour.—The ſpecific name originated from a ſtriking reſemblance in the leaves to thoſe of *Clinopodium incanum*, and was originally written by Linnæus, on the ſpecimen in his herbarium, *clinopodifolia*.

6. M. *punctata.* Spotted Monarda. Linn. Sp. Pl. 32. Andr. Repoſ. t. 546. Sm. Inſects of Georgia, t. 24. (M. lutea; Michaux Boreal-Amer. v. 1. 16.)—Flowers in whorls. Corolla ſpotted. Bracteas large and coloured.—Native of North America; cultivated here in 1714, by Mr. Thomas Fairchild.

Fairchild.—*Root* biennial. *Stems* erect, nearly two feet high, branched, jointed. *Leaves* in ftalks, lanceolate, in clufters at each joint, ferrated from the middle to the end, fmooth, veined. *Flowers* axillary, in denfe whorls, yellow, fpotted with purple, accompanied by very handfome, crimfon *bracteas*. Michaux has changed the fpecific name to *lutea*, becaufe he obferves, the *corolla* in every fpecies of *Monarda* is fpotted. We cannot however accede to this change, as in our prefent plant, the fpots on the corolla are fo infinitely more apparent than in any other, as to render the name fufficiently defcriptive.

7. M. *allophylla*. Various-leaved Monarda. Vahl. Enum. v. 1. 219. Michaux. Boreal-Amer. v. 1. 16.—Leaves oblong, ferrated. Calyx bearded at the border. Flowers capitate, terminal.—Found by Michaux in North America, from whom and Vahl all that we know of it is collected. The former fays, that the fhape, ferratures, and pubefcence of its *leaves* are fo various as to induce a fuppofition that its varieties may conftitute different fpecies. *Flowers* flefh-coloured.

8. M. *ciliata*. Virginian ciliated Monarda. Linn. Sp. Pl. 33. (Clinopodium anguftifolium non ramofum, flore cæruleo: labio trifido, atropurpureis maculis ornato; Pluk. Alm. t. 164. f. 3.)—Leaves oblong or oval, gradually pointed. Flowers capitate, whorled. Bracteas ciliated.—Native of Virginia and Carolina. Introduced at Kew by Mr. Francis Maffon in 1798. It flowers in July. —*Root* creeping. *Stems* a foot or more in height, diftantly jointed, hairy, efpecially at the upper part. *Lower leaves* on ftalks, roundifh, an inch long, notched; upper ones feffile, narrower. *Flowers* capitate, in whorls, large, blue, elegantly marked, with dark purple fpots. The habit and appearance of this fpecies are different to all the reft, and it has the fmell of Mint.

Monarda, in *Gardening*, contains plants of the fibrous-rooted, herbaceous, flowery, biennial, and perennial kinds, of which the fpecies cultivated are: the purple monarda (M. fiftulofa); the long-leaved monarda (M. oblongata); the fcarlet monarda, or Ofwego tea (M. didyma); the white monarda (M. rugofa); and the fpotted monarda (M. punctata).

Method of Culture.—All thefe plants may be increafed by parting the roots, and fome of them by flips and cuttings as well as feeds. But as the firft fort does not increafe faft by the roots, the feeds may be fown in the autumn on a bed of good earth, and in the following fummer the plants be removed into nurfery rows half a foot apart, in a rather fhady fituation, and in the beginning of the following autumn fet out where they are to remain and flower. They fucceed beft in a foft loamy foil not too much expofed.

The roots fhould be divided either in the autumn or very early fpring, but the former is the better feafon, being afterwards either planted out in rows till they are ftrong, or, when ftrong, at once where they are to remain. And ftrong flips or cuttings of the branches may be taken off in the beginning of fummer, and planted out in a fhady border, due fhade and water being given till well rooted, when in the autumn they may be removed to where they are to remain.

The third fpecies fucceeds beft in a light foil in an eaftern afpect.

Thefe plants all afford ornament in the borders and clumps of pleafure-grounds, &c.

MONARDES, Nicholas, in *Biography*, a Spanifh phyfician, was born at Seville in the early part of the fixteenth century. He received his education at the univerfity of Alcala de Henarez, and fettled in the practice of his profeffion in his native city. Little is recorded refpecting his life, which terminated at the fame place in the year 1578. He was confiderably diftinguifhed, however, by his writings, the firft of which related to a controverted queftion, and was entitled, "De fecanda vena in Pleuritide inter Græcos et Arabes concordia," Hifpal. 1539. His next was a tract, "De Rofa et partibus ejus; de fucci Rofarum temperatura, &c."—But his reputation was chiefly extended by his work, in the Spanifh language, concerning the medicinal fubftances imported from the new world, entitled, "Dos Libros de las cofas que fe traen de las Indias Occidentales, que firven al ufo de Medicina," Sevilla 1565. It was reprinted in 1569 and 1580, and to the latter edition a third book was added. Charles l'Eclufe, or Clufius, tranflated this work into Latin, with the title of "Simplicium Medicamentorum ex novo orbe delatorum, quorum in Medicina ufus eft, Hiftoria," Antw. 1574, and improved it by his annotations, and by the addition of figures. This work was alfo tranflated into Italian and French. The botanift will feek in vain for accuracy in his defcriptions, but the work was ufeful, by exciting the public attention to medicines heretofore little known. Monardes alfo publifhed three works in Spanifh, which were tranflated into Latin by l'Eclufe, with the title of "Nicolai Monardi Libri tres, magna Medicinæ fecreta et varia Experimenta continentes," Lugd. 1601. The firft of thefe relates to the lapis bezoardicus; the fecond, to the ufe and properties of fteel, which he was the firft after Rhazes to recommend as a deobftruent, according to Dr. Freind; and the third, to the efficacy of fnow. His name is perpetuated by the botanical genus *Monarda*, in the clafs diandria of Linnæus. Eloy Dict. Hift. Gen. Biog.

MONAS, in *Natural Hiftory*, a genus of infects of the order Infuforia. The generic character is, worm invifible to the naked eye, moft fimple, pellucid, refembling a point. This genus includes five fpecies, of which three are found in our own country. Mr. Adams defcribes five other fpecies.

Species.

* Atomus. Whitifh, with a variable point. The animalculum itfelf appears as a white point, which, when highly magnified, is egg-fhaped: the fmaller end is generally marked with a black point, of which the fituation is fometimes varied, and found at the other end. Sometimes there are two black points feen croffing the middle of the body. Mr. Adams fays it was found in fea-water that had been kept the whole winter; it was not fetid, but no other fpecies of animalcula could be difcovered in the fame water.

Punctum. A folid opaque black point. The animalcula of this fpecies are very minute points, folid, opaque, and black, round and long. They are difperfed in the infufion, and move with a flow wavering motion, and were found in a fetid infufion of pears.

* Mica. This is tranfparent, or rather femi-tranfparent, like talc, with an oval moveable circle in the middle. It may be difcovered fometimes in very pure waters with the third lens of a fingle microfcope: when the magnifying power is increafed, it appears nearly fpherical, or oval, as it feems able to affume either of thefe forms at pleafure. There is a confiderable variety in its motions: it often turns round for a long time in the fame place. An appearance has been exhibited like two kidnies in the middle of the body, and the little animal is beautifully encompaffed with a kind of halo, arifing, moft probably, from invifible and vibrating fibrillæ.

* Lens. This, as its name imports, is tranfparent, with frequently

frequently a greenifh margin. It is nearly of a round figure, and fo pellucid, that it is not poffible to difcover the leaft veftige of inteftines. The animalcula of this fpecies are frequently feen collected together, forming a kind of vefi-cular or membranaceous mafs. The motions of the *lens* are in general rapid, and Mr. Adams fays that two united together may frequently be feen fwimming among the reft; while in this fituation they have been miftaken by obfervers for a different fpecies, but it is the fame generating another by divifion. It is found in almoft all kinds of water; alfo in infufions of animal and vegetable fubftances, myriads are faid to be contained in a fingle drop.

Termo. A moft minute fimple gelatinous point. Of this Mr. Adams obferves, "Among the various animalcula which are difcovered by the microfcope, this is the moft minute and the moft fimple; a fmall jelly-like point, eluding the powers of the compound microfcope, and being but imperfectly feen by the fingle; thefe and fome others of the Monas kind are fo delicate and flender, that it is no wonder they often efcape the fight of many who have examined infufions with attention; in a full light they totally difappear, their thin and tranfparent forms blending as it were with the water in which they fwim. Small drops of infufed water are often fo full of thefe, that it is not eafy to difcover the leaft empty fpace, fo that the water itfelf appears changed into another fubftance lefs tranfparent, but confifting of innumerable globular points, thickly fown together; which, though full of life, feem only a kind of inflated bladder. In this a motion may be perceived, fomething fimilar to that which is obferved when the fun's rays fhine on the water, the animalcula being violently agitated, or in commotion like a hive of bees."

Such are the fpecies defcribed in Gmelin's edition of Linnæus. Mr. Adams has mentioned five others as follow:

Ocellus. Trafparent like talc, with a point in the middle. The margin is black; it moves irregularly; is found in ditches covered with conferva, and frequently with the "Cyclidium milium."

Tranquilla. Egg-fhaped, tranfparent, with a black margin. The animalcula of this fpecies feem to be animated points, and nearly fixed to one fpot, where they have a fluctuating and reeling motion; they are frequently furrounded with a halo, like the *mica*, but differ in their figure, being fometimes fpherical, and fometimes quadrangular. They are found in urine kept fome time. This fluid is, after it has remained any length of time in the veffel, covered with a dark coloured pellicle, in which the little animals exift. In moft cafes a fingle drop of urine is fatal to animalcula, but the difcovery of thefe prove that there are beings of a peculiar kind appropriated to and flourifhing in it.

Lamellula. Flat and tranfparent. Found chiefly in fea-water. Its colour is whitifh, twice as long as it is broad, tranfparent, with a dark margin, the motion is vacillatory; it often appears as if it were double.

Pulvisculus. Tranfparent, with a green margin. The animalcula of this fpecies appear, when properly magnified, like fpherical pellucid grains of different fizes; the circumference is green, and a green bent line paffes through the middle of fome of them, fuppofed to indicate that they are feparating into two diftinct animalcula. They rove about with a wavering motion, and are found early in the fpring in marfhy grounds.

Uva. Tranfparent and gregarious. The animalcula of this fpecies, when collected in a heap, have a rotatory motion. The fmaller particles feparate from the larger, dividing, fometimes, into as many portions as there are conftituent particles in the group, when feparated they revolve with incredible fwiftnefs. "To try," fays Mr. Adams, "whether this group of animalcula was collected together by mere chance, or whether it was their natural ftate, the following experiment was made. A fingle corpufcle was taken the moment it was feparated from the reft, and placed in a glafs by itfelf; it foon increafed in fize, and when it had attained nearly the fame bulk as the group from which it was feparated, the furface began to affume a wrinkled appearance, which gradually changed till it became exactly fimilar to the parent group." The fame procefs was again tried, and with fimilar fuccefs. It is found in a variety of infufions.

MONASABA, in *Geography*, a town of Hindooftan, in Oude; 25 miles E. of Mahomdy.

MONASERAI, a town of Hindooftan, in the circar of Sumbulpour; 10 miles S.E. of Sumbulpour.

MONASIO, a town of Italy, in the department of the Lario; 15 miles N. of Como.

MONASTEER, a town of Africa, built by the Arabs, on a peninfula, which advances into the fea; 50 miles S.E. of Tunis.

MONASTER, a town of Ruffian Poland, in the palatinate of Kiev; 40 miles E. of Bialacerkiev.

MONASTEREVEN, a poft-town of Ireland, in the county of Kildare and province of Leinfter. It is fituated on the river Barrow, and the Athy branch of the grand canal paffes very near it. It has a flourifhing trade, and a confiderable population. There was an abbey here, which after the fuppreffion came into the Moore family. It ftill wears the venerable appearance, and retains the name of an abbey, and under the appellation of Moore abbey is the feat of the marquis of Drogheda. Monaftereven is 30 miles S.W. from Dublin, and 10 N.W. from Maryborough.

MONASTERII Provisor. See Provisor.

MONASTEROLO, in *Geography*, a town of France, in the department of the Stura; three miles N.W. of Savigliano.

MONASTERY, a convent, or houfe built for the reception of religious; whether it be abbey, priory, nunnery, or the like.

Monastery is only properly applied to the houfes of monks, mendicant friars, and nuns. The reft are more properly called *religious houfes*.

For the origin of monafteries, fee Monastic and Monk. The houfes belonging to the feveral religious orders, which obtained in England and Wales, were cathedrals, colleges, abbies, priories, preceptories, commanderies, hofpitals, friaries, hermitages, chantries, and free chapels. Thefe were under the direction and management of feveral officers. The diffolution of houfes of this kind began fo early as the year 1312, when the Templars were fuppreffed; and in 1323, their lands, churches, advowfons, and liberties, here in England, were given by 17 Edw. II. ftat. 3. to the priory and brethren of the hofpital of St. John of Jerufalem. In the years 1390, 1437, 1441, 1459, 1497, 1505, 1508, and 1515, feveral other houfes were diffolved, and their revenues fettled on different colleges in Oxford and Cambridge. Soon after the laft period, cardinal Wolfey, by licence of the king and pope, obtained a diffolution of above thirty religious houfes, for the founding and endowing his colleges at Oxford and Ipfwich. About the fame time a bull was granted by the fame pope to cardinal Wolfey to fupprefs monafteries, where there were not above fix monks, to the value

value of eight thousand ducats a year, for endowing Windsor, and King's college in Cambridge; and two other bulls were granted to cardinals Wolsey and Campeius, where there were less than twelve monks, and to annex them to the greater monasteries; and another bull to the same cardinals to enquire about abbies, to be suppressed, in order to be made cathedrals. Although nothing appears to have been done in consequence of these bulls, the motive which induced Wolsey, and many others, to suppress these houses, was the desire of promoting learning; and archbishop Cranmer engaged in it with a view of carrying on the Reformation. There were other causes that concurred to bring on their ruin: many of the religious were loose and vicious; the monks were generally thought to be, in their hearts, attached to the pope's supremacy; their revenues were not employed according to the intent of the donors; many cheats in images, feigned miracles, and counterfeit relics, had been discovered, which brought the monks into disgrace; the Observant friars had opposed the king's divorce from queen Catherine; and these circumstances operated, in concurrence with the king's want of a large supply, and the people's desire to save their money, to forward a motion in parliament, that, in order to support the king's state, and supply his wants, all the religious houses might be conferred upon the crown, which were not able to spend above 200*l.* a-year; and an act was passed for that purpose, 27 Hen. VIII. c. 28. By this act about 380 houses were dissolved, and a revenue of 30 or 32,000*l.* a-year came to the crown; besides about 100,000*l.* in plate and jewels. The suppression of these houses occasioned great discontent, and at length an open rebellion; when this was appeased, the king resolved to suppress the rest of the monasteries, and appointed a new visitation; which caused the greater abbies to be surrendered apace; and it was enacted by 31 Hen. VIII. c. 13. that all monasteries, &c. which have been surrendered since the fourth of February, in the twenty-seventh year of his majesty's reign, and which hereafter shall be surrendered, shall be vested in the king. The knights of St. John of Jerusalem were also suppressed by the 32 Hen. VIII. c. 24. The suppression of these greater houses by these two acts, produced a revenue to the king of above 100,000*l.* a-year, besides a large sum in plate and jewels. The last act of dissolution in this king's reign was the act of 37 Hen. VIII. c. 4. for dissolving colleges, free chapels, chantries, &c. which act was farther enforced by 1 Edw. VI. c. 14. By this act were suppressed 90 colleges, 110 hospitals, and 2374 chantries and free chapels. The number of houses and places suppressed from first to last, so far as any calculations appear to have been made, seems to be as follows:

Of lesser monasteries, of which we have the valuation	374
Of greater monasteries	186
Belonging to the hospitallers	48
Colleges	90
Hospitals	110
Chantries and free chapels	2374
Total	3182

Besides the friars' houses, and those suppressed by Wolsey, and many small houses, of which we have no particular account.

The sum total of the clear yearly revenue of the several houses at the time of their dissolution, of which we have any account, seems to be as follows:

	£	s.	d.
Of the greater monasteries	104,919	13	3½
Of all those of the lesser monasteries, of which we have the valuation	29,702	1	10½
Knights hospitallers head house in London	2,385	12	8
We have the valuation of only 28 of their houses in the country	3,026	9	5
Friars' houses, of which we have the valuation	751	2	0¼
Total	£ 140,784	19	3¼

If proper allowances are made for the lesser monasteries, and houses not included in this estimate, and for the plate, &c. which came into the hands of the king by the dissolution, and for the value of money at that time, which was at least six times as much as at present; and we also consider that the estimate of the lands was generally supposed to be much under the real worth, we must conclude their whole revenues to have been immense.

It doth not appear that any computation hath been made of the number of persons contained in the religious houses.

Those of the lesser monasteries dissolved by 27 Hen. VIII. were reckoned at about	10,000
If we suppose the colleges and hospitals to have contained a proportionable number, these will make about	5,347
If we reckon the number in the greater monasteries, according to the proportion of their revenues, they will be about 35,000; but as probably they had larger allowances in proportion to their number than those of the lesser monasteries, if we abate upon that account 5000, they will then be	30,000
One for each chantry and free chapel	2,374
Total	47,721

But as there were probably more than one person to officiate in several of the free chapels, and there were other houses which are not included within this calculation, perhaps they may be computed in one general estimate at about 50,000. As there were pensions paid to almost all those of the greater monasteries, the king did not immediately come into the full enjoyment of their whole revenues: however, by means of what he did receive, he founded six new bishoprics, *viz.* those of Westminster, (which was changed by queen Elizabeth into a deanery, with twelve prebends and a school,) Peterborough, Chester, Gloucester, Bristol, and Oxford. And in eight other sees he founded deaneries and chapters, by converting the priors and monks into deans and prebendaries, *viz.* Canterbury, Winchester, Durham, Worcester, Rochester, Norwich, Ely, and Carlisle. He founded also the colleges of Christ-church in Oxford, and Trinity in Cambridge, and finished King's college chapel there. He likewise founded professorships of divinity, law, physic, and of the Hebrew and Greek tongues, in both the said universities. He gave the house of Grey Friars, and St. Bartholomew's hospital, to the city of London; and a perpetual pension to the poor knights of Windsor; and laid out great sums in building and fortifying many ports in the channel. It is observable, upon the whole, that the dissolution of these houses was an act, not of the church, but of the state; in the period preceding the Reformation, by a king and parliament

ment of the Roman Catholic communion, in all points except the king's supremacy; to which the pope himself, by his bulls and licences, had led the way.

Although none, in this enlightened period, can approve either the original establishment or continued subsistence of monasteries; yet the destruction of them was felt and lamented, for a considerable time, as a great evil. One inconvenience that attended their dissolution was the loss of many valuable books, which their several libraries contained: for during the dark ages, religious houses were the repositories of literature and science. Besides, they were schools of education and learning; for every convent had one person or more appointed for this purpose; and all the neighbours that desired it might have their children taught grammar and church music there, without any expence. In the nunneries also young females were taught to work and read; and not only people of the lower rank, but most of the noblemen's and gentlemen's daughters were instructed in those places. All the monasteries were also in effect great hospitals, and were most of them obliged to relieve many poor people every day. They were likewise houses of entertainment for all travellers. And the nobility and gentry provided not only for their old servants in these houses, by corrodies, but for their younger children, and impoverished friends, by making them first monks and nuns, and in time priors and prioresses, abbots and abbesses. On the other hand, they were very injurious to the secular and parochial clergy, by taking on themselves many prebends and benefices, by getting many churches appropriated to them, and pensions out of many others; and by the exemptions they got from the episcopal jurisdiction, and from the payment of tithes. Nor were they less injurious to the nation in general, by depriving the public of so many hands, which might have been very serviceable to it in trade and other employments; by greatly diminishing the number of people, in consequence of the institution of celibacy; and by their houses or churches being sanctuaries for almost all sorts of offenders. And if the superstition had continued, and the zeal of establishing religious institutions had exerted itself with equal vigour to the present age, we should ere this have been a nation of monks and friars, or probably have become a prey to some foreign invader. We say nothing now of the acts of moral turpitude, which were committed in these abodes of celibacy and indolence; which, however they might have been exaggerated, were without doubt flagrant and atrocious. See Tanner's Notitia Monastica; and for an abstract, Burn's Eccl. Law, art. *Monasteries*.

MONASTIC, something belonging to monks, or the monkish life.

The monastic profession is a kind of civil death, which in all worldly matters has the same effect with the natural death.

The council of Trent, &c. fix sixteen years for the age at which a person may be admitted into the monastical state.

St. Anthony is the person who, in the fourth century, first instituted the monastic life; as St. Pachomius, in the same century, is said to have first set on foot the cœnobitic life, *i. e.* regular communities of religious.

In a short time the deserts of Egypt became inhabited with a set of solitaries, who took upon them the monastic profession. (See ANCHORET, HERMIT, &c.) St. Basil carried the monkish humour into the East, where he composed a rule, which afterwards obtained through a great part of the West.

In the eleventh century, the monastic discipline was grown very remiss. St. Odo first began to retrieve it in the monastery of Cluny: that monastery, by the conditions of its erection, was put under the immediate protection of the holy see, with a prohibition to all powers, both secular and ecclesiastical, to disturb the monks in the possession of their effects, or the election of their abbot. In virtue hereof, they pleaded an exemption from the jurisdiction of the bishop, and extended this privilege to all the houses dependent on Cluny. This made the first congregation of several houses under one chief immediately subject to the pope, so as to constitute one body, or, as they now call it, one *religious order*. Till then, each monastery was independent, and subject to the bishop. See MONK.

MONASTIER, in *Geography*, a town of France, in the department of the Upper Loire, and chief place of a canton, in the district of Le Puy; 9 miles S.S.E. of Le Puy. The place contains 1766, and the canton 8255 inhabitants, on a territory of 197½ kiliometres, in 9 communes.

MONASTIRSKA, a town of Russia, in the government of Tobolsk, on the Mura. N. lat. 57° 4'. E. long. 99° 24'.

MONATOO, a town of Bengal, in the province of Palamow, where is a passage across mountains to Koonda; 23 miles N.N.E. of Palamow.

MONAZZO, a town of Naples, in the province of Otranto; 14 miles S.E. of Tarento.

MONBACHIO, a town of Naples, in Principato Ultra; 15 miles E. of Conza.

MONBIN, or MOMBIN, in *Botany*, the French and Spanish name of a West Indian fruit, called by the English Hog Plum, *Spondias lutea*, Linn. Sp. Pl. 614; Monbin arbor foliis fraxini, fructu luteo racemoso; Plum. Nov. Gen. 44. t. 22. Madam Merian, who gives an excellent representation of this plant in her tab. 13, describes the fruit as of an astringent quality, but causing perspiration, which is of the same yellow colour as itself. See SPONDIAS.

MONBLANC, in *Geography*, a town of Spain, in Catalonia, on the river Francoli; 17 miles N. of Taragon.

MONBODDO, LORD, in *Biography*, so called according to the courtesy of the Scottish bar, and on this account he is more generally known by that title, than by his name of James Burnet, was born about the year 1714. He was educated at one of the Scotch universities, and paid a great attention to classical studies: but as soon as he had determined on the law as the future profession of his life, he passed through the ordinary course of juridical studies, and was, in the year 1737, admitted a member of the faculty of advocates at Edinburgh. His application to literary and juridical studies was almost incessant, and he acquired a high reputation for legal knowledge, as well as for an extensive acquaintance with the Grecian language and literature. In the year 1767 he obtained a judge's seat on the bench of the court of session, and performed with credit and honour the duties of that high office; insomuch that it is recorded, that no sentence passed by him was ever reversed by the house of peers. In the course of his literary studies, he was led to attempt the composition of a work, that might raise his name to distinction among men of letters, the main object of which is to prove the superior wisdom of the ancients, compared with that of the moderns. The first volume of his intended work, entitled "The Origin and Progress of Language," was given to the public in 1773, which was followed, at different periods, by five other volumes. With the philosophical history of language was involved necessarily that of civilization and knowledge; and what the author wrote on these subjects was perused by critics

critics with ſentiments of mingled reſpect, deriſion, and indignation. His lordſhip had, however, many advocates, whoſe zeal, to ſay the leaſt, was in every reſpect equal to their knowledge and learning. Thoſe who were partial to modern literature, ſays a biographer of lord Monboddo, on account of their ignorance of, and inability to enter into that of antiquity; or who, though not unacquainted with the more popular of the ancient authors, were, however, ſtrangers to the deeper myſteries of Greek erudition, condemned lord Monboddo's work with bitter and contemptuous cenſure. The Scotch literati generally held the labours of their countryman in much diſeſteem; but in England its reception was more favourable to the author's expectations. Here were found ſome critics of univerſally acknowledged talents and profound learning, who, while they ſmiled at many of his ſtrange notions and hypotheſes, were willing to applaud him for the ſervice he had done to the intereſts of learning. In the late Mr. Harris, the author of Philoſophical Grammar, and other erudite works, he found an admirer and literary friend, who was exceedingly delighted to meet with a perſon that had cultivated thoſe ſtudies with an ardour equal to what he had himſelf beſtowed on them, and who almoſt worſhipped the excellence of the ancient Greeks, as far ſurpaſſing all other excellence. While lord Monboddo was proceeding in his publication of this work, he commenced the compoſition of a larger undertaking, with the expreſs view of unfolding and vindicating the principles of Grecian philoſophy. This work, entitled "Ancient Metaphyſics," conſiſted of five volumes, quarto, of which the firſt was publiſhed in 1779, and the laſt appeared after the author's death. In this he vainly attempts to revive the abſurd principles of the Ariſtotelian philoſophy, and treats modern ſyſtems, not excepting that of the immortal Newton, with a ſort of ridicule and contempt, that only expoſed himſelf to well merited deriſion, or to the more worthy emotions of pity and compaſſion. Lord Monboddo's private life was ſpent in the practice of all the ſocial virtues, and in the enjoyment of much domeſtic happineſs. He married an amiable lady, by whom he had a ſon and two daughters; but of theſe joys in the cup of life, he was quickly bereaved by the loſs of his ſon and wife,—afflictions which cut deep to the heart: but like a true philoſopher, when he found ſorrow of no avail, he rouſed himſelf to exertion, and called forth his Chriſtian principles, which, in the midſt of calamity, led him to truſt and hope in him who gave, and who has a right to take away.

He was now offered, in addition to his place as judge in the ſupreme civil court in Scotland, a ſeat in the court of juſticiary, the ſupreme criminal court, on which he would have done the higheſt honour, compared with ſome of the men who have ſince ſat there, and who will be everlaſtingly remembered for their ſentences in the years 1793, 1794, &c. Though the ſalary of this office would have produced a convenient increaſe of his income, he was ſatisfied with his preſent emoluments, and refuſed to accept what had been offered, leſt its buſineſs ſhould too much detach him from his favourite ſtudies. His patrimonial eſtate did not amount to more than a clear income of 300*l. per annum*, yet he would never raiſe his rents, ſuppoſing that he was by this means ſerving his tenants; an idea unqueſtionably founded in error. We have known many inſtances, in which land has been vaſtly improved, and tenants enriched, by demanding of them a riſe in their rents, correſponding to the increaſed demands of the times. The error of lord Monboddo was, however, very venial: it originated from the beſt and moſt humane motives. He ſhewed, indeed, at no time a particular ſolicitude for any great improvement of his lands: his main object was, that the perſons who lived on them ſhould be amply ſupported by the produce. The vacations of the court of ſeſſion afforded him leiſure to retire every year, in the ſpring and autumn, to the country, where he was accuſtomed to dreſs in a ſtyle of ſimplicity, as if he had been only a plain farmer, and to live among the people upon his eſtate with all the kind familiarity and attention of a father among his children. In this ſtate he had a viſit from Dr. Samuel Johnſon; and though, probably, no two perſons could differ more than theſe, yet lord Monboddo was too hoſpitable to enter into any contentious diſcuſſions with a ſtranger in his own houſe. His lordſhip frequently viſited London, during his vacations; to which city he was allured by the great number of men of profound erudition, whoſe converſation he had an opportunity of enjoying there. In all his journies he was accuſtomed to ride on horſeback, attended by a ſingle ſervant. On his return from the laſt viſit, which he made purpoſely to take leave of his friends, he was taken ill on the road, and would probably never have reached home, had not a friend overtaken him, and prevailed on him to travel the remainder of the way in his carriage. His lordſhip died in June 1799, in the 85th year of his age. Although rigidly temperate in his habits, he delighted much in the convivial ſociety of his friends; and among theſe he could number all the moſt eminent characters in Scotland for virtue, literature, and real elegance of converſation. Of his various excellencies we have heard much from a noble lady, now herſelf no more, who never ceaſed to cheriſh his memory with reſpect and honour.

MONBRUN, in *Geography*, a town of Africa, in the kingdom of Hoval; 15 miles S.W. of Gourbel.

MONBUEY, a town of Spain, in the province of Leon; 30 miles S.S.W. of Aſtorga.

MONCADA, a town of Spain, in Catalonia; 8 miles N. of Barcelona.—Alſo, a town of Spain, in Valencia; 7 miles N.W. of Valencia. This town is now reduced to a village: it has a pariſh church, a convent of Dominicans, and a population of about 1000 inhabitants.

MONCALIER, a town of France, in the department of the Po, on an eminence near the river, containing two churches, ſeveral convents, and a royal palace; 4 miles S. of Turin.

MONCALVO, a town of Iſtria; 7 miles S. of Rovigno.—Alſo, a town of France, in the department of Marengo; 9 miles N. of Aſti.

MONÇAON, a ſmall but fortified town of Portugal, in the province of Entre Duero é Minho, on the Minho; 25 miles N. of Braga. N. lat. 42°. E. long. 8° 10.

MONÇARAS, a town of Portugal, in Alentejo, on the Guadiana, containing more than 1500 inhabitants; 25 miles E. of Evora.

MONCAYO, a town of Spain, in Aragon; 11 miles W. of Borja.

MONCHABOO, a town of the Birman empire, which was formerly its capital; 52 miles N. of Ava. N. lat. 22° 34′. E. long. 97° 40′.

MONCLAR, a town of France, in the department of the Lot, and chief place of a canton, in the diſtrict of Montauban; 10 miles E.S.E. of it. The place contains 1776, and the canton 5267 inhabitants, on a territory of 150 kiliometres, in 8 communes. N. lat. 43° 58′. E. long. 1° 40′.—Alſo, a town of France, in the department of the Lot and Garonne, and chief place of a canton, in the diſtrict of Villeneuve-d'Agen; 7 miles weſt from it. The place contains

contains 2061, and the canton 8462 inhabitants, on a territory of 150 kiliometres, in 10 communes.

MONÇON, a town, with a castle, of Spain, in Aragon, on the river Cinca; 25 miles N.W. of Lerida.

MONCONTOUR, a town of France, in the department of the Vienne, and chief place of a canton, in the district of Loudun; 7 miles S.S.W. of Loudun. The place contains 819, and the canton 7173 inhabitants, on a territory of 212½ kiliometres, in 18 communes. N. lat. 46° 53′. E. long. 0° 4′.—Also, a town of France, in the department of the North Coasts, and chief place of a canton, in the district of St. Brieuc; 10 miles S.S.E. of St. Brieuc. The place contains 1685, and the canton 14,380 inhabitants, on a territory of 215 kiliometres, in 11 communes.

MONCONYS, Balthasar de, in *Biography*, a writer of travels, was born at Lyons, and received the early part of his education in the Jesuits' college of that city. The plague, which in 1628 desolated many countries, at this period, forced him to quit his native place; and he went to Spain, where he completed his studies at the university of Salamanca. He attached himself to mathematics, chemistry, and astrology; and in Portugal, which he visited, he gained considerable reputation by his facility in forming horoscopes. From Portugal he travelled into the East, for the purpose of increasing his knowledge in the occult sciences, as they were falsely called, and tracing the remains of the philosophy of Hermes Trismegistus, and Zoroaster. Discovering, perhaps, the vanity of the pursuit, he returned to France, and devoted himself to mathematical and physical studies, which engaged him in correspondence with most of the learned men of his time. He died at Lyons in 1665; soon after which his travels were published, in three volumes, quarto: they are said to contain many rare and very curious observations. Moreri.

MONCOORAH, in *Geography*, an island in the mouth of the Ganges, about twelve miles long, and three broad. N. lat. 22° 10′. E. long. 91° 10′.

MONCOQ, a town of France, in the department of the Lot, and chief place of a canton, in the district of Cahors; 12 miles S.W. of Cahors. The place contains 1970, and the canton 10,804 inhabitants, on a territory of 205 kiliometres, in 16 communes. N. lat. 44° 20′. E. long. 1° 17′.

MONCRIF, Francis-Augustin Paradis de, in *Biography*, a French poet and polite writer, was born of a family in middle life, at Paris, in 1687. Though intended for a business suited to his rank in society, he devoted himself to literature, hoping to obtain the patronage of some person of consequence. One of his earliest compositions was an "Ode on the Death of Louis-le-Grand," by which he expected to conciliate the favour of the regent. But he did not excel in lyrics, and is chiefly distinguished by small theatrical pieces, complimentary verses, madrigals, and ballads, which the French call *romances*. He was an actor as well as a writer, read with grace, and acted in a very agreeable way in the dramatic interludes then in vogue, and thus rendered himself acceptable to the most cultivated societies; at the same time, by his discretion and good humour, avoided every thing that might give offence. He obtained the posts of private secretary to the count of Clermont, and reader to the queen, and was admitted to many honours in the court of Lewis XV. He did not live wholly to himself, but was liberal to his poor relations, zealous in the service of his friends, and grateful for past favours; an instance of which last quality he gave, in his request to be allowed to follow into his retreat the count d'Argenson, who was exiled in 1757. Moncrif lived enjoying perfect health till a very short time before his death, which took place in 1770, when he had attained the age of 83. As an author, his principal productions are "Essai sur la Necessité et sur les Moyens de plaire," which is a very instructive work on the art of becoming agreeable in society; "Les Abderites," a comedy; "Poesies diverses;" some dissertations; and several little dramatic pieces of the opera kind. His "Histoire des Chats" was a trifle of the sportive kind. His works have been published collectively in four volumes.

MONDA, or Munda, in *Geography*, a town of Spain, in Grenada, near which Cæsar gained a victory over the sons of Pompey; 23 miles W. of Malaga.

MONDAGELE, a town on the east coast of Ceylon; 28 miles S. of Trincoli.

MONDAHU, a river of Brazil, which runs into the Atlantic, S. lat. 3° 10′. W. long. 40° 46′.

MONDARA, a town of Nubia; 40 miles S.W. of Dekin.

MONDAY, Plough. See Plough.

Monday *Bay*, in *Geography*, a bay on the coast of Terra del Fuego, in the straits of Magellan, affording good anchorage in 20 fathoms; 15 miles S.E. of Cape Upright.

MONDEGO, a river of Portugal, which rises near Guarda, in the province of Beira, and discharges itself into the Atlantic, 12 miles S.W. of Montemor e Velho.

MONDEJAR, a town of Spain, in New Castile; 25 miles E. of Madrid.

MONDELLO, a town of Sicily, in the valley of Mazara; 8 miles N. of Palermo.

MONDIM, a town of Portugal, in the province of Beira; 10 miles S.S.E. of Lamego.

MONDINO, or in Latin Mundinus, in *Biography*, a physician deservedly celebrated in the dark ages, was born at Milan, according to Freind, and flourished early in the 14th century. He held the professorship of medicine at Bologna in the year 1316, and enjoyed an extensive reputation throughout Italy, then the great seat of science, for his medical skill. His principal claim to distinction, however, rests upon his zeal and success in the cultivation of anatomy, of which art he must be deemed the restorer, having been the first among the moderns who dissected human bodies. He was the author of a work, entitled "Anatomia omnium humani Corporis interiorum Membrorum," first printed at Pavia in 1478, and afterwards frequently republished, with various commentaries. It is a methodical treatise, very copious upon the subject of the viscera, in the description of which he introduced many original observations, but passes lightly over the subject of the nerves and blood-vessels. It abounds, however, with a multitude of errors, resulting from his attachment to the opinions of Galen and Avicenna, and is marked by the rudeness and inaccuracy of the times. Nevertheless, it conferred a real benefit on the infant science, and acquired such a high character for authority in Italy, that the statutes of Padua, and some other medical schools of Italy, prohibited the use of every other work, as a text-book for the students of anatomy: and it continued in this general estimation for nearly two centuries. Mundinus died at Bologna in 1325, or 1326, and was buried in the church of St. Vital. Freind's Hist. of Med. Eloy Dict. Hist.

MONDONEDO, in *Geography*, a town of Spain, in Galicia, 25 leagues N.E. of St. Jago, and at a similar distance W. of Oviedo, is surrounded by mountains; situated at the bottom of a hill, at the entrance of a fertile and pleasant valley, and in the midst of several springs and brooks, and separated by the

the two rivers Sigto and Ruzos from its suburbs. It is the see of a bishop, suffragan of Compostella, and has seven churches, including the cathedral and convents, one chapter of canons, one seminary, one oratory, and two hospitals. The town, which is tolerably large, is encompassed by walls, and has five gates and two bridges. The houses are tolerably built, of good stone; the streets are rather narrow, but regular; the grand square is watered by a fountain, and many other fountains cool and cleanse the streets. The air is very salubrious. The population consists of 5600 persons. The place is defended by the castle of Castro Oro. The river Mino rises at a little distance north of this town.

MONDONEDO, *Sierra de*, a mountain of Galicia of great extent, occupying the whole extremity of the north-east of Galicia, towards the Asturian boundary to the east, and proceeding to the north as far as Cabo Ortegal, and to the west as far as the Atlantic ocean.

MONDONVILLE, JOHN JOSEPH CASSANEA DE, in *Biography*, born at Narbonne in 1711, owes his reputation and his fortune to incessant diligence and toil, a great passion for his art, and a regular conduct. He at first acquired his reputation by the violin: he was the rival of the famous Guignon, who was at the head of his art. They executed together at the Concert Spirituel, and varied with great taste numerous favourite airs in duo, to the infinite satisfaction of the public. He is celebrated by the famous Le Cat of Roan, for producing the *sons harmoniques* upon his violin, of which art he seems to have been the first who distinguished himself.

He composed sonatas for the harpsichord, with an accompaniment *obligato* for the violin, which at one time were in high favour all over Europe. After this, motets for a single voice, accompanied by difficult lessons on the harpsichord, which gained him the place of master of the chapel royal. He directed the Concert Spirituel during many years with great reputation, and likewise composed several pieces for the opera, which had great success.

M. Laborde, from whom this article is extracted, has recorded his private character in a way that does his memory more honour, perhaps, than his compositions; which, though in great favour in these days at Paris, were always too much cast in a French mould to be equally admired elsewhere. His melody was national, but his accompaniments were spirited and ingenious. He died in 1772, at 61.

MONDOVI, in *Geography*, a town of France, in the department of the Stura, late capital of a small province in Piedmont, to which it gave name; situated at the foot of the Apennines, on a mountain near the river Ebro. It was erected into a bishopric by pope Urban VI. in 1388, under the archbishopric of Turin. Besides the cathedral, it has five parish churches, an university, twelve convents, and about 10,000 inhabitants. It was taken by the French, after a splendid victory, in 1796; 30 miles S. of Turin. N. lat. 44° 24'. E. long. 7° 56'.

MONDRAGON, a town of Spain, in the district of Guipuscoa, in the province of Biscay, near which are medicinal springs, and a mine of excellent iron; 24 miles S.S.W. of St. Sebastian.

MONDRAGONE, a town of Naples, in Lavora, near the sea-coast, celebrated on account of its medicinal baths; 13 miles N.W. of Capua.

MONDUKOLSKOI, a town of Russia, in the government of Irkutsk, on the borders of China. N. lat. 50° 8'. E. long. 103° 24'.

MONEAH, a town of Hindoostan, in Bahar, on the right bank of the Ganges; 17 miles W. of Patna.

MONEBA, a town of Africa, in Calbari, on the Camaroners. N. lat. 3° 40'.

MONEDA, a town of Sweden, in the province of Smaland; 14 miles N.W. of Wexio.

MONEDULA, JACKDAW, in *Ornithology*, a species of *Corvus*; which see.—Also, a species of Crotophaga. See CROTOPHAGA *Ani*.

MONEER, in *Geography*, a town of Hindoostan, in Bahar; 23 miles N.W. of Saseram.

MONEGAL, a town of Hindoostan, in Golconda; 33 miles S. of Combamet.

MONEGLIA, a town of the Ligurian republic; seven miles W. of Brugneto.

MONEINS, a town of France, in the department of the Lower Pyrenees, and chief place of a canton, in the district of Oleron; 9 miles W. of Pau. The place contains 5550, and the canton 11,004 inhabitants, on a territory of 157½ kilometres, in 7 communes.

MONEMERION, Μονημεριον, among the ancient Romans, a show, according to some, wherein none but tame beasts were exposed to view.

Others will have it to be a show of one day's continuance.

MONESTIER, in *Geography*, a town of France, in the department of the Higher Alps, and chief place of a canton, in the district of Briançon; 13 miles N.W. of Gap. The place contains 2708, and the canton 4736 inhabitants, on a territory of 212½ kiliometres, in three communes.

MONESTIER-*de-Clermont*, a town of France, in the department of the Isere, and chief place of a canton, in the district of Grenoble; 16 miles S. of Grenoble. The place contains 569, and the canton 4258 inhabitants, on a territory of 355 kiliometres, in 10 communes.

MONESTIES, a town of France, in the department of the Tarn, and chief place of a canton, in the district of Alby; 9 miles N. of Alby. The place contains 1210, and the canton 8101 inhabitants, on a territory of 250 kiliometres, in 18 communes.

MONETA, or JUNO MONETA, in *Mythology*, the goddess of money, who had a temple at Rome, is represented upon medals with the instruments of coinage, the hammer, the anvil, the pincers and the die, with the Latin word "moneta." Others say, that this name is formed from *moneo*, I warn or advise, because a little before the Gauls besieged Rome, she had warned the people to buy a sow big with young, an etymology that is supported by the authority of Cicero: "Junonem appellatam monetam, a moneo videlicet verbo, denominatam." See MONEY.

MONETÆ PES. See PES.

MONETAGIUM, MONETAGE, or *Mintage*, the right or privilege of coining money.

MONETALES TRIUMVIRI. See TRIUMVIRI.

MONETARIUS, or MONEYER, a name which antiquaries and medallists give to those who struck the ancient coins or monies.

Many of the old Roman, &c. coins have the name of the monetarius, either written at length, or at least the initial letters of it. See MEDAL.

MONETIA, in *Botany*, received its name from L'Heritier, in compliment to the celebrated J. B. de Monet, Chevalier de Lamarck; see LAMARCKIA.—L'Herit. Stirp. Nov. 1. t. 1. Schreb. 81. App. 813. Willd. Sp. Pl. v. 1. 669. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 2. v. 1. 264. (Azima; Lamarck Dict. v. 1. 343. Illustr. t. 807. Juss. 425.)—Class and order, *Tetrandria Monogynia*, L'Herit. (*Dioecia Tetrandria*, Schreb. 813.) Nat. Ord. uncertain.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, fwelling, permanent, cloven into four, lanceolate, acute, reflexed fegments, two of which are deeper than the reft. *Cor.* Petals four, linear, acute, recurved, longer than the calyx. *Stam.* Filaments four, erect, inferted into the receptacle, almoft as long as the corolla; anthers ovate, incumbent. *Pift.* Germen fuperior, nearly fquare, terminating in a thickifh, conical ftyle, fhorter than the ftamens; ftigma acute. *Peric.* Berry? juicelefs, globular, with a little point, furrounded by the calyx, of two cells? *Seeds* folitary, flat on one fide, convex on the other.

Obf. The flowers are occafionally trifid or bifid.

Eff. Ch. Calyx inferior, four-cleft. Corolla of four petals. Berry? of two cells. Seeds folitary.

1. M. *barlerioides*. Four-fpined Monetia. L'Herit. Stirp. Nov. t. 1. Willd. Thunb. Prodr. 28. (Azima tetracantha; Lamarck Dict. v. 1. 343. Lycium indicum fpinis quaternis ad foliorum fingulorum exortum; Seb. Thef. v. 1. 21. t. 13. f. 1.)—Spines four. Leaves fmooth on both fides. Native of India, and the Cape of Good Hope. It flowers in the ftove about Auguft or September. This is a middling-fized fpinous fhrub, refembling *Barleria hyftrix* in habit. *Root* perennial, woody, branched, cracked, with the tafte of liquorice. *Stem* erect, full of chinks, afh-coloured. *Branches* oppofite, diffufe, denfe; the fmaller ones prickly, deflexed, fquare, green at firft, afterwards greyifh. *Shoots* green, naturally downy, but becoming fmooth by culture. *Prickles* four together, croffing each other horizontally, awl-fhaped, fharp-pointed, withering at the tip, with one internal ftreak, about half as long as the leaves. *Leaves* oppofite, on very fhort ftalks, fpreading, ovate, pointed, entire, ribbed. *Flowers* axillary, on the young fhoots, about three in a clufter, fometimes folitary, feffile and herbaceous. *Bracteas* two-leaved, oppofite, adhering to the flowers laterally, very narrow, acute, changing into prickles.

2. M. *diacantha*. Two-fpined Monetia. Willd. (Azima diacantha; Lamarck Dict. v. 1. 343. Amaranthoides indicum verticillatum parietariæ hirfutis foliis, fpinofum; Pluk. Alm. t. 133. f. 3. Tsjérou-Kára; Rheed. Hort. Malab. v. 5. 73 t. 37.)—Spines two. Leaves downy beneath. Native of India.—This is an evergreen fhrub, rifing to the height of fix feet, with a thickifh *ftem*, and numerous afh-coloured *branches*, which are very fpinous. *Leaves* two or three together, almoft feffile, roundifh-oblong, thick, clofe; dark green, fmooth and fhining above, paler and hairy beneath. *Flowers* axillary, at the bafe of the fpines, fmall and greenifh. The whole herb has a bitter flavour.

Mr. Dryander, in his remarks on Profeffor Gmelin's edition of the *Syftema Naturæ*, Linn. Tranf. v. 2. 221, obferves "that *Azima nova* he fuppofes is meant for *Azima tetracantha* of Lamarck. *A. diacantha* being only taken from Plukenet's figure, is confequently doubtful."—We have however retained it after the example of Willdenow, relying upon the accuracy of Rheede's defcription and figure.—Kanden-Kára; Rheed. Hort. Malab. v. 5. 71. t. 36, feems undoubtedly of this genus, and perhaps merely a variety of *diacantha*.

Schreber, on revifing this genus, has removed it from *Tetrandria* to *Dioecia*, a meafure, of which we do not fee the propriety, both organs being prefent in all the flowers, though, as it appears, each is occafionally defective.

MONETOU Islands, in *Geography*, two iflands in lake Michigan. N. lat. 44° 50′. W. long. 85° 28′.

MONEY, in *Commerce*, is a general term for coin, paper, or any other meafure of value, or reprefentative of property, that paffes current from hand to hand as a circulating medium. See Bank, Cash, Circulation, Coin, Currency, Exchange, Paper *Money*, and Political *Economy*. For an accurate definition of money, fee the next article.

The origin of money feems to have been coeval with the firft regulations of civil fociety, or at leaft it is too remote to be traced by any authentic hiftory. The invention of this common meafure, or ftandard, according to which all other things fhould be eftimated, is afcribed by fome perfons, on the authority of Jofephus, to Cain; although the firft information that has been tranfmitted concerning it, originates with the patriarch Abraham, who paid 400 fhekels for a burying place. The Greeks refer the invention of money to Hermodice, wife of king Midas; and the Latins to Janus. Barter, that is the exchange of one commodity for another, was the ordinary mode of traffic in the earlier periods of the world: thus we find in Homer, that Glaucus's golden armour was valued at 100 oxen, and Diomedes's armour at 10. This method, which ftill obtains among favage nations, muft have been found extremely inconvenient in the early ages of commerce, and hence the neceffity of adopting fome commodity of general utility and demand as a meafure of value. This neceffity and its expedient are well explained by Ariftotle in his Politics (book i. chap. 6.) "All ufeful things," fays the philofopher, "could not, without great difficulty, be tranfported from place to place, it was refolved, by common confent, that in bartering commodities, they fhould reciprocally give and receive fome fubftance, which, being in its nature applicable to the purpofes of life, might, at the fame time, be eafily carried about."

The fubftance which has been adopted as a circulating medium, or meafure of value, has been various in different ages and countries. In Italy it was originally cattle, if we may judge from the Latin word *pecunia*, money, which is faid to be derived from *pecus*, a herd or flock. Thus Scaliger fays, "à pecu formatur pecunius, undè pecunia: fubintelligatur res vel quid fimile, et ficut veterum divitiæ confiftebant in copia pecudis, ita moneta pecudis effigie primùm notata fuit. Et apud Athenienfes nummi figurâ boum fignati fuerunt." Pliny fays, that money was called *pecunia*, becaufe their firft coin was ftamped with the figure of a cow. The Latin word *moneta* for money is however probably more modern than *pecunia*, and is faid to be derived from *moneo*, to advife or mark, that is, to fhew by fome mark the weight and finenefs of the metal of which coins were compofed. Thus, according to Ifidorus, "Moneta ita appellatur, quia monet nè qua fraus in pondere vel metallo fiat." In favour of this etymology, Suidas obferves, that when the Romans were in want of money, Juno *admonifhed* them to practife juftice, and then there would be no want of money; and when they had found the good effect of this counfel, fhe was furnamed *Juno Moneta*, and money was coined in her temple. In procefs of time, money was made a goddefs, and enfhrined by the name of *Dea Pecunia*, under the figure of a woman holding a balance in one hand, and a cornucopia in the other.

In all nations where commerce has made any confiderable progrefs, the precious metals, either in coins or ingots, or their reprefentative value in paper, have been adopted as money. Other fubftances, however, are ftill ufed for this purpofe in different countries, efpecially for the common or inferior purpofes of trade, as cowries or fmall fhells in India, and falt bricks, and beads, in Abyffinia. See Coin, and the fequel of this article.

As we have already given an account of the progrefs and prefent ftate of metallic monies under the article Coin, and of monies of exchange under the head Exchange, it remains here to explain what is to be underftood by monies of account, and to ſtate their names in different countries, and alſo their value compared with ſterling.

Money is diſtinguiſhed into real and imaginary. By real money is underſtood coin, or any other circulating medium, and by imaginary, or ideal money, a nominal ſum, which is not repreſented by any piece or coin, but which is uſed in keeping accounts, as the pound ſterling, the livre Tournois, &c.

Imaginary monies have had their origin, for the moſt part, in real coins, or in weights. Theſe units, which were originally adopted as meaſures of value, have been always continued under the ſame denomination, notwithſtanding the fluctuations which may have taken place in the prices of metals, or of merchandize. There are, however, imaginary monies which have not thus originated, but have been contrived for the purpoſe of ſimplifying accounts, as the centimes of France, and the cents in America. It ſhould, however, be obſerved, that all monies of account are not imaginary, nor are they, in all places, the monies of exchange, but they are moſt generally ſo.

In order to underſtand the monies of account in the following table, ſome preliminary explanations may be neceſſary.

Monies are diſtinguiſhed in different countries by particular denominations, as *ſpecie*, *effective*, *currency*, *banco*, *giro*, *moneta di cambio*, *caſh*, *valuta*, *&c.*

Specie and *effective* generally mean coin, but in Germany the word *ſpecie* is applied to the rix-dollar and its diviſions, as coined after the rate of the empire.

Currency moſtly ſignifies the common or current money of a place, which, in Holland, is called *caſſe*, in Venice *moneta piccola*, and in other parts of Italy *moneta lunga*; but in ſome parts of Germany, and particularly in Augſburg, currency means money of account, and it has the ſame meaning in America and the Weſt Indies, where it derives its name from a paper currency which has been long depreciated and diſcontinued.

Banco is the money which is placed in banks of depoſit, and which is not drawn out, but transferred from one perſon to another, in the payment of debts and contracts.

Giro, in moſt parts of Germany, means money of exchange, which in Italy is called *moneta di cambio*.

Caſh generally means real money, but in Hanover the term is applied to a certain ſuperior kind of money uſed for large payments, as diſtinguiſhed from another ſort, uſed in inferior departments of buſineſs, called old value. The word caſh is likewiſe applied to a ſmall coin in China, and in ſome parts of India beyond the Ganges.

The word *valuta*, or *valeur*, is applied in moſt parts of the continent of Europe to the prices or rates at which different kinds of monies are reckoned in commercial tranſactions.

The difference of one ſort of money compared with another is moſtly reckoned at ſo much *per cent.* When a better ſort is given for a worſe, the premium or per centage is called *agio*. But when the difference or per centage is conſidered with regard to the inferior ſort of money, it is called *diſcount*. *Diſcount* is likewiſe a term applied to an allowance of ſo much *per cent. per annum* for the payment of money before it becomes due, and this diſcount differs from the former as *agio* differs from *intereſt*.

Intereſt is an allowance of ſo much *per cent. per annum* for the uſe of money, and is therefore an addition to the principal, but *agio* adds nothing to the capital, being only the actual difference in value. In the ſame manner diſcount between different ſorts of monies, and diſcount for prompt payment differ; in the former caſe there is no loſs nor diminution, but in the latter there is a deduction from the principal. See Agio, Interest, and Discount.

The following table, which we extract, by permiſſion, from the Univerſal Cambiſt, will ſhew the value of the principal monies of account of the chief trading places, in ſterling, according to the mint regulations of thoſe countries compared with the mint laws of England; and though moſt of the monies are imaginary, yet, as they repreſent certain ſums of coined money, their value is thence eaſily known.

Table of Monies of Account, containing the Value of the Monies of Account of different Places (expreſſed in Pence and Decimals of Pence), according to the Mint Price both of Gold and Silver in England; that is, *3l. 17s. 10½d. per* Oz. for Gold, and *5s. 2d.* per Oz. for Silver.

		Value in Silver.		Value in Gold.	
		d.	*dec.*	*d.*	*dec.*
Aix la Chapelle -	Rixdollar Current - -	31	40	31	43
Alicant - -	Libra or Peſo - - -	39	40	37	38
Amſterdam - -	Rixdollar Banco (agio at 4 *per cent.*)	54	64	variable*	
	Florin Banco - - -	21	85	ditto	
	Pound Flemiſh Banco - -	131	10	ditto	
	Rixdollar current - -	52	54	ditto	
	Florin current - - - -	21		ditto	
	Pound Flemiſh current - -	126		ditto	
Antwerp - -	Pound Flemiſh (money of exchange)	123	25	123	87
	Florin (money of exchange) -	20	54	20	64
	Pound Flemiſh current - -	105	65	106	18
	Florin current - - - -	17	60	17	70
Arragon - -	Libra Jaqueſa - - - -	49	25	46	75
Augſburg - -	Florin Giro, or money of exchange	32		31	83
	Florin current - - -	25	20	25	07
Barcelona - -	Libra Catalan - - - -	28	14	26	70
Baſil - -	Rixdollar, or Ecu of exchange -	47	27	47	
	Rixdollar current - -	42	45	42	20

* In the places marked *variable*, the price of the coins is not fixed; and, therefore, the intrinſic value in gold of the monies of account cannot be aſcertained for any length of time.

		Value in Silver. d.	dec.	Value in Gold. d.	dec.
Bergamo	Scudo of 7 Lire	35	67	36	50
Berlin	Pound Banco	47	25	variable	
	Rixdollar current	36		ditto	
	Rixdollar in Fredericks	—	— *	39	68
Bern	Ecu of 3 Livres	42	64	42	90
	Crown of 25 Batzen	35	53	35	75
Bologna	Lira corrente	10	86	10	62
	Lira money of exchange	11	12	10	89
Bolfano	Florin Giron, or money of exchange	33	26	33	08
	Florin moneta lunga, or currency	25	20	25	06
Bremen	Rixdollar current	37	80	variable	
	Rixdollar in Carls d'or	—	—	39	68
Canary Iflands	Real current	3	95	3	66
Caffel	Rixdollar current	37	80	variable	
Cologne	Rixdollar fpecie of 80 Albufes	31	38	ditto	
	Rixdollar current of 78 Albufes	30	60	ditto	
Conftantinople	Piaftre, or Dollar	13	12	uncertain	
Dantzic	Gulden or Florin	9		9	
Denmark	Rixdollar fpecie	54	72	—	—
	Rixdollar Sundifh fpecie	53	21	—	—
	Rixdollar Crown money	48	37	—	—
	Rixdollar Danifh currency	44	27	44	88
	Rixdollar Holftein currency	43	78	44	16
England	Pound fterling	240		240	
Florence	Lira	8	10	8	53
	Ducat, or Crown current	56	70	59	71
	Scudo d'oro, or Gold Crown	—	—	63	97
France	Livre Tournois	9	54	9	38
	Franc (new fyftem)	9	70	9	52
Francfort	Rixdollar Convention money	37	80	37	65
	Rixdollar Muntze, or in fmall coins	31	50	—	—
Germany	Rixdollar current	37	80	variable	
	Rixdollar fpecie	50	40	ditto	
	Florin of the Empire	25	20	ditto	
	Rixdollar Muntze	31	50	ditto	
	Florin Muntze	21		ditto	
Geneva	Livre current	16	13	16	93
	Florin	4	60	4	84
Genoa	Lira fuori Banco	7	99	7	83
	Pezza, or Dollar of exchange	45	94	45	02
	Scudo di cambio, or Crown of exchange	36	75	36	02
	Scudo d'oro marche	85	49	83	77
Hamburgh	Mark Banco (at a medium)	18	22	variable	
	Pound Flemifh Banco	136	65	ditto	
	Mark current	14	82	ditto	
	Pound Flemifh current	111	15	ditto	
Hanover	Rixdollar, *in cafh*	42		42	26
	Rixdollar, *gold value*	39		39	24
Ireland	Pound Irifh	221	56	221	56
Konigfberg	Gulden or Florin	12		variable	
Leghorn	Pezza of 8 Reals	46	75	49	16
	Lira moneta buona	8	13	8	55
	Lira moneta lunga	7	79	8	19
Leipfic	Rixdollar convention money	37	80	variable	
	Rixdollar in Louis d'or or Fredericks	—	—	39	68
Lucca	Lira	7	40	7	77
	Scudo d'oro	55	50	58	27
	Scudo corrente	51	80	54	39
Malta	Scudo or Crown	21	32	23	34

* Where the columns are marked with a dafh, it is to be underftood that there is no coin in the metal of that column by which the monies of account can be computed.

		Value in Silver. d.	dec.	Value in Gold. d.	dec.
Milan	Lira Imperiale	10	41	10	53
	Lira corrente	7	36	7	44
	Scudo Imperiale	60	90	61	60
	Scudo corrente	42	32	42	78
Modena	Lira	3	82	—	
Munich	Gulden or Florin	21		21	28
Nancy	Livre (money of Lorraine)	7	38	7	26
Naples	Ducat regno	40	80	uncertain	
Navarre	Real	4	92	4	67
	Libra	8	21	7	79
Neufchatel	Livre Tournois	13	63	13	40
	Livre foible	5	45	5	36
Novi	Scudo d'oro marche	85	49	83	77
Parma	Lira	2	45	2	40
Perfia	Toman of 100 Mamoodis	287	60	—	
Poland	Gulden or Florin	6	03	6	27
Portugal	Milree	68	75	67	34
	Old Crufade	27	50	26	94
Prague	(*See Vienna.*)				
Riga	Rixdollar Alberts	52	54	variable	
	Rixdollar currency (agio at 40 *per cent.*)	37	53	ditto	
Rome	Scudo or Crown	52	05	51	63
	Scudo di Stampa d'oro	79	37	78	73
Ruffia	Ruble	38	50	39	35
St. Gall	Florin, money of exchange	27	44	variable	
	Florin current	22	76	ditto	
St. Remo	Lira	8	46	8	90
Sardinia	Lira	18	21	18	82
Sicilly	Ounce	122	54	124	80
	Scudo or Crown	49	02	49	92
Spain	Real of old plate	4	93	4	57
	Real of new plate	5	24	4	86
	Real of Mexican plate	6	55	6	07
	Real Vellon	2	62	2	43
	Dollar of old plate or of exchange	39	45	36	59
Stralfund	Rixdollar of account	28	35	variable	
	Pomeranian Gulden	14	18	ditto	
Strafburg	Livre and Franc (*fee France.*)				
	Florin	19	08	18	76
Sweden	Rixdollar	55	41	56	43
Switzerland	Franc (new fyftem)	22	14	—	
Triefte	Florin, Auftrian currency	25	20	25	05
	Lira, Triefte currency	4	76	4	73
	Lira di piazza	4	65	4	63
Turin	Lira	11	28	11	23
Valencia	Libra	39	45	36	59
Venice	Lira piccola (in the old coins)	5	07	variable	
	Lira piccola (in the coins introduced by the Auftrians)	4	25	ditto	
Vienna	Florin	25	20	25	05
Zant	Real	4	06	variable	
Zurich	Florin, money of exchange	25	85	ditto	
	Florin current	23	50	ditto	

From the above table the Intrinfic Par of exchange may be computed where the monies of account and of exchange are the fame; but for a more fyftematic and comprehenfive ftatement of the par, both according to affays and mint regulations; fee EXCHANGE.

We fhall here fubjoin fome additions to the hiftorical part of the prefent article, as well as to that of COIN and COINAGE, to which the reader is referred.

Among the ancient Britons, iron rings, or, as fome fay, iron plates, or tin plates and rings, were ufed for money. Among the Lacedæmonians, iron bars were quenched with vinegar, thus intending that they fhould not ferve for any other ufe. Seneca obferves, that there was anciently ftamped money of leather, *corium forma publica impreffum*; and the fame thing was put in practice by Frederic II. at the fiege of Milan; to fay nothing of an old tradition among

among ourselves, that, in the confused time of the barons wars, the like was done in England. In 1360, king John of France, who agreed to pay our Edward III. for the ransom of his person 3,000,000 of gold crowns, was reduced to the necessity of paying for the necessaries of his houshold in leather money, in the middle of which there was a little nail of silver. The Hollanders, we know, coined great quantities of pasteboard in the year 1574. Numa Pompilius made money of wood and leather; nor does it appear that the Romans were much acquainted with the art of striking money in metal during the time of their kings. There is reason to believe, that both gold and silver money were very early in use in Egypt and Asia, and thence soon afterwards introduced into Carthage and Greece. From Greece it was brought to Rome, and thence gradually westward into all the Roman provinces.

The first shape, says Mr. Pinkerton, in which money appeared, was that of pieces of metal without any stated form or impression, but merely regulated to a certain weight; for *weight* was the grand standard of ancient coinage, so that all large sums were paid in weight even down to the Saxon period of England. With us weight is now applied to each particular piece, and that only in gold: whereas, with the ancients, weight was applied to the sum total; to silver as well as gold; nay, in some instances, to brass. In Greece large sums were referred to so many "Mnæ," or "Minæ," and also to the larger denomination of so many "Talents." (See MINA and TALENT.) As in Greece the first estimation of money was merely by weight, this was likewise the case in Rome. Silver was the metal first used in Grecian coinage, but copper in the Roman; the former metal having been long unknown to the Romans. The first valuation of Roman money was by the "libra gravis æris," or pound of heavy brass; and when by the progress of their conquests they obtained silver and gold, these were regulated in the same manner. The common Roman pound, yet used at Rome, consisted of 12 ounces of 458 grains each, equal to our ounce avoirdupois; but the money ounce seems to have had only 420 troy grains, and the pound 5040. This was the standard of copper; and when silver came to be coined, seven denarii went to the ounce, as in Greece eight drachms: the gold was regulated by the scriptulum, scrupulum, scruple, or third part of a denarius, and by the larger weights just mentioned. (See DENARIUS, ÆS, and SESTERTIUS.) Money in old Rome, when rising to a high sum, was estimated not by the talent, a term unknown to the Romans, but by the hundred weight of brass, called "Pondus" by way of eminence. See SESTERTIUM.

As to the origin of the Roman coinage we may observe, that the states adjoining to Latium, and from which most probably the form of the first Roman coinage was derived, were, on the N. and W. the Etruscans; and upon the S. and E., at a great distance, the Grecian colonies in Magna Græcia and Sicily. To the Etruscans Mr. Pinkerton ascribes the origin of the Roman coinage, and not to the Grecian colonies, or to the Sicilians. (See LIBRA.) The first Roman coinage, according to Pliny and other respectable authors, took place in the reign of Servius Tullus in the year 460 B.C., or according to the common calculation 550 years B.C. The coinage of Tullus seems to have been confined to the As, Æs, or piece of brass only. (See AS.) The largest imperial brass coin was a piece of the value of two-pence English, called "Sestertius," which see. Before the time of the first Cæsar, as Mr. Pinkerton thinks, yellow brass began to be used in the Roman coinage, and this was always considered as double in value to the Cyprian, or copper. From Augustus downward, the large brass were all of the yellow sort, and not one of them copper. The largest of those that are called the middle size were likewise all of yellow brass; and that of the next size, which is the As, weighing the half ounce, is universally copper. The orichalcum, or what we term brass, was by the ancients held in far superior esteem to copper, or the "Æs Cyprium." It is observed, that all the large brass coins were of yellow metal, and the middle brass yellow, or red; but the former were always of the finest workmanship. The rust, with which time covers them, has confounded them together, and our putting little more value on brass than on copper hath confirmed the deceit, whereas the ancients put double the value on brass that they put on copper; but the large brass should not be taken for copper, because they sometimes have now a copper hue: before the person who examines can decide, he must always scrape the side of the metal; and he will thus learn that the ancient coinages of brass and of copper were kept as distinct as those of gold and silver. (See SESTERTIUS.) Under Valerian and Gallienus, there appeared a new coinage of copper washed with silver. Coins of this sort are just the size of the denarius; and, indeed, they are the "denarii," or "philippei ærei." See DENARIUS and FOLLIS. For an account of the silver coinage of Rome; see DENARIUS.

The gold coinage of Rome took place, according to Pliny, sixty-two years after silver, that is, in the 547th year of the city, by vulgar account, or 204 B.C. At that time the scruple, which even now remains, passed for 20 sesterces. Afterwards it was thought proper to coin 40 pieces out of the pound of gold; and by degrees this weight was diminished to 45 in the pound. See SCRUPLE.

The aureus, or common gold coin, in the first coinage was worth 30 silver denarii, equal to 1*l.* sterling; gold being to silver as $17\frac{1}{7}$ to 1. It thus continued till Sylla's time, when it weighed no less than 166 grains at an average, or 30 in the pound of gold. About the year of Rome 675, 77 years B.C., the aureus fell to the rate of 40 to the pound, and passed for 20 denarii. In the reign of Claudius the aureus went for 100 sestertii, or 25 silver denarii; at which rate it remained. The aureus fell by degrees to 45 in the pound, or about 110 grains of medial weight each, and continued of this standard till the time of Elagabalus, when it fell to about 92 grains at an average, or near 55 in the pound. Under Philip aurei of two or three sizes appear, of a rude fabric, and having a head of Rome on one side, and various reverses; and this practice of making different sizes of gold coins continued, so that under Valerian I., Gallienus, and his successors, five or six sizes occur. That the aureus went for 25 silver denarii down to Alexander Severus is clear, but the value of these different sizes does not appear. Supposing that standard to remain till the time of Constantine I. the double aureus will have borne 50 silver denarii, and the aureus 25. The "triens" must have had eight silver denarii, and two denarii ærei; the double triens twice as much. The denarius was not then worth above 14*s.* English. Under Aurelian and his successor Probus, the aureus was of 100 grains; and there were also halves of about 50 grains, and double aurei, upwards of 200 grains, of very fine workmanship. Down to Constantine I. the aureus stood at between 80 and 70 grains. This prince, without altering the size of the coin, introduced, instead of the aureus, the solidus of 6 in the ounce of gold, and to pass for 14 of his new

new silver coins, called Milliarenses, and 25 denarii as before; gold being to silver about 14 to 1. The solidus, or chief gold coin, continued of the same standard to the close of the Byzantine empire; for gold was common in Constantinople, while silver became more and more scarce. The solidus was worth 12s. sterling. See SOLIDUS.

In the first gold coinage at Rome, the aureus was divided into four inferior parts; the semissis, or half, of 60 sestertii; the tremissis, or third, of 40; the fourth, of 30; and the sixth, or scrupulum, of 20. But soon after all these subdivisions were discontinued, except the semissis, or half; which occurs in the consular times, and in those of some emperors, but is extremely scarce, so that few of them must have been struck. Some have supposed, without sufficient authority, that the Romans called the gold semissis a denarius aureus. Denarius was used, as our penny, for a coin. The common aureus was called denarius aureus very naturally, because it was of the same size with the silver denarius. See AUREUS.

With regard to the materials of English money, see COIN.

As for the *impression* of money, the Jews, though they detested images, yet stamped on the one side of their shekel, the golden pot which had the manna: and on the other, Aaron's rod; the Dardans, two cocks fighting; Alexander, as is held by some, his horse Bucephalus: though this may be doubted of, because the horse is found as frequently on the coins of several of the kings of Macedon, his predecessors, as his. The Athenians stamped their coins with an owl, or an ox; whence the proverb on bribed lawyers, *bos in lingua;* the people of Ægina with a tortoise; whence that other saying, *Virtutem & sapientiam vincunt testudines.* As to the Romans, the monetarii sometimes impressed the images of men that had been eminent in their families, on their coins; but no living man's head was ever stamped on the Roman coin till after the fall of the commonwealth; after that time they bore the emperor's head on one side; and, from this time, the practice of stamping the prince's image on coins has obtained among all civilized nations, the Turks and other Mahometans excepted; who, in detestation of images, inscribe only the prince's name, with the year of the transmigration of their prophet.

For an account of the impression of British money, see COIN.

As to the *figure* of money, it is either round, as in England; multangular, or irregular, as in Spain; square, as in some parts of the Indies; or nearly globular, as in most of the rest.

After the arrival of the Romans in this island, the Britons imitated them, coining both gold and silver with the images of their kings stamped on them; when the Romans had subdued the kings of the Britons, they also suppressed their coins, and brought in their own, which were current here from the time of Claudius to that of Valentinian the Younger, this being about the space of five hundred years.

Mr. Camden observes, that the most ancient English coin he had known, was that of Ethelbert, king of Kent, the first Christian king in the island; in whose time all money accounts began to pass by the names of pounds, shillings, pence, and mancuses.

The penny seems borrowed from the Latin *pecunia,* or rather from *pendo,* on account of its just weight, which, till Edward III.'s reign, contained as much silver as about three-pence of our money: these were coarsely stamped with the king's image on one side, and either the mint master's name, or the city's where it was coined, on the other: five of these pence made their scilling, probably so called from *scilingus,* which the Romans used for the fourth part of an ounce; forty of these scillings made their pound, and four hundred of these pounds were a legacy, or a portion for a king's daughter; as appears by the last will of king Alfred.

By these names they translated all sums of money in their old English testament; talents by *pundes;* Judas's thirty pieces of silver by *thirtig scillinga;* tribute-money, by *pening;* and the mite by *feorthling.*

But it must be observed they had no other real money, but pence only; the rest being imaginary monies, *i.e.* names of numbers, or weights: thirty of these pence made a mancus, which some take to be the same with a mark; manca, as appears by an old MS., was *quinta pars unciæ.* These mancas, or mancuses, were reckoned both in gold and silver; for in the year 680, we read, that Ina, king of the West Saxons, obliged the Kentish men to buy their peace at the price of thirty thousand mancas of gold. In the notes on king Canute's laws, we find this distinction, that *mancusa* was as much as a mark of silver; and *manca,* a square piece of gold, valued at thirty-pence. See MANCUS.

The Danes introduced a way of reckoning money by ores, *per oras,* mentioned in Domesday book; but whether they were a distinct coin, or a certain sum, does not plainly appear: this, however, may be gathered from the abbey-book of Burton, that twenty ores were equivalent to two marks.

They had also a gold coin called *byzantine,* or *bezant,* as being coined at Constantinople, then called *Byzantium;* the value of which coin is not only now lost, but was so entirely forgotten, even in the time of king Edward III. that, whereas the bishop of Norwich was fined a byzantine of gold, to be paid the abbot of St. Edmunsbury, for infringing his liberty (as it had been enacted by parliament in the time of the Conqueror), no man, then living, could tell how much it was; so that it was referred to the king to rate how much he should pay; which is the more unaccountable, because, but a hundred years before, two hundred thousand bezants were exacted by the sultan, for the ransom of St. Lewis, of France; which were then valued at one hundred thousand livres.

Though the coining of money be a special prerogative of the king, yet the ancient Saxon princes communicated it to their subjects; insomuch, that in every good town there was, at least, one mint, but at London eight; at Canterbury four for the king, two for the archbishop, one for the abbot at Winchester, six at Rochester, at Hastings two, &c.

The Norman kings continued the same custom of coining only pence, with the prince's image on one side, and on the other the name of the city where it was coined, with a cross so deeply impressed that it might be easily parted, and broken into two halves, which, so broken, they call *halfpence,* or into four parts, which they called *furthings,* or *farthings.*

In the time of king John, money coined in the east parts of Germany came in special request in England, on account of its purity, and was called *easterling money,* as all the inhabitants of those parts were called *Easterlings;* and shortly after, some of those people, skilled in coining, were sent for hither, to bring the coin to perfection; which, ever since, has been called *sterling,* from *easterling.*

King Edward I. who first adjusted the measure of an ell by the length of his arm, herein imitating Charles the Great, was the first, also, who established a certain standard for the coin, which is expressed to this effect by Gregory

gory Rockley, mayor of London, and mint-maſter. "A pound of money containeth twelve ounces: in a pound there ought to be eleven ounces, two eaſterlings, and one farthing, the reſt alloy: the ſaid pound ought to weigh twenty ſhillings and three-pence in account and weight; the ounce ought to weigh twenty-pence, and a penny twenty-four grains and a half. Note, that eleven ounces two-pence ſterling ought to be of pure ſilver, called *leaf-ſilver;* and the minter muſt add, of other weight, ſeventeen-pence halfpenny farthing, if the ſilver be ſo pure."

About the year 1320, the ſtates of Europe firſt began to coin gold; and, among the reſt, our king Edward III. The firſt pieces he coined were called *Florences*, as being coined by Florentines; afterwards he coined nobles; then roſe nobles, current at ſix ſhillings and eight-pence; half-nobles, called *halfpennies*, at three ſhillings and four-pence, of gold; and quarters at twenty-pence, called *farthings of gold*. The ſucceeding kings coined roſe-nobles, and double roſe-nobles, great ſovereigns, and half Henry nobles, angels, and ſhillings.

King James I. coined units, double crowns, Britain crowns; then crowns, half-crowns, &c. On this ſubject, ſee MEDALS.

TABLES of Gold and Silver, compoſed from the Authority of Mr. Lowndes, who inſpected the original Indentures, and from Biſhop Fleetwood.

Gold Table.					Silver Table.			
Reigns.	Specie.	Diviſion.	Tale.	Stand. fine.	Specie.	Tale.	Stand. fine.	Propor.
		s. d.	£ s. d.	car. gr.	d.	s. d.	oz. dwt.	100
28 Edw. I.	—	—	—	—	—	XX III	II 2	13 83
18 Edw. III.	Florins	VI	15 0 0	23 3½				
Eodem ann.	Nobles	VI VIII	13 3 4	Ditto				
20 ——	Ditto	Ditto	14 0 0	Ditto	—	XXII VI	Ditto	
27 ——	Ditto	Ditto	15 0 0	Ditto	IV II I	XXV	Ditto	
30, 37, 46 18 Ric. II. 3 Hen. IV.	Ditto	Ditto	Ditto	Ditto	Ditto	Ditto	Ditto	
9 Hen. V.	Ditto	Ditto	16 13 4	Ditto	IV II I ½ ¼	XXX	Ditto	
1 Hen. VI.	Royals Angels	X VI VIII	22 10 0	Ditto	Ditto	XXXVII VI	Ditto	
4 ——	Nobles	VI VIII	16 13 4	Ditto	Ditto	XXX	Ditto	
24 ——	Ditto	Ditto	Ditto	Ditto	Ditto	Ditto	Ditto	
39 ——	Angels	VI VIII	22 10 0	Ditto	Ditto	XXXVII VI	Ditto	II I
4 Edw. IV.	—	—	20 16 0	Ditto	Ditto	Ditto	Ditto	
5 ——	Nobles Angels	X VI VIII	22 10 0	Ditto	Ditto	Ditto	Ditto	
8, 11 16, 22 —— 1 Ric. III. 9 Hen. VII.	—	—	—	—	—	—	Ditto	
1 Hen. VIII.	Sovereigns Royals Angels Nobles	XXII VI XI III VII VI VI VIII	27 0 0	Ditto	Ditto	XXXV	Ditto	II 17
	Crowns ½ Ditto	V II VI	Gold ſtand. lowered. 25 2 6	22 0	Ditto	—	Ditto	
						Silver ſtand. lowered.		
34 ——	Sovereigns Angels	XX VIII	28 16 0	23 0	XII VI III ½ ¼	XLVIII	10 0	A ſtate of confuſion
36 ——	Crowns	V	30 0 0	22 0	Ditto	Ditto	6 0	
37 ——	—	—	30 0 0	20 0	Ditto	Ditto	4 0	
1 Edw. VI.	Ditto	Ditto	Ditto	Ditto		Ditto	Ditto	
3 ——	Ditto	Ditto	34 0 0	22 0	XII	LXXII	6 0	
4 ——	Sovereigns Angels	XXIV VIII	28 16 0	23 3½	—	—	Ditto	
5 ——	—	—	—	—	Ditto	Ditto	3 0	
6 ——	Sovereigns Angels	XXX X	36 0 0	23 3	s. s. d. V 2 6 d. XII VI III 1½ ¼d.	LX	II I	

Gold Table.					Silver Table.			
Reigns.	Specie.	Division.	Tale.	Stand. fine.	Specie.	Tale.	Stand. fine.	Propor.
		s. d.	£ s. d.	car. gr.	d.	s. d.	oz. dwt.	100
	Sovereigns	XX	33 0 0	22 0				
	Crowns	V						
1 Mary	—	—	36 0 0	23 3½	—	LX	11 0	
2 Eliz.	Sovereigns	XXX						
	Royals	XV	36 0 0	23 3½	VI IV III	Old stand.		
	Angels	X			II ½ 1½			
	Sovereigns	XX						
	Crowns	V	33 0 0	22 0	—	LX	11 2	11 16
19 Eliz.	Angels	X	36 0 0	23 3½	Ditto	LX	11 2	
26 —	Nobles	XV	36 0 0	23 3½				
35 —	Sovereigns	XX	33 0 0	22 0				
	Crowns	V						
43 —	Angels	X	36 10 0	23 3½	s. s. d. d. V 2 6 XII d. VI II I ½	LXII	11 2	
	Sovereigns	XX	33 10 0	22 0				
	Crowns	V						
2 Jac. I.	Unites	XX						
	Dub. crow.	X						
	British crow.	V	37 4 0	22 0	Ditto	Ditto	11 2	
	Thistl. crow.	IV						
3 —	Royals	XXX	40 10 0	23 3½				
	Angels	X						
10 —	Ditto	Ditto	44 0 0	Ditto				
	Unites	XXII						
	Doub. Carolus's, &c.	XI	40 18 4	22 0				
2 Car. I.	Rose Royals	XXX						
	Spur Royals	XV	44 10 0	23 3½	s. s. d. d.			
	Angels	X			V 2 6 XII			
	Unites	XX			d.	LXII	11 2	
	Dub. crow.	X	40 0 0	22 0	VI II 1½			
	British crow.	V						
12 Car. II.	—	—	The same of both kinds and value, gold and silver.					
22 —	Guineas	XX						
	½ Guineas	X	44 10 0	22 0	Ditto	LXII	11 2	14 54
	2 Guineas	XL						
	5 Guineas	C						
1 Jac. II.	Ditto	Ditto	Ditto	Ditto	Ditto	Ditto	Ditto	
1 W. & M. Queen Anne George I. George II.	I do not find any alteration in the standard of the gold or silver down to the present time. 22 carats fine and 2 alloy are the lb. of gold, and 11 oz. 2 dwt. fine, and 18 dwt. alloy, the standard lb. of silver; and the division of the pound of gold continues the same; that is to say, into 44½ guineas, and the silver into the usual number of crowns, &c. But the guineas have varied in the nominal value several times, rising up to XXX*s.* and declining to XXI, the present current value; but never have been reduced again to their intended level of XX*s.*, nor indeed ought, when compared with the Portugal pieces of 3*l.* 12*s.*, 1*l.* 16*s.*, the guinea appears to be better worth XXI*s.*							15 21

			To the lb. Troy.	
Portugal	-	£3 12 -	13	£46 16 0
English guineas		1 1 -	44½	46 14 6
				0 1 6
And the Portuguese standard worse ¼ grain				0 2 6
Total worse lb. troy by standard and tale			-	0 4 0

This, and the difference in point of exactness in coining, wherein the Portugal is much more defective than the English coins, may be very good reasons for their being refused in payments in any of the receipts of the public revenue; but answer very well the purpose of those who benefit by the irregularity, in trading with the heavier, and passing off the lighter by tale; and which, if they can turn into guineas or heavy silver, make another gain.

How our standard is proportioned to that of other countries, and thence what the true par of exchange is between us, see COIN.

A TABLE exhibiting the Standard, Weight, Value, and comparative View of English Gold Money from King William I., A.D. 1066, to King George III. A.D. 1764.

Years of the kings' and queens' reigns, or the dates of the several mint indentures.		Standard of the gold at each period. Fine gold.			Alloy.			Value or number of pounds, &c. the lb. troy of stand. gold has been coined into.			Value or number of pounds, &c. the oz. troy has been coined into.			Value of 20 shillings of coined gold at each period of our present money.			Proportion of the same 20 shillings to our present 20 shillings.	Proportion between the current value of the lb. troy of standard silver and standard gold.	Proportion of fine silver to fine gold at each period.
Anni Regnorum.	A.D.	oz.	dw.	gr.	oz.	dw.	gr.	£	s.	d.	£	s.	d.	£	s.	d.			
William I.	1066	11	18	18	0	1	6												
William II.	1087	11	18	18	0	1	6	9	0	0	0	15	0	5	12	$8\frac{1}{2}$	5.63414	9.0000	8.36874
18th Edw. {III. VI.}	1345	11	18	18	0	1	6	15	0	0	1	5	$1\frac{5}{8}$	3	7	$7\frac{1}{8}$	3.38048	14.8148	13.7754
18th same	1345	11	18	18	0	1	6	13	3	4	1	2	$0\frac{5}{8}$	3	17	$0\frac{1}{4}$	3.85118	13.0041	12.0917
20th same	1347	11	18	18	0	1	6	14	0	0	1	3	$5\frac{1}{8}$	3	12	$5\frac{1}{4}$	3.62194	12.4444	11.5714
27, 30, 37, and 46th d° 18th Richard II. and 3d Henry IV.	1373 1395 1402	11	18	18	0	1	6	15	0	0	1	5	$1\frac{1}{8}$	3	7	$7\frac{1}{4}$	3.38048	12.0000	11.1581
9th Henry V.	1422	11	18	18	0	1	6	16	13	4	1	7	$11\frac{1}{8}$	3	0	$10\frac{1}{8}$	3.04243	11.1111	10.3315
1st and 39th Henry VI.	1422 1461	11	18	18	0	1	6	22	10	0	1	17	$8\frac{3}{8}$	2	5	$0\frac{1}{8}$	2.25365	12.0000	11.1581
4th same	1426	11	18	18	0	1	6	16	13	4	1	7	$11\frac{1}{8}$	3	0	$10\frac{1}{8}$	3.04243	11.1111	10.3315
4th Edw. {IV. VII.}	1465	11	18	18	0	1	6	20	16	8	1	14	$10\frac{7}{8}$	2	8	8^{1}	2.43394	11.1111	10.3316
5, 8, 11, 16, and 22d d° 1st Richard III. and 9th Henry VII.	1482 1483 1494	11	18	18	0	1	6	22	10	0	1	17	$8\frac{3}{8}$	2	5	$0\frac{7}{8}$	2.25365	12.0000	11.1581
1st and 23d Henry VIII.	1509 1532	11	18	18	0	1	6	27	0	0	2	5	$2\frac{7}{8}$	1	17	$6\frac{3}{4}$	1.87804	12.0000	11.1581
											2	5	0						
1st and 23d same	1509 1532	11	0	0	1	0	0	25	2	6	2	5	$8\frac{1}{4}$	1	27	$2\frac{1}{4}$	1.85971	11.1666	11.2682
34th same	1543	11	10	0	0	10	0	28	16	0	2	10	1	1	13	$11\frac{1}{5}$	1.69614	12.0000	10.4348
36th same	1545	11	0	0	1	0	0	30	0	0	2	14	$6\frac{1}{2}$	1	11	1	1.55750	12.5000	6.81818
37th same 1st and 2d VI. Edw. IX.	1546 1549	10	0	0	2	0	0	30	0	0 0	3	0	0	1	8	$3\frac{2}{7}$	1.41591	12.5000	5.0000
3d same	1550	11	0	0	1	0	0	34	0	0	3	1	$9\frac{3}{4}$	1	7	$5\frac{7}{8}$	1.37426	9.4444	5.15151
4th same	1551	11	18	18	0	1	6	28	16	0	2	8	3	1	15	$2\frac{1}{2}$	1.76066	8.0000	2.01048
6th same	1553	11	18	18	0	1	6	36	0	0	3	0	$3\frac{3}{4}$	1	8	2	1.40853	12.0000	11.1078
6th same	1553	11	0	0	1	0	0	33	0	0	3	0	0	1	8	$3\frac{1}{8}$	1.41591	11.0000	11.0500
1st Mary I. 2d Elizabeth	1553 1560	11	18	18	0	1	6	36	0	0 0	3	0	$3\frac{3}{4}$	1	8	2	1.40853	12.0000	11.0576
2d and 35th same	1560 1594	11	0	0	1	0	0	33	0	0 0	3	0	0	1	8	3	1.41591	11.0000	11.1000
19th and 26th same	1578 1585	11	18	18	0	1	6	36	0	0	3	0	$3\frac{3}{4}$	1	8	2	1.40853	12.0000	11.1581
43d same	1601	11	18	18	0	1	6	36	10	0	3	1	$1\frac{3}{4}$	1	7	$9\frac{3}{8}$	1.38924	11.7741	10.9481
43d same	1601	11	0	0	1	0	0	33	10	0	3	0	$10\frac{3}{7}$	1	7	$10\frac{3}{4}$	1.39477	10.8064	10.9047
1st James I.	1603	11	0	0	1	0	0	37	10	0	3	8	$2\frac{1}{8}$	1	4	11	1.24600	12.0967	12.2067
2d same	1604	11	0	0	1	0	0	37	4	0	3	7	7	1	5	$1\frac{1}{2}$	1.25604	12.0000	12.1091
3d same	1605	11	18	18	0	1	6	40	10	0	3	7	$10\frac{1}{4}$	1	5	$0\frac{1}{4}$	1.25203	13.0645	12.1479
10th same	1613	11	18	18	0	1	6	44	0	0	3	13	8	1	3	$0\frac{5}{8}$	1.15243	14.1935	13.1977
10th same	1613	11	0	0	1	0	0	40	18	4	3	14	$4\frac{3}{4}$	1	2	10	1.14195	13.1935	13.3189
2d Charles I. 12th Charles II.	1627 1661	11	18	18	0	1	6	44	10	0	3	14	$6\frac{5}{8}$	1	2	$9\frac{1}{2}$	1.13948	14.3548	13.3478
2d Charles I.	1627	11	0	0	1	0	0	41	0	0	3	14	$6\frac{1}{2}$	1	2	$9\frac{1}{2}$	1.13948	13.2258	13.3460
22d Charles II. 1st James II.	1671 1685	11	0	0	1	0	0	44	10	0	4	0	10	1	1	0	1.05000	14.3548	14.4853
William III.		11	0	0	1	0	0	47	15	9	4	6	$11\frac{3}{4}$	0	19	$6\frac{3}{8}$	9.76743	15.4314	15.5717
3d George I. 3d George III.	1717 1763	11	0	0	1	0	0	46	14	6	4	4	$11\frac{1}{2}$	1	0	0	1.00000	15.07258	15.20960

For

A TABLE, fhewing the ftandard Weight, Value, and comparative View of Englifh Silver Money, from King William I. A. D. 1066, to A. D. 1765.

Dates of the feveral Mint indentures.	Standard of the filver at each period. Fine Silver.	Alloy.	No. of fhillings &c. in the pound weight, viz. in twelve ounces troy, of ftandard filver coined at each period.	Weight of twenty fhillings in reckoning of ftandard filver at each period.	Weight of fine filver contained in twenty fhillings at each period.	Value of the fame twenty fhillings in reckoning of our prefent money.	Proportion of money at each period to that of our prefent money.	Value of the ounce of the then ftandard filver to that of our prefent money.	Value of the ounce fine filver at each period.	Kings and queens in thefe periods.
A. D.	oz. dw.	oz. dw.	s. d.	oz. dw. gr.	oz. dw. gr.	£ s. d.		s. d.	s. d.	
1066	11 2	0 18	21 4	11 5 0	10 8 3	2 18 1½	2.9062	5 2	1 11¼	William Conq.
1087	11 2	0 18	20 0	12 0 0	11 2 0	3 2 0	3.1000	5 2	1 9⅜	William Rufus.
1300	11 2	0 18	20 3	11 17 1	10 19 6	3 1 2¼	3.0614	5 2	1 9⅞	Edward I.
1347	11 2	0 18	22 6	10 13 8	9 17 8	2 15 1⅜	2.7557	5 2	2 0⅝	Edward III.
1354 1395 1402	11 2	0 18	25 0	9 12 0	8 17 11½	2 9 7½	2.4802	5 2	2 3	Richard II. Henry IV.
1412	11 2	0 18	32 0	7 10 0	6 18 18	1 18 9	1.9375	5 2	2 10⅙	
1422	11 2	0 18	30 0	8 0 0	7 8 0	2 1 4	2.0666	5 2	2 8½	Henry VI.
1422	11 2	0 18	37 6	6 8 0	5 18 10	1 13 0¾	1.6531	5 2	3 4½	
1426 1446	11 2	0 18	30 0	8 0 0	7 8 0	2 1 4	2.0666	5 2	2 8½	
1461 1464 1482 1483 1494	11 2	0 18	37 6	6 8 0	5 18 10	1 13 0¾	1.6531	5 2	3 4½	Edward IV. Edward V. Henry VII.
1505	11 2	0 18	40 0	6 0 0	5 11 0	1 11 0	1.5500	5 2	3 7¼	
1509 1532	11 2	0 18	45 0	5 6 16	4 18 6	1 7 6⅝	1.3776	5 2	4 0⅚	Henry VIII.
1543	10 0	2 0	48 0	5 0 0	4 3 8	1 3 3¼	1.1635	4 7⅞	4 9⅝	
1545	6 0	6 0	48 0	5 0 0	2 10 0	0 13 11⅚	0.6984	2 9½	8 0	
1546 1547 1548	4 0	8 0	48 0	5 0 0	1 13 8	0 9 3¾	0.4656	1 10⅜	12 0	
1549	6 0	6 0	72 0	3 6 16	1 13 8	0 9 3¾	0.4656	2 9½	12 0	Edward VI.
1551	3 0	9 0	72 0	3 6 16	0 16 16	0 4 7⅞	0.2328	1 4¾	24 0	
1553	11 1	0 19	60 0	4 0 0	3 13 16	1 0 6⅞	1.0286	5 1¾	5 5⅛	Mary I.
1560 1583	11 2	0 18	60 0	4 0 0	3 14 0	1 0 8	1.0333	5 2	5 4⅞	Elizabeth.
1601 1605 1627 1661 1671 1685 1720 1764	11 2	0 18	62 0	3 17 10	3 11 14½	1 0 0	1.0000	5 2	5 7	James I. Charles I. Charles II. James II. George I. George III.

For tables containing the principal gold and filver coins of all nations: the firft table fhewing the finenefs of thofe of gold, compared with the Englifh ftandard of 22 carats, with their weight, and contents in pure gold, and their value, according to the mint price of gold in England, *i. e.* 3*l.* 17*s.* 10½*d. per* ounce, ftandard; and the fecond table exhibiting the finenefs of all filver coins, compared with the Englifh ftandard of 11 oz. 2 dwts., their weight and contents in pure filver, with their value according to the mint price of filver in England, *i. e.* 5*s.* 2*d. per* ounce, ftandard; we refer to the valuable publication of Dr. Kelly, entitled "Univerfal Cambift."

The

The king, by proclamation, may at any time prohibit all his subjects, not exceeding one year, to lend or advance money to any foreign prince or state, without licence under the great or privy seal; and if any person knowingly offend in the premises, he shall forfeit treble the value of the money lent, &c. two-thirds to the king, and the other to the informer; but persons may deal in foreign stocks, or be interested in any bank abroad, established before issuing his majesty's proclamation. Stat. 3 Geo. II. cap. 5.

Money, taking the term in its most comprehensive sense, may be defined to mean any commodity that can be employed for the purpose of facilitating the interchange of what men possess for what they desire.

In the science of political economy, discussion is much retarded and perplexed, by the loose and ambiguous meaning of the terms employed, and by the want of introductory and preparatory axioms: the terms used in this science have, in the common concerns and language of life, acquired certain meanings so firmly, that it is difficult to shake them loose and forget them, when we come to employ them in it. The consequence is, that the reader, not aware that words, the meaning of which is familiar to him, are to be taken, in the discussion on which the author has entered, in a new and peculiar sense, is startled and thrown back into doubt and confusion, when, after having followed the train of reasoning for some time, and admitted its justness and force, he finds that he and the author have throughout it been affixing very different meanings to the same terms. The same perplexing consequences result from the want of introductory and preparatory axioms: perhaps every science would be benefited as well as mathematics, though not to such a degree, if the terms to be employed were previously defined, and the positions to be taken for granted were previously laid down. It is certain that thus the way would be cleared at the commencement, and this every person conversant with subjects which require a long and intricate train of reasoning knows to be of the utmost importance towards the attainment of the truth.

These observations are introduced to apologize for, or rather to warrant the time that may be occupied in pursuing the justness and accuracy of the definition given of money, and in pointing out the erroneous and defective character of some other definitions, before entering on the subject itself.

Hume, in his Essay on Money, has defined it to be "the instrument which men have agreed upon to facilitate the exchange of one commodity for another." At first sight it may seem that this definition of Hume, and that which stands at the head of this article, are precisely the same; they, no doubt, are very similar; and if precision and fullness were not absolutely indispensable in all definitions, and if political economy, as has been already remarked, did not more than most other sciences, require this fullness and precision, Mr. Hume's definition must have been adopted as sufficiently accurate. But on examining it we shall find, that, taking it strictly (and a definition, if it will not bear to be taken strictly, loses its essential character and its whole utility), it does not comprehend money, when employed to interchange labour and skill for commodities. In all cases where one commodity is exchanged for another commodity, and an instrument is employed for the purpose of facilitating that exchange, that instrument, according to Mr. Hume's definition, is money; but if we adhere strictly to his definition, the facilitating of no exchange except of one commodity for another is effected by money; or rather, Mr. Hume's definition does not comprehend any other kind of exchange, except that of one commodity for another, and here he does not comprehend all the uses of money, or employs the term *commodity* in a sense not generally known and admitted: in either case it is objectionable; in the first, because there are instances of interchange which it does not comprehend, and in the second case, because it employs a term in a meaning not known and acknowledged.

After all, however, Mr. Hume's definition of money approaches much nearer the truth than those which are commonly given. According to some, money may be defined to be the standard of value. Here another source of error and confusion opens to our view: in all scientific discussions, metaphorical language, or terms borrowed from other subjects, if not employed with great caution and judgment, are very prejudicial: they either leave no distinct idea when transformed from their appropriate subjects, or more frequently carry with them more of their original meaning and force than the subject to which they are applied will admit of. If we examine the phrase standard of value, without at present enquiring how far it is a proper definition of money, we shall find that it gives no distinct idea: the word standard is here employed in a meaning perfectly different from that which is given to it, in subjects where it is a common and appropriate term. If we were to talk of the standard of weight, of height, or of fineness, we should be immediately struck with the expression as conveying no meaning, as, in fact, nonsense: it is well known what a standard weight, height, or fineness are; they mean a weight, height, or fineness fixed by law or custom. Standard of value, therefore, as applied to money, cannot define it, because, if examined, it will be found to convey no meaning: and if the terms be altered, and "standard value" used in their stead, though these words convey a meaning, it is a meaning which cannot be applied to them, if employed as a definition of money. Money cannot be said to be the standard value of commodities: if the price of any commodity were fixed by law, suppose, for instance, that the price of a bushel of wheat were fixed at one guinea, then this coin, this description of money might be said to be the standard value of a bushel of wheat; but in no point of view can money, generally speaking, be said to be the standard value of commodities; and we have shewn that the expression standard of value has no meaning.

It perhaps may be thought that more time has been occupied in pointing out the absurdity of this definition than was necessary; but in political economy, as much is to be done by removing error, as by establishing truth: when error is completely removed, so that the way is clear and open, common sense will do much in this branch of science.

The next definition of money is much more plausible: those who are aware, either of the absurdity, or who suspect the incorrectness of the former definition, maintain that money is the measure of value. In our remarks on that definition which made money the standard of value, it was not deemed necessary to investigate the proper meaning of the word *value*, because the remarks that were offered on the other term were deemed amply sufficient to set it aside. But on examining this definition, both the terms must be scrutinized.

Smith, in his Wealth of Nations, has observed that every commodity has two sorts of value, a value in use and a value in exchange; but in political economy the term *value* can have only one meaning. Political economy relates only to a state of society, where a division of labour exists; where, of course, each man has more of the commodities his labour and skill have produced than he has occasion for, and consequently wishes to exchange them for commodities produced by the labour and skill of others. Where no division of labour exists; where there is, consequently, no interchange of commo-

commodities; there is, ſtrictly ſpeaking, no wealth, no value; there is no room, no occaſion for the ſcience of political economy. Whether, in treating of other ſubjects, *value* ſhould or can be uſed in a ſenſe different from that which is given it in political economy, as a ſcience relating to the interchange of commodities, is a queſtion foreign to the preſent diſcuſſion. In political economy, and under the circumſtances of ſociety, which political economy ſuppoſes and refers to, *value* ought only to be employed in one ſenſe. What that ſenſe is a little reflection will teach us.

In the ſtate of ſociety we are ſuppoſing commodities are interchanged: before this can take place, the quantities or weights of each commodity that are to be given for any other commodity, muſt be fixed; and that particular weight or quantity of any given commodity, which can be obtained for a certain weight or quantity of another commodity, may, ſtrictly ſpeaking, be ſaid to be the value of this ſecond commodity: it avails or has power to obtain the former commodity. But this expreſſion may be reciprocally uſed: if, for inſtance a buſhel of wheat is exchanged for 30lb. of meat, the value of the buſhel of wheat may be ſaid to be 30lb. of meat, and the value of 30lb. of meat to be a buſhel of wheat. Value, therefore, is a term which, in political economy, has, properly ſpeaking, only one meaning, becauſe this ſcience relates ſolely to a ſtate of ſociety, where interchange of commodities takes place: and this meaning of the word value, referring to the interchange of commodities, implies that where any two commodities are interchanged, each can procure a certain portion of the other.

Let us now revert to the definition of money under conſideration: according to it, money is the meaſure of value. The expreſſion, at firſt ſight, ſeems ſufficiently preciſe and clear, whatever opinion may be formed of its propriety and juſtneſs as a definition of money. But a cloſer inſpection and examination of it will probably convince us that it is not ſo preciſe and clear as at firſt ſight in ſeems to be. When we talk of a yard as a meaſure of length, we have preciſe and clear ideas affixed to our expreſſion: we mean, that if ſuch a table is a yard long, we can immediately not only figure to ourſelves its length, but compare it with other objects which poſſeſs length. How will this apply to money defined and conſidered as the meaſure of value? Whoever knows what a yard is, immediately and clearly knows what is meant by a yard of cloth; but he who equally well knows what an ounce of gold, or a guinea is, by no means, therefore, certainly knows what quantity of corn, or any other commodity, this ounce of gold or guinea will meaſure. Indeed the very application of the term *meaſure*, as applied to value, when thus brought forward in a particular caſe, and not uſed generally and looſely, muſt ſtrike us as improper, and contrary to analogy. We have ſeen what is the meaning of the term *value;* it expreſſes the quantity of any particular commodity which can be procured in exchange for another commodity:—in order to do as much juſtice as poſſible to the definition of money, under conſideration, let us take money as one of the commodities, and corn as another; we ſhall ſtill perceive that the definition is incorrect. How can money be ſaid to meaſure the value of corn? It has been obſerved, that value is a reciprocal expreſſion; that is, it can be equally well applied to either of the two commodities, which are interchanged for each other: if money, therefore, may be defined to be the meaſure of the value of any commodity, of corn for inſtance; corn, with equal propriety, may be defined to be the meaſure of the value of money. But in neither caſe can the definition be uſed; for nothing changeable in value, that is, which at one time will command a greater or leſs quantity of any commodity than at another time, can meaſure value.

It may, perhaps, be urged, that if the term were changed, and if money were defined to be the expreſſion of the value of commodities, the objection would be removed: there is ſome weight and propriety in this remark: value muſt have reference to two commodities: it muſt expreſs how much of any particular commodity can be obtained for another commodity; and as money is uſed as that commodity, for which all others are directly given in exchange, the value of all others would naturally be expreſſed with reference to money. But ſtill this would be a very incomplete definition of money; and when we come to enquire how money (according to the definition given at the head of this article) facilitates the interchange of what men poſſeſs for what they deſire, we ſhall find that this definition includes the former.

Let us now inquire what qualities money muſt poſſeſs, in order that it may anſwer the purpoſe pointed out in the definition; *viz.* that of facilitating the interchange of what men poſſeſs for what they deſire. Money, it has been ſaid, being the meaſure of value, muſt have value, on the ſame principle and for the ſame reaſon, that whatever meaſures length muſt have length. It may be true that money muſt have value; but not for the reaſon (if reaſon it can be called) here alleged. This mode of reaſoning affords another inſtance of the bad effects of borrowing illuſtrations and proofs in political economy from other ſubjects. At firſt ſight, the concluſion that money, being the meaſure of value, muſt have value, appears to follow neceſſarily from the facts brought forward in ſupport of it; though thoſe facts are merely analogous, and not belonging to the ſubject to be proved; but it requires only a little time for reflection, it merely requires that the judgment ſhould have time to withdraw itſelf from the influence of powerful but irrelevant aſſociations, in order to perceive that there is no force in the remark, that becauſe what meaſures length poſſeſſes length, therefore what meaſures value (allowing the expreſſion) ſhould poſſeſs value.

There is, in fact, not the leaſt occaſion for bringing in this analogy to prove that money, in its character of money, muſt poſſeſs value: that is implied in the very meaning of the term; nothing can facilitate the interchange of commodities; nothing can be exchanged itſelf for any other commodity which does not poſſeſs value. But a much more important and difficult queſtion remains to be noticed, diſcuſſed, and ſolved. Is it eſſential to the character and uſes of money that the commodity of which it is formed ſhould poſſeſs value, independent of its application as ſuch? Another queſtion ariſes out of this, or rather is involved in it. Can the value of any commodity, when uſed as money, be greater than it poſſeſſed when not applied to this purpoſe?

In order that theſe intricate and important queſtions may be conſidered with due deliberation, on ſufficient data, and in regular order, it will be proper to call in the aid both of ſpeculative reaſoning, and of what we know to be fact. Our acquaintance with the hiſtory of nations, at that period when they firſt began to perceive the neceſſity of adopting ſome inſtrument of barter, is ſo very imperfect, that we are not ſupplied with a detail of the different methods they purſued previous to the adoption of the metals for that purpoſe: it is eaſy to imagine, however, how they would proceed: and by the help of what we actually know to have been the caſe, and of what we may fairly conclude to have been the intermediate ſteps, where hiſtory is ſilent, we may gain the point we have in view; *viz.* an anſwer to the queſtions, whether it is eſſential to the character and uſes of money, that the commodity of which it is formed should possess value, independent of its application as such; and whether the value of any commodity, when used as money, is greater than it possessed when not applied to this purpose. All history coincides in informing us that the commodities first used as money possessed value prior to, and independently of, their being invested with this character. Cattle appear to have been used for this purpose at as early a period of history as we can trace back; and when the metals were first employed, those kinds were chosen which were in regular use and demand, and which, consequently, possessed value. Indeed it is natural to suppose, that if a person could not, in exchange for the produce of his labour, procure directly what he wanted, he would dispose of it only for such a commodity as he knew was in general demand, and which, therefore, he could be at no loss to dispose of. Unless we can imagine that men would barter their commodities for what they neither needed at the moment, nor what, at some future period, would procure them what they needed, this must have been the case. Let us suppose that a person, in this state of society, had more corn than his own wants required; and that another person stood in need of this corn, but had only some commodity to offer in exchange for it, which the first person did not then require: if this commodity were of such a nature, as the first person were likely soon to require, or if it were such as he knew was in demand, and would, therefore, be the certain means of obtaining him any other commodity which he might wish for, he would have no objection to exchange his corn for it. But it is evident, that in both these cases the exchange is that of commodities that are valuable; *i. e.* each of which avails to purchase or procure some other useful and desirable commodity. In the latter case, where the exchange of the corn was made for a commodity which was to be employed again in exchange, that commodity, in fact, was money: it answers exactly to the definition of money, it facilitates the exchange of commodities: the person who possessed the corn, wished, for instance, to exchange it for meat; but the person who was disposed to take his corn, and to whom, at that period, we could suppose he could alone dispose of it, had no meat; he, therefore, offered him some other commodity, and if this commodity would avail, either by direct or indirect exchange, to procure meat, the person possessing the corn would not hesitate to part with the one for the other. But it is plain, that unless this commodity would avail to obtain, either directly or indirectly, the meat which he needed (or whatever else it might be), the person could not part with his corn. Money, therefore, or that commodity which is employed for the purpose of facilitating the exchange of what men possess for what they desire, must possess value, at least when first used in that character.

It still, however, remains to be inquired, whether a commodity used as money, and, as such, possessed of value, when first employed for that purpose, may not retain its character and power of money, when deprived of its property of value. As the metals are now used for money, let us suppose that gold and silver were to lose all value, independently of their character as money; that there was no demand for them as articles of luxury or use:—would they still be as valuable as money? It would, at first sight, appear certain, that as they had derived their power as money solely from their being valuable commodities, when they were stript of their value, they would at the same time be necessarily stript of their character of money. But this may be doubted, both from what we know of the human mind, and from what actually takes place. Men, having been so long accustomed to receive gold and silver in exchange for their commodities; and having so long ceased to revert to, or consider on every occasion of parting with their commodities for these metals, that they were receiving something in exchange intrinsically valuable; *i. e.* valuable independently of its character of money; would, by the mere force of habit and association, and by the confidence which they had produced, continue to receive gold and silver, even after their intrinsic value had ceased; *i. e.* after they had lost that property which at first had made them pass as money. This we see partly to be the case: men do not hesitate to receive coin that is much worn; or, in other words, they exchange their commodities for coin, after it has lost part of its value; and the habit and association are much more likely to be broken, by a diminution in the size, or an alteration in the appearance of the coin, while the value of what is actually received remains the same, than by receiving coin in exactly the same state as usual, only that the metal of which it is made has lost its intrinsic value.

We may therefore infer, on this part of the subject, that no commodity can be employed at first as money, unless it possess value; that any circumstance which affects this value, will, for a very considerable time, affect the character and credit of the commodity as money; but that, in process of time, the consideration of the intrinsic value of the commodity loses much of its force, and it is taken as money without reference to this intrinsic value.

In one respect, however, the value of money would fall, if the commoditiy of which it were formed lost its intrinsic value; *i. e.* if it no longer were in demand for any other purpose but that of money. Let us suppose that the demand for gold and silver, except for the purpose of money, suddenly ceased: the natural and immediate consequence would be, that what was before used for articles of luxury, &c. would be coined into money; and the quantity of money being thus increased, its value would necessarily fall. The other question that was started, *viz.* can the value of any commodity, when used as money, be greater than it possessed, when not applied to this purpose; has, in a great measure, been solved in the observations already made. In all cases where worn coin is taken, this is, in fact, the case. It may, indeed, be urged, that worn coin, only of the inferior metals, is received at its original value; that gold coin is not so received; and that in the instances where silver coin, when worn, is received at its original value, it is only so received as part of the gold coin. But as there can be no doubt of the fact, that the value of twenty-one worn shillings, when compared with the value of a guinea, is much less than the value of that quantity of silver which would form twenty-one mint shillings, when compared with a guinea, the inference is indubitable, that in all cases where worn silver coin is received either for commodities, or for gold coin at its original value, the value of silver used as money is greater than its value as a simple commodity.

The inference which has been drawn, however, from this circumstance is by no means correct;—that money does not derive its character from the intrinsic value of the commodity of which it is formed, nor from the general confidence resulting from the knowledge of that value, and the consequent willing, and habitual acceptance of it in exchange for all commodities; but from authority. Those who are of this opinion, contend that the stamp on the coin gains it a ready circulation, not because it proves its legal weight and purity, but because it is the sign of the authority of government; that in receiving money no regard is paid to the material of which

which it is formed, nor to the value of that material, but solely to the authority which issued it. If this were true, the same authority could make stamped leather pass as current as stamped gold and silver. But this opinion is grounded entirely on a misconception of the nature of money, and of the manner in which any given commodity is invested with that character; it also confounds two things quite distinct and unconnected. There can be no doubt that government, or any body of men, who receive a large portion of the wealth of the community, could give a partial circulation to any kind of money, independently of its intrinsic value, by declaring their readiness to receive it in payment of their demands. In Scotland, and in the provincial districts of England, where local bank notes are common, confidence and circulation are often given to them in a great degree, by the declaration of the agents of government, that they will receive them in payment of the different taxes; but this is not authority: this mode of giving circulation to any kind of money is merely an illustration of the doctrine that has been laid down in this article; that the reason why any commodity, when originally employed as money, should possess intrinsic value, is, that thus it will be readily and generally received; but if this ready and general acceptance can be given any other way, the purpose is effectually answered. In a rude state of society, the only mode of ensuring this was, to offer some commodity in general use and demand; and therefore when a person parted with the produce of his labour, if he could not get for it what he wanted, he selected, and kept by him, some commodity which would always ensure the obtaining of the object of his wishes either directly or indirectly. In a more advanced state of society, confidence would effect the same object; but there is a great difference between authority and confidence; there is a great difference between commanding that any commodity should be received as money, and declaring that it will be received as such. The former mode, we know from history, has always failed of success, whenever the command was not supported by the intrinsic value of the commodity ordered to pass as money. The latter mode, if the declaration came from those through whose hands a great portion of the money of the country must pass, will give credit and circulation as money to any commodity, nearly with as much facility and certainty; though not to such an extent, as if the commodity possessed intrinsic value equal to that at which it was issued as money.

Money, then, or any commodity which can be employed for the purpose of facilitating the interchange of what men possess, for what they desire, must, in the first instance, have possessed intrinsic value: if this intrinsic value were lessened, before its character and use, as money, had become so firmly fixed, as to have superseded or effaced, in commercial transactions, all reference to its intrinsic value, then the value of it, as money, would fall in proportion as its intrinsic value were lessened. But this would not be the case, at least so certainly, and in such exact proportion, if the lessening of the intrinsic value took place in a country of great commerce and confidence, in a gradual manner, and by no means that were calculated to create alarm or distrust.

The next topic, in point of order and importance, connected with the consideration of the principles of money, is suggested, and will be best explained by a passage in the essay "Of Money" by Hume, already referred to. "It was a shrewd observation of Anacharsis the Scythian, who had never seen money in his own country, that gold and silver seemed to him of no use to the Greeks, but to assist them in enumeration and arithmetic." In this sentiment of Anacharsis, we may perceive the germ of the opinions of those authors, who maintain either what they call the doctrine of an abstract currency, or that money is but counters wherewith to reckon the different commodities that are mutually exchanged in the concerns of life; and it is also worthy of remark, that the mode in which the use of money is supplied in London and all commercial cities, where observation and experience have suggested expedients for it, is exactly that which Anacharsis supposes to have been the only mode, in which gold and silver were of use to the Greeks. Our modern merchants, in many of their transactions, merely set off the value of one commodity against the value of another; this they indeed do by rating the value in their books by pounds, shillings, and pence, but real money is not used in the transaction. But to return to the consideration of the more immediate and relevant topic suggested by the remark of Anacharsis. If gold and silver were of no use, but to assist in numeration and arithmetic, as he directly maintained; and as those who regard it only as counters, virtually maintain; or if the real currency of a country could be only an abstract currency; then the value of this money or currency could not vary, except by a variation in the supply of commodities; for, confining ourselves at present to the doctrine which represents money only as counters, it is evident that they must always bear the same proportion to the commodities (provided, as before remarked, that the supply of commodities did not vary) which they served to rate or estimate, in the same manner as if all exchanges of commodities were effected by the mode adopted in London for many of them, the only circumstance which could make any difference in the value at which they were respectively rated in the books of the merchants, would be a variation in the supply; for if money were only counters, and of no use but to assist in numeration and arithmetic, there would be no motive to increase the quantity of it, and consequently any variation between the supply of it and of commodities, must arise from a greater or less supply of the latter. The inference, that any difference in the value of money, or the command it possesses over commodities, must arise from a variation in the supply of the latter, follows more directly and necessarily from the doctrine of an abstract currency. It is, however, so very difficult to conceive of such a currency, and therefore to reason upon it, that very few observations may suffice. Those who maintain it seem to confound two things; the name and denomination, and the power of the currency; and to infer, because the former may be considered as something abstract, therefore the latter is so also; that because the former remains the same, therefore there is no change in the latter. If, however, by abstract currency, they mean money of account, (and that seems the only clear meaning that can be affixed to the terms,) then the observation just made holds perfectly good; that if there were no other money but money of account, or abstract currency, any variation in the power or value of this, when compared with commodities, must proceed from a change in the supply of the commodities; for it is impossible that mere abstract currency, or money of account, not having actual existence, can vary.

But money is of some other use than merely to assist in numeration and arithmetic; and this leads us to the consideration of it, not merely in the character of a commodity which can facilitate the interchange of what men possess for what they desire—though that is the essential character of it; but as the source of industry, skill, and enterprize, and consequently of real wealth. Mr. Hume, remarking on the observation of Anacharsis, says, "It is indeed evident that money is nothing but the representation of labour and commodities, and serves only as a method of rating and estimating them.

them. Where coin is in greater plenty, as a greater quantity of it is required to represent the same quantity of goods; it can have no effect either good or bad, taking a nation within itself, any more than it would make an alteration in a merchant's books; if, instead of the Arabian method of notation, which requires few characters, he should make use of the Roman, which requires a great many. Nay the greater quantity of money, like the Roman characters, is rather inconvenient, and requires greater trouble both to keep and transport it;" it is not however perfectly correct to say, that, taking a nation within itself, a greater plenty of coin can have no effect, either good or bad; and indeed Mr. Hume afterwards points out some effects both good and bad, which a greater supply of coin produces. One effect, however, he does not advert to, which is of so injurious a nature, that if it were not generally, and in a great degree counterbalanced by the beneficial consequences of this greater supply, it would render it a most serious evil. If, where coin is in greater plenty, a greater quantity of it is required to represent the same quantity of goods; then the power of all those who possess only money, over those goods, must be diminished. We must therefore look to the other consequences of a greater supply of money.

These Mr. Hume has detailed, but the order and manner in which he supposes them to flow, is by no means correct, or warranted by facts. As this is a most important and interesting topic, it will be necessary to quote his observations, before we proceed to point out their error.

"Though the high price of commodities be a necessary consequence of the increase of gold and silver, yet it follows not immediately upon that increase, but some time is required before the money circulates through the whole state, and makes its effect be felt on all ranks of people. At first no alteration is perceived; by degrees the price rises, first of one commodity, then of another, till the whole at last reaches a just proportion with the new quantity of specie which is in the kingdom. In my opinion it is only in this interval or intermediate situation between the acquisition of money and rise of prices, that the increasing quantity of gold and silver is favourable to industry. When any quantity of money is imported into a nation, it is not at first dispersed into many hands, but is confined to the coffers of a few persons, who immediately seek to employ it to advantage. Here are a set of manufacturers or merchants, we shall suppose, who have received returns of gold or silver for goods which they sent to Cadiz. They are thereby enabled to employ more workmen than formerly, who never dream of demanding higher wages, but are glad of employment from such good paymasters. If workmen become scarce, the manufacturer gives higher wages, but at first requires an increase of labour; and this is willingly submitted to by the artizan, who can now eat and drink better, to compensate his additional toil and fatigue. He carries his money to market, where he finds every thing at the same price as formerly, but returns with greater quantity and of better kinds, for the use of his family. The farmer and gardener, finding that all their commodities are taken off, apply themselves with alacrity to the raising more, and at the same time can afford to take better and more clothes from their tradesmen, whose price is the same as formerly, and their industry only whetted by so much new gain. It is easy to trace the money in its progress through the whole commonwealth, where we shall find that it must first quicken the diligence of every individual, before it increases the price of labour."

Now there are three positions maintained in this illustrative reasoning, the first of which may, or may not, be true, according to circumstances; the other two cannot be true under any circumstance. It is assumed that the price of labour will not be increased, in the first instance, by an increase in the quantity of money, because a greater number of workmen will be employed; and of course the number of workmen thus increased, bearing the same proportion to the increased money, that they formerly did, no addition will be made to the price of labour; this, however, cannot be the case, unless we suppose that before the increased quantity of money gave employment to these workmen, they were entirely unemployed; for if they were previously employed, the greater demand for them, occasioned by the increase of money, must undoubtedly and necessarily raise the price of labour. Again, Mr. Hume supposes that the workmen who have thus gained employment, find every thing in the market at the same price as formerly, though an increased demand for the commodities sold there is necessarily occasioned by the increased money these workmen carry to market. If the price of commodities in the market is not increased immediately on the increase of demand for them, when, or how, can it be raised? not afterwards, for, as Mr. Hume justly observes, the farmer and gardener apply themselves with alacrity to raising an additional supply; and if the price was not raised, when there was only the usual supply, and a more than usual demand, it must fail when the supply is raised proportionally to the demand. The same remarks may be applied to the third position laid down by Mr. Hume, *viz.* that the farmer and gardener, though they go to their tradesmen with more money in their pockets, and can therefore afford to buy better, and more clothes than formerly, yet get them at the old prices.

In fact, the process by which an increase of money in any country promotes industry and raises prices, varies according to circumstances: if the increased supply is brought in by those who lay out money principally or entirely in consumption, the process goes on in one mode; if the increased supply is brought in by those who lay out money principally for the purposes of production, the process goes on in another way. In the first instance, the persons into whose possession the increase of money has come, naturally lay it out according to their fancies and habits, either in obtaining a larger quantity of those commodities which they formerly bought, or in the purchase of other commodities which their inferior means hitherto prevented them from obtaining: in either case there is a greater demand in the market while the supply is the same. If, for instance, the increased money comes into the possession of labouring men, they either lay it out in getting more bread for themselves and families; or if they previously had enough of that, but could not procure meat, the increased money is laid out in the purchase of meat. In the one case there is a greater demand for bread, in the other for meat; while the supply is the same: a rise in price must therefore take place. The next step in the process is that the bakers or butchers, finding a greater demand for their articles, and obtaining consequently a higher price for them, are induced to increase the supply: here then we may suppose the increased money and the bread or meat to have balanced each other. But we must look a little farther; the baker or the butcher, in the first instance, obtaining a higher price for their commodities, and subsequently selling a greater quantity, and thus increasing their profits, are enabled, in their turn, to do what the labouring men did when they obtained more money. They can afford to spend more; (for at present, all the cases we suppose are those of men who lay out their increased money in consumption, not in production); the articles on which they spend their increased profits must in their turn experience a rise of price, which will produce a greater supply. It is needless to pursue

sue the operations of this additional supply of money any further, or to point out how it will be gradually spread over the community, always in some degree affecting the prices of those commodities to the purchase of which it is applied. It may, however, be further remarked, that there are many disturbing forces, which may prevent the consequences now enumerated from following certainly, and in the order laid down, from an increased supply of money; and that the rise of price is seldom or never proportioned exactly to the increased demand; while, on the other hand, a supply equal to the increased demand seldom brings the prices down to their former level.

Let us now suppose that the increased quantity of money is in the possession of those who will expend it in productions; some individual case will render the subject more clear, and enable us to trace the consequences more directly and minutely. A cotton manufacturer, for instance, has his capital doubled, and determines to apply this increase of fortune solely to the extension of his trade: of course he must employ more men to work for him, and more of the raw material. Unless we can imagine that there were quite unemployed the additional number of men that he would need, his demand for more workmen must raise the price of labour; and even on the supposition that there were a sufficient number of unemployed workmen, still, if we reflect a little, we must be convinced that the price of labour will be raised, even in this case; for these unemployed workmen, being of course anxious to procure employment, may be considered as a supply greater than the demand in the market; of course this circumstance must have a considerable effect in lowering the price of labour; but when the cotton manufacturer hires them, he in fact increases the demand for workmen, and therefore must raise the price. So that the effect is not altered in its nature, though it is in degree, whether we suppose the cotton manufacturer to go into the market for workmen, where all are already engaged, or where there are a sufficient number to be found unemployed: in the former case, the price of labour would rise much higher than it would in the latter case; for we are to reflect that the lowering of the price of labour or of any commodity is effected, not only by those who want it not being so numerous, or not being so able and willing to purchase it at the former price, but also, in nearly an equal degree, by those who have it to dispose of, on their perceiving the demand diminished, offering it at a lower rate, each being anxious, under these circumstances, to get rid of the article he has in the market.

The first effect, then, of the increased capital of the cotton manufacturer is to raise the price of labour: it is unnecessary to point out again how the increased wages which the labourer obtains will operate on the price of commodities, and subsequently on their supply; this has already been done. But besides a rise in the price of labour, the increased capital of the manufacturer, being partly expended on cotton, and partly also on the buildings and machinery necessary to manufacture this additional quantity of cotton, its effects on these must also be apparent, at first in the rise of price, and afterwards in the greater supply. On the other hand, the supply of cotton goods in the market being increased, while the demand remains the same, the price of them must fall: here then we may perceive an essential difference between the effects of an increased supply of money, accordingly as it comes into the hands of those who lay it out in consumption, or into the hands of those who lay it out in production. In the latter case, the immediate effect is a rise in price, the indirect and subsequent is a greater supply, stimulated by this rise in price; but this greater supply may not be more than sufficient to meet the greater demand; in the former case, although a rise in the price of labour, and of those articles necessary for the manufacture is occasioned, which is also met by a greater supply; yet, besides these effects corresponding to the effects in the latter instance, there is a greater supply of cotton goods in the market; so that whatever opinion may be formed respecting the consequences (as they affect the national prosperity) of an increased supply of money in the hands of those who expend it in consumption, there seems to be no reason for doubting that the consequences are beneficial, when the increased supply is expended on production.

But it will be proper to look more closely into the effects of a greater quantity of money, in order to perceive in what case it is beneficial to a nation, and by what means it is beneficial; and in what cases it is prejudicial to a nation, and by what means it is so.

When the effect of a greater supply of money is to stimulate industry, so as to bring a greater quantity of commodities into the market, then there can be no doubt that it is beneficial to a nation. At first sight it may appear of little moment, whether there is a greater quantity of commodities produced or not, if the price of them is not diminished: but the real wealth and prosperity of a nation does not consist in there being few commodities produced, though they are sold at ever so cheap a rate; it consists in the abundant supply, provided there is a demand for that supply, whatever be the price of them; for an abundant supply and a proportional demand proves that all classes of the community have full employment; that they are exerting their skill and industry, and that this skill and industry are well paid. Now there is no motive which will stimulate men so powerfully and generally to the exertion of additional skill and industry, as the prospect of greater gain; and the prospect of greater gain cannot be held out, unless there is a greater demand for their goods, and a consequent higher price given for them; this, it is evident, cannot be the case, unless the quantity of money in the nation be increased. It may, indeed, be alleged, that a greater demand for any particular commodity may be created by the abstraction of demand for some other commodity; but in this case it is evident, that what is gained to the nation in one case, is lost in the other; for those who produce the latter commodity will suffer from the diminution of demand, as much as those who produce the former commodity will be benefited by an increase of demand. The case supposed, therefore, must be that of a greater demand for any particular description of commodities, without any variation in the demand for any other commodity; and this case cannot exist, unless there be a greater quantity of money in the nation.

This illustration of the effects of an increased quantity of money has proceeded on the supposition that they were confined within the nation where the increase took place: but it may be proper to examine what will be the effects on the commercial transactions of this nation with other nations: these effects will be similar to those which are known to proceed from great capital; *i. e.* the ability to purchase the raw materials of manufacture cheaper, by taking them in greater quantities, and for ready money, and to sell the manufactured article cheaper, both from the circumstance of the raw materials having been bought cheaper, and from the increase of capital, and consequently of trade, enabling the manufacturer to be satisfied with less proportional profits. It is evident, however, that all these beneficial consequences depend on one important circumstance; that the increased quantity of money, on whatever it is expended, though it at first raises the price, yet soon afterwards, by stimulating induftry, brings in fuch an additional fupply, as fully anfwers the increafed demand. In this cafe alone money, when it flows with greater abundance than formerly into a nation, is beneficial to it.

A greater abundance of money will be prejudicial to a nation, either when it flows in too rapidly or irregularly; or when the nation, previoufly to this additional fupply of money, had exerted its induftry and fkill to the utmoft. As this latter cafe is a very improbable one, we fhall confine our obfervations principally to the former.

When a greater quantity of money flows in very rapidly, the induftry of the nation cannot keep pace with it; prices are fuddenly raifed very high; and though the fame effect follows in fome degree, even in this cafe, which we have feen to be the natural confequence of a greater quantity of money, a greater demand, and a rife in the price of commodities, *viz.* that a greater fupply is produced by the ftimulus given to induftry; yet, induftry muft have fome time in which to exert itfelf, and it alfo has its limits. Befides, it by no means follows, that the increafed demand for any commodity, is in the exact proportion of the increafed quantity of money brought into market for the purchafe of that commodity; fo that if the increafed fupply of it be regulated by the increafed quantity of money, independently of any regard to what is the actual amount of the increafed demand, the confequence will be that a larger quantity of the commodity will be brought into the market, than can find vent there, at leaft at a fair price. Now this circumftance is moft likely to happen, where a greater abundance of money flows in very rapidly; the immediate confequence is that there is a ftrong competition, and the price of the commodity is forced up much higher than would have been the cafe, if the flow of money into the market had been gradual and progreffive.

The fame evil refults from the circumftance of a greater abundance of money flowing in irregularly; partly in the mode juft detailed, and partly in another manner. Nothing renders the production of any commodity fo certain and fteady, and confequently nothing benefits a nation at large, and thofe whofe labour gives birth to it, fo much as a regular and known demand for it: but if at one time there is a large fupply of money in the market, and at another time the fupply is comparatively fmall, the manufacturer does not know how to regulate his labour, and as it is fafer and more prudent to err on the fide of a deficient fupply, the market is moft likely to fuffer in this refpect.

We may therefore conclude that where a greater abundance of money flows into a nation flowly, gradually, and regularly, the nation will be benefited by it: induftry and fkill will proceed in their natural courfe, by advances likewife flow, gradual, and regular; and the ground which they thus fecure, they will keep certainly and firmly. The wealth of the nation refting on a firm foundation, will not be apt to be fhaken or diminifhed. But, on the other hand, where the influx of wealth is fudden, rapid, or irregular, it will certainly tend much more to raife the prices than to increafe the fupply of commodities; and even that increafed fupply, as far as it does take place, will not be conftant or regular.

The other cafe, in which a greater abundance of money was ftated to be prejudicial to a nation, was that, where, previoufly to this additional fupply, the nation had exerted its induftry and fkill to the utmoft. This, it was added, was a very improbable cafe; yet it certainly exifted in Holland fome time before the French revolution deftroyed the commerce of that country. Money was there fo abundant, that it could fcarcely be employed in any manner, fo as to produce a fmall profit. In this country, therefore, under thefe circumftances, it is evident that a greater abundance muft have been prejudicial; the only effect it could have would have been that of ftill farther depreffing the profits of thofe who either had money to lend, or who employed it themfelves.

Let us now look at the effects on the property of a nation, which would be produced by diminifhing the quantity of its money; and, in order that we may perceive and trace thefe effects more clearly, let us fuppofe a particular cafe. Let us fuppofe that the quantity of money brought into the market for the purchafe of meat was diminifhed: the immediate refult would be, that each butcher, anxious to difpofe of his meat, would offer it below the ufual price; or, if we can fuppofe that they all perfifted in feeking, and actually obtained the ufual price, then, in this cafe, part of the meat muft remain unfold. In either cafe, the butchers would carry home lefs money than ufual, and of courfe would be able to fpend lefs on the commodities they were in the habit of buying; the venders of thofe commodities, in their turn, would either be obliged to difpofe of them all at reduced prices, or there would remain unfold a part of them. This would happen if the money withdrawn were what was ufually laid out in articles of confumption; but if it were what were ufually laid out on labour, and for the manufacture of commodities, it is plain that the price of labour would fall, and the fupply of manufactured articles would be diminifhed. In procefs of time, no doubt all things would accommodate themfelves to this diminifhed fupply of money; but in the mean while induftry would be checked, and the real ftrength and profperity of the nation would be affected.

It is a curious and difficult queftion to folve, whether, under any circumftances of the diminution of money, the fupply of commodities would ftill remain the fame, fo that, in fact, the only confequence would be that all things would be cheaper; in the fame manner, that the only confequence of an increafed fupply of money may, under certain circumftances be, that the price of commodities is raifed; or whether, as on the latter fuppofition, the confequence may be, either that the price is raifed, or that induftry being ftimulated, the fupply of commodities is increafed in a proportion equal to the increafe of money; fo, on the former fuppofition, of a diminution of money, the confequences may be either a diminution of price, or a proportional diminution of fupply. One thing, however, is certain, that as it is fcarcely poffible for money to flow into a nation in greater abundance than formerly, without ftimulating the induftry of the nation, whatever may be its permanent effects on the price of commodities; fo it is fcarcely poffible for money to be taken away from a nation, without checking its induftry, whatever may be the effects of this meafure on price.

Dr. Smith juftly obferves, that it is impoffible to determine what is the proportion which the circulating money of any country bears to the whole value of the annual produce circulated by means of it; but though it is impoffible to determine this, yet one rule for approximating towards the truth is laid down, which, as it feems to proceed on an erroneous idea of the nature of money, deferves fome notice in a difcuffion on the principles of that commodity. It has been faid, that the quantity of money required to conduct the commerce of any nation, muft be directly as the amount of that commerce, and as the rapidity with which the money circulates; it is this latter divifion of the rule for eftimating the neceffary quantity of money, that requires fome notice, as proceeding on an erroneous idea of it. Whenever any commodity employed as money ceafes to circulate, it ceafes to be money; it is only money, ftrictly and properly fpeaking, while it circulates; and in the intervals of its circulation,

culation, be they long or short, it suffers a temporary loss of that character, because it is not then performing the office of money. A thousand guineas locked up in the chest of a miser, or by any other means kept unemployed, can with no more propriety be called money than a thousand ounces of plate, or a thousand medals of gold in the same situation. The phrase rapidity of circulation, therefore, ought to be set aside, as conveying an erroneous idea. To put this in a stronger and clearer point of view; let us suppose that the circulating medium of any country consists of a million guineas; and that there are coined at the mint an additional hundred thousand: while these continue in the mint, it could not with any propriety be said, that the circulating medium was increased one-tenth; nor could this be said, if, as soon as they were issued from the mint, they were locked up, and not brought into circulation. Let us now suppose, that the circulating medium consists of 1,100,000*l*., but that one-eleventh of this, or 100,000*l*., are constantly unemployed: they, strictly speaking, could not be said to constitute any part of the money of the nation; nor, if they were thrown into regular and constant circulation, could it be said that the rapidity of the circulation was increased, any more than it could be said with propriety that the circulation was increased by the additional supply of one hundred thousand guineas from the mint, or from the chest in which they had been locked up. It makes no real difference in the circulating medium of a country, whether the same hundred thousand guineas are constantly locked up, or when a sum to that amount, the guineas constituting it continually changing, is constantly unemployed: the circulating medium in both cases would be actually increased, if that sum were added to the money of the country; *i. e.* if it were brought into constant use; in neither case could it properly be said that the rapidity of circulation was increased.

An erroneous idea, founded on a similar misconception of the real nature of money, is very generally entertained respecting the cause of a high or low rate of interest. That the rate of interest should be low when money is plentiful in a country; and that, on the other hand, it should be high when money is scarce, are supposed to be the natural, obvious, and necessary consequences of these circumstances respectively. Now, as in the case of coin unemployed, it has not the character, and cannot fulfil the offices of money; so in the case of money not brought into competition with any given commodity, it cannot affect the price of that commodity. There is as little reason to suppose that an increased quantity of money would directly and necessarily raise the price of meat, if it were all expended in the purchase of bread, as to imagine that this increased supply, merely because it flows into a nation, should lower the rate of interest: the rate of interest, like the price of all commodities, must depend on the proportion between the supply and demand: if the increased quantity of money is employed to enlarge the supply of money to be lent out at interest, while the demand continues the same, then the rate of interest will be lowered; but if it is employed for any other purpose, then it can have no effect on the rate of interest. Such are the leading and most important topics connected with the discussion of the *principles* of money, to which alone this article has been confined. An attempt has been made to illustrate these principles, in the first place, by pointing out the real nature of money, or the qualities necessary in any commodity which is to be employed for the purpose of facilitating the interchange of what men possess for what they desire; in the second place, by pointing out the modes in which money operates in the interchange of commodities; and in the third place, by detailing and explaining the effects produced on the prosperity of a nation, by an increase or diminution in the supply of money. Some collateral and incidental topics have also been touched upon, all tending to the same object, *viz.* that of illustrating the nature of money, and the mode of its operations.

It has been thought proper to abstain from introducing any discussion respecting the different kinds of money that have been, or are, generally employed, or respecting the questions to which this branch of the subject would naturally give rise; as whether, if metallic money is employed, one metal alone should be the standard and legal tender, and the others should be permitted to circulate along with it, according to their market price; or whether the proportions should be fixed by law: the discussion of this point will fall under the head of SILVER. What are the advantages and disadvantages of a metallic and paper currency; and the various important questions connected with this branch of the subject of money; these will fall under the head PAPER *Currency*: and what circumstances affect the proportional value of the currency of one country, as compared with that of other countries; these will be considered under the head PAR *of Exchange*. In the course of the present article, the nature of value has been slightly touched upon; this will be more fully and particularly treated of under its proper head; and some further illustration of the nature and operations of money, will occur under the articles PRICE, STOCK or *Capital*, and WEALTH, which could not so properly find a place in this article.

In noticing the authors that treat on the *principles* of money, it is scarcely necessary to mention Smith, in his Wealth of Nations; on this, as on most of the fundamental topics of political economy, this author is perspicuous and satisfactory, though he does not always exhaust the subject on which he treats.

On the *principles* of money, much perhaps may be gained from his incidental illustrations, and from the general principle that pervades his works, and lies at the foundation of his system, than from what he directly advances on the subject. Hume, in his essay "Of Money," has thrown out only some very luminous ideas, which, though not always exactly correct, as we have endeavoured to prove, yet almost unavoidably, in the mind of an attentive reader, give rise, not merely to the perception of the error which they contain, but also to such a train of reflections as still further illustrate the subject. Indeed it is the singular merit of this author in his essays, that he guides and stimulates his readers to reflection. Sir James Stewart, in his Enquiry into the Principles of Political Economy, has entered pretty fully into the subject of money in the 28th chapter of his 2d book: there is a very striking and essential difference between the works of this author and that of Smith in his Wealth of Nations. Throughout the whole work of Stewart, there is that want of methodical and luminous arrangement, that obscurity and unsatisfactoriness in reasoning, and that clashing and contradictoriness of opinion, which must exist, where there are no clear and well grounded general principles established and pursued. His chapter on money, however, contains many valuable and sound doctrines; pushed in some instances too far, as where he endeavours to prove that an increase of money in a nation cannot affect the prices; the opinion that it necessarily, uniformly, and permanently must raise the prices, is no doubt erroneous; but if the illustrations in this article are correct, the contrary opinion, that it cannot produce this effect, is also erroneous. The controversy which took place towards the close of the 17th century respecting the state of the currency, and that which took place a few years ago, gave rise to many pamphlets, some of which treat directly and entirely on on the principles of money, and others of them only incidentally; these are, of course, of various merit, and will not add much that is satisfactory and solid to what may be gathered from Smith, Hume, and Stewart.

Money, *False*, or *Base*, is either struck by an unqualified person, and of unstatutable metals; or that which has lost of its weight, either by being clipped on the corners, or filed on the edges: or, lastly, by having some of its surface eaten off; if gold, by aqua regia: if silver, by aqua fortis.

Another kind of base money is that made of pieces of iron, copper, or other metal, covered on each side with a thin plate or leaf of gold or silver, neatly soldered and joined round the edges, and struck, like other coin, with figures, legends, &c. only to be distinguished from them by the bulk and weight, and sound.

Money-*Bills*, in *Parliamentary Language*, comprehend all bills, by which money is directed to be raised upon the subject, for any purpose or in any shape whatsoever; either for the exigencies of government, and collected from the kingdom in general, as the land-tax: or for private benefit, and collected in any particular district, as by turnpikes, parish-rates, and the like. With respect to these bills, the commons are so reasonably jealous of their privilege of framing new taxes for the subject, that they will not suffer the other house to exert any other power but that of rejecting: they will not permit the least alteration or amendment to be made by the lords to the mode of taxing the people by bills of this nature.

Money, *Cert*. See Cert-money.

Money, *Chimney*, *Madning*, *Poll*, *Prest*, *Prestation*, *Salvage*, *Ship*, and *Trophy*. See the several articles.

Money-*wort*, in *Botany*. See Nummularia.

MONEYERS, Moneyors, or *Moniers*, officers of the mint, who work and coin gold and silver money; and answer all the waste and charges.

Moneyers is sometimes also used for hawkers; or those who make a trade of turning and returning money.

MONEYGALL, in *Geography*, a small post-town of Ireland, in the King's county. It is 69 miles S.W. from Dublin, and 10 S.W. from Roscrea.

MONEYMORE, a small post-town of the county of Londonderry, province of Ulster, Ireland, in the southern part of the county. It is 83 miles N. from Dublin, and two miles from Cookstown.

MONFALCO, a town of Spain, in Catalonia; 5 miles N.E. of Cervera.

MONFALCONE, a town of Italy, capital of a small principality of the same name, seated on the coast of the Adriatic, and containing about 1200 inhabitants; the whole territory comprehends 20 villages, and about 4600 inhabitants; 15 miles N.W. of Trieste. N. lat. 45° 53′. E. long. 13° 30′.

MONFALOUT, or Momflot. See Manfalout.

MONFIA, an island in the Indian sea, near the coast of Africa, governed by a king, tributary to the Portuguese; about 60 miles in circumference. S. lat. 7° 30′.

MONFORT-l'amaury, a town of France, in the department of the Seine and Oise, and chief place of a canton, in the district of Versailles. The place contains 2400, and the canton 15,809 inhabitants, on a territory of 212½ kiliometres, in 28 communes.

MONFORTE, or Montfort, a town of Portugal, in the province of Tras-los-Montes; 33 miles W. of Braganza.—Also, a town of Spain, in Valencia; 13 miles W.N.W. of Alicant.—Also, a town of Portugal, in the province of Alantejo; 12 miles S. of Portalegre. N. lat. 38° 56′. W. long. 7° 12′.—Also, a town of Portugal, in Beira; 15 miles S.E. of Castel Branco. N. lat. 39° 38′. W. long. 6° 58′.—Also, a town of Sicily, in the valley of Demona; 10 miles W.S.W. of Messina.

Monforte *de Lamos*, a town of Spain, in Galicia; 15 miles N.N.E. of Orense.

MONGAELLI, a sea-port of Madagascar, on the W. coast. S. lat. 13° 55′.

MONGAGUBA, a river of Brazil, which runs into the Atlantic, S. lat. 9° 20′. W. long. 34° 56′.

MONGALLO, or Gallo, a kingdom of Africa, N. of Mocaranga; having a capital of the same name, on a river called Mongallo, which runs into the Indian ocean, S. lat. 10° 5′. E. long. 39° 14′.

MONGALORE, a town of Hindoostan, in the Carnatic; 15 miles W. of Gingee.

MONGAN, a town of Chinese Tartary. N. lat. 41° 46′. E. long. 123° 54′.

MONGANORE, a town of Hindoostan, in Golconda; 12 miles W.N.W. of Rachore.

MONGAS, a country of Africa, S. of Sofala, furnishing a great quantity of gold, particularly at Massapa and Maninas, and the mountain of Ophir, whence, as some have supposed, Solomon derived his treasures. The Portuguese are settled at Massapa, under the government of Mozambique.

MONGASABA, a town of Hindoostan, in Oude; 28 miles N. of Kairabad.

MONGAULT, Nicholas-Hubert de, in *Biography*, a man of letters, who was born at Paris in 1674, entered, at an early age, into the congregation of the Fathers of the Oratory, and was sent to study philosophy at Mans. The system then taught in the schools was that of Aristotle, which, as Mongault could not comprehend, he did not scruple to reject, and adopted that of Descartes in its stead, the principles of which he openly maintained in public exhibitions. His want of health obliged him to retire, in 1699, to the college of Burgundy, at Paris, where he finished a translation of Herodian, which was published in the following year. In a few months afterwards, he published the first volume of a translation of the "Letters of Cicero to Atticus," and almost immediately after, Colbert, archbishop of Toulouse, gave him apartments in his palace. In a short time the superintendant Foucault, who wished for the conversation and services of a man of learning, prevailed upon Mongault to reside with him, and obtained for him admission into the Academy of Inscriptions and Belles Lettres. In 1710, the duke of Orleans appointed him tutor to his son, the duke of Chartres: in this situation he is celebrated by Duclos, in his Memoirs of the Regency, as "a man of parts and erudition; a theologian, who thought freely on the subjects of religion;" but whether he thought his pupil incapable of enlightened principles, or that princes should themselves be subjected to the most powerful restraints, he certainly endeavoured to impress on the mind of the young prince a system of religion which had a tendency to excite the greatest degree of terror. The result was, as might have been expected, that after his father's death, the youth went into all the austerities of monkish devotion, in which he continued till his death. The abbé's services were, however, so well received by the family, that he obtained, through their means, several church benefices and civil places. For many years of his life he was subject to melancholy, but when free from this complaint, his conversation was lively and instructive. He died in 1746: besides his translation of Cicero's letters, in six volumes, he published two dissertations in the Memoirs of the Academy of Inscriptions. He was admitted into the French academy in 1718. Moreri.

MONGELLA, in *Geography*, a small island in the Persian gulf, near Cape Bardistan. N. lat. 27° 37'.

MONGER, a little sea vessel which fishermen use.

When a word ends with *monger*, it signifies *merchant*; from the Saxon *manger*, i. e. *mercator*.

MONGERAH, in *Geography*, a town of Hindoostan, in Oude; 55 miles N.W. of Manickpour.

MONGHIR, a town and fortress of Hindoostan, in Bahar, on the S. coast of the Ganges; 40 miles E. of Bahar. N. lat. 25° 25'. E. long. 86° 36'.

MONG-HOA, a city of China, of the first rank, in the province of Yun-nan, to which no district belongs; it is surrounded with high mountains, which abound with the animals that yield musk. N. lat. 25° 18'. E. long. 100° 4'.

MONGIA, or MUGIA, a sea-port town of Spain, in Galicia, near the sea-coast; 35 miles W.N.W. of Compostella.

MONGIARDIA, a town of the Ligurian republic; 23 miles N. of Genoa.

MONGLEE, a town of Hindoostan, in Dowlatabad; 28 miles S. of Renapour.

MONGLEGOARRY, a town of Hindoostan, in the circar of Guntoor; 12 miles E. of Guntoor.

MONGLETORE, a town of Hindoostan, in Golconda; 30 miles S.W. of Rachore.

MONGOL, one of the small Philippine islands, N.E. of Masbate. N. lat. 12° 14'. E. long. 123° 55'.

MONGOLBONG, one of the smaller Philippine islands, E. of Masbate. N. lat. 12° 10'. E long. 124°.

MONGOLES, MONGULS, or *Moguls*, a people of ancient origin, and of widely extended dominions in the north-western parts of Asia; whose conquests, as far as history can trace them, might be consigned to oblivion, if they had not produced in successive ages signal revolutions in the state of governments and of mankind. It is not easy to separate them from the people called Tartars, or to ascertain their first rise, and their early progress towards that vast empire which they ultimately acquired. Both the Moguls and Tartars are said to have been the descendants of Japhet, the eldest son of Noah. The progeny of Magog, Meshech, and Tubal, as many learned men have maintained, planted both the Scythias, and consequently the country of the ancient Moguls and Tartars. The Tartars claim priority of origin, and pretend to be descended from Turk, the eldest son of Japhet, whom they call Japhis. From their ancient ancestor they derive the name of Turks, which they seem to have retained till the time of Jenghiz Khan. This name was succeeded by that of Tartars or Tatars; and this appellation was afterwards changed by some of their tribes into that of Monguls or Moguls, which appellation prevailed till the dominion of the people, thus denominated, over the southern provinces of Asia expired, when the former name was again resumed. The immediate successor of Turk was his son Taunak, who contributed to enrich and aggrandize the nation over which he presided; and the government descended in this line, from which Timur Beg at a future period is said to have sprung. One of these princes, called Alanza Khan, having twin sons, *viz.* Tatar and Mogul, or more properly Mung'l, divided his dominions between them, not long before his decease. From Tatar Khan, the Tatars or Tartars derived their name, as the Moguls deduce theirs from Mogul or Mung'l Khan. The latter prince, the first monarch of the Moguls, was of a very melancholy disposition, which circumstance gave occasion to his name; *Mung*, in the Tartarian language, signifying *melancholy*. At his death he left four sons, from the eldest of whom, in a direct line, descended the famous Jenghiz Khan. Kara Khan, the eldest of these sons, ascended the throne upon the decease of his father; and the Tartars say, that in his time the true religion was banished out of the world, and idolatry substituted in its place. His son and successor, Ogus Khan, is said to have worshipped the true God; and issued an order, that every one in his dominions should embrace the true religion. Ogus Khan was a valiant and victorious prince, and subdued by his arms the people of Kitay or Kathay, and those of other nations. Ogus Khan, who extended his conquests through a long reign, as the Tartars say, of 116 years, was held in high veneration over a great part of the East, and regarded as the greatest hero, except Jenghiz Khan, that ever lived in the eastern parts of the world, by the Turks and Tartars of all denominations. The Ottomans, or Ottoman Turks, so called in contradistinction to the Turkish or Tartarian tribes settled in Great and Little Tartary, from him assume the name of Oguzians; and pretend that the Othman or Ottoman family is descended in a direct line from Ogus Khan. The Tartar historians blend many fictions with their account of the Tartarian and Mogul princes, so that at this distance of time, and without the assistance of collateral records, it is impossible to distinguish between the true and the fabulous relations which their history contains. Although they are mistaken in their chronology, as is the case particularly with Abu'l Ghazi Bahadur, whose Tartarian MS. containing the genealogical history of the Turks, Tartars, and Moguls, was brought into Europe by M. Von Strahlenberg, by him translated into the German tongue, and afterwards into French, and published at Leyden in 1726, who refer Ogus Khan to the ninth generation from Noah; it nevertheless appears, that this prince was at the head of a powerful nation in the East, from which the present Tartars sprung, and rendered himself famous by his conquests. Some have supposed, that this Ogus Khan was the same with the Madyes of Herodotus, and, therefore, that the conquests of this prince terminated in the reduction of the Upper Asia, and that he put an end to his expeditions about the year 631 B.C.

Dismissing the ancient history of the Mongoles or Moguls, between whom and the Tartars many contentions subsisted for several successive ages, we shall confine our account of them, in the sequel of this article, to a later period. In the 9th century these nations appeared roaming about the northern side of China and Corea; in the west, or Modern Mongolia, the Mong-u, afterwards called Monk-kos and Mongoles; further to the east, the Kitanes; and lastly, beyond Corea, as far as the eastern ocean, the Niudsches or Kin, who, generally speaking, are the same people with the Tunguses, and the Mandschu or Mantchew, the present sovereigns of China. These three people, gradually increasing, became at length powerful nations; though at first they were weak and inconsiderable. In the 10th century, the Kitanes first subdued the two other nations, and then the northern provinces of China. The Niudsches, however, soon rebelled, and being called to their assistance by the Chinese, gained the ascendancy over them, as well as the Kitanes. Upon this, a part of the latter retreated westwards, and took possession of the Lesser Bucharia, where they have since borne the name of Karakitans, or Karakitayans. In the mean time the Niudsches ruled over the north of China, and the Mongoley as far as the eastern ocean. The Mongoles were divided into several hordes, who, notwithstanding the supremacy of the Niudsches, had their own khans. It was one of these petty princes, Temudschin or Temulin, who, under the name of Tschinghis-khan, or Jenghiz-khan, became the founder of a new monarchy, and

and one of the moſt memorable ravagers of the world. He was only thirteen years old, on the death of his father in 1176, when he became ſovereign of 40,000 families. His career laſted twenty years; during which time he deſolated the countries and ſubjected the people from the Mongoley and from China to the further Aſia, and in Europe quite up to the ſhores of the Dnieper. In the firſt three years of his warfare, he ſubdued the Naimanes, Kirghiſes, and the other Tartarian hordes. He received the voluntary ſubmiſſion of the Igures, a poliſhed nation, who communicated the art of writing to the Mongoles, from whom afterwards the Mandſchu received it. About the ſame time he preſſed forward into the north-weſtern parts of China, and made the king of Tangut his vaſſal. Soon after he turned his arms againſt the Niudſches, proceeding in his conqueſts, murder, and rapine, as far as the capital of Irnking, forced it to ſurrender, and found in it the wiſe Ilidſchutzay, a truly great and noble-minded man, whom he made his firſt officer of ſtate; and who not only reſcued ſeveral millions of perſons from their impending fate, who would otherwiſe have fallen victims to the ſavage Mongoles, but who may be alſo juſtly ſaid to have created the Mongolian ſtate, by poliſhing the manners of that people, and, as far as he was able, diſſeminating among them the arts and ſciences. While the Mongolian army was fighting againſt the Niudſches, in 1217, the flames of war broke out with increaſing fury on the weſtern ſide of the Mongolian empire, which, in proceſs of time, communicated to all the countries round, and the Mongoles advanced to nether Aſia, and thence again to Europe. Having defeated Keſchluk, king of the Naimanes, and cauſed the country to ſubmit, Tſchinghis haſtened to meet the ſultan of Khovareſm, who had cauſed his ambaſſador to be ſlain, and who was his mightieſt and moſt dangerous adverſary, and obliged him to ſubmit. In 1220, Khovareſm, the capital, was captured, and on this occaſion the number of the killed amounted to upwards of 100,000 perſons, and every Mongolian warrior received to his own ſhare twenty-four ſlaves. About the ſame time all the countries and nations round, as far as the Oxus, ſubmitted to his arms. Tſchinghis now diſpatched an army acroſs that river, took Khoraſan, and drove the new khovareſmian ſultan to India. Another army was engaged in China againſt the Niudſches; a third was making conqueſts in Kaptſchak, on the N. ſide of the Caſpian; and a fourth, which had reduced the countries on the S. ſide of that ſea, was now advancing againſt the Kaptſchaks. In 1223, the Polovtzes, a branch of the Kaptſchaks, and Ruſſians loſt the great battle on the Kalka, and were purſued as far as the Dnieper by the Mongoles; who, without proceeding farther into Ruſſia, returned, laden with their booty, by Kaptſchak to Bucharia, to join Tſchinghis. In this year Tſchinghis convoked a general diet, in which was ſettled the form of government to be adopted by the conquering countries. His intended progreſs to India was reſiſted by the army; and, therefore, after an abſence of ſeven years he returned, in 1225, to Mongoley; but in the following year he was obliged to undertake a campaign againſt the rebellious Tangut. The Mongoles penetrated acroſs the great ſandy deſert into that country, and were every where victorious; the royal race was exterminated, and the inhabitants were ſlaughtered in ſuch ſhocking multitudes, that ſcarcely one in fifty was ſpared. After this conqueſt, and when Tſchinghis was meditating the deſtruction of the empire of the Niudſches in China, death, in 1227, terminated all his projects. Oktay, the ſon and ſucceſſor of Tſchinghis, put an end to the empire of the Niudſches in China, and reduced the whole northern China to his authority: he then made war upon the kings of Corea, and determined, with an army of more than a million and a half of men, to overrun the world from one end of one hemiſphere to the other. With 600,000 of his troops he marched in perſon againſt the dynaſty of Song in ſouthern China; while the main body of his army, under the command of his ſon Kayuk and his nephews Baaty and Menku, proceeded to the weſt. In their progreſs they ſubdued the Tcherkaſſes and Avkhaſes, penetrated the Baſchkirey, into Kazan and Bulgaria, and finally came to Moſcow. Fourteen Ruſſian towns were burnt in one month, February 1238. Baaty proceeded toward Novgorod, and ordered all the inhabitants in his paſſage to be maſſacred: but ſuddenly changing the direction of his march, he haſtened to the regions of the Polovtzes and Bulgarians on the Volga. After a deſperate reſiſtance of ten weeks, Kief ſurrendered (1240), and received a Mongolian viceroy. All Ruſſia, except Novgorod, was now tributary to the Mongoles, who every where appointed viceroys, without expelling the Ruſſian princes. Baaty khan, with two great armies, ravaged Poland, Sileſia, and Moravia; marched in perſon into Hungary, pillaged and murdered wherever he went, both here and in Slavonia, Boſnia, Servia, and Bulgaria. While the Mongoles were committing ſuch horrors in Europe, and proſecuting the war againſt the Coreans and the ſouthern Chineſe, they overran likewiſe, with their numerous hoſts, the hither Aſia. A force was ſent through Tſcherkaſſia, or Circaſſia, to make an incurſion upon Armenia; and the Mongoles penetrated into the regions of Arbela, marched through Nineveh, approached Bagdad, conquered Erzerum, ravaged and ſubjugated ſeveral cities and diſtricts of the Leſſer Aſia, and in 1242 made the ſultan of Iconium their vaſſal. In the following year they purſued their inroads into Syria, and came to Aleppo. The death of Oktay ſaved Aſia for a time, and Europe for ever. After an interregnum of four years, the ſucceeding grand khan Kayuk made formidable preparations for war in Europe, but death defeated his projects. His ſucceſſor Menku aboliſhed the caliphate, and ſubjected the ſultan of Iconium and Aſia Minor, as far as the ſtraits of Conſtantinople, to the Mongolian authority. Menku was ſucceeded in 1259 by Koblay. The diſtance of the paramount ſovereign from the other Mongolian ſtates, which extended from the eaſtern ocean as far as the Dnieper and the Mediterranean ſea, accelerated by diſcord and ambition the diſſolution of this enormous monarchy, which now ſeparated into the following extenſive ſtates, *viz.* China, Iran or Perſia, as far as the hither Aſia, Dſchagatay or Tchagatay, ſo called after its founder, Kaptſchak, and Turan; which ſee reſpectively. The next ambitious conqueror, or cruel deſtroyer, as we may call him, that occurs to our notice in the hiſtory of the Mongoles, is Timur or Tamerlane, who was prince of Keſch, near Samarcand, about the time when the Mongoles were entirely expelled from China. His dominion took its riſe in Grand Bucharia, a part of the ancient Dſchagatay. Having ſucceeded in the reduction of that empire, he received, in 1369, the homage of the grandees, and the title of the ſovereign of the world. Of his expeditions and conqueſts we have given ſome account under the article MOGUL *Empire*, and referring to his biographical article, we ſhall here only ſay that juſt as he was preparing to reſtore the dominion of the Mongoles in China, he was removed by death. His ſucceſſors loſt, one after another, all the countries which Tamerlane had left them, Bukharay and Khoraſan excepted; and even theſe the laſt khan Baber, in 1498, was obliged to abandon, who, however, from being an outcaſt and a fugitive, became the founder of the ſtate of Grand Mongolia,

Mongolia in Hindooſtan. With the fall of the Grand Mongolian empire of the Tſchinghiſes began alſo the epocha of their decline: the diſſolution into ſmaller ſtates, which parted again into ſmaller ſtill, and were then reduced to ſubjection, at length brought about a diviſion into ſtems and hordes, and, conſequently, a complete retrogradation from the ſtate of civilization to the condition of raw uncultivated man. It appears that many centuries ago the Mongoles were divided into two leading nations, whoſe partition might probably be owing either to national circumſtances, or to a natural ſeparation by mountains, and afterwards kept up by the ſeparate intereſts of their princes, or from a national enmity occaſioned by perpetual diſſentions. Theſe two nations were brought to a union into one common ſtate by the great Tſchinghis; but on the deſtruction of the monarchy which he had erected, they were ſeparated again by the ancient feuds, and have ever ſince, to their mutual ruin, been engaged in almoſt perpetual hoſtilities. The Mongoles, properly ſo called, compoſe the one, and the Doerbœn-Oiræt the other of theſe nations. Doerbœn-Oiræt means the quadruple alliance, and is the common appellation of four principal races, *viz.* the Oeloet, Kho-it, Tummut, and Barga-Burat. The Oeloet conſtitute that branch, which in Weſtern Aſia and in Europe is known under the name of *Kalmucks*, which ſee: the ſecond ſhoot, Kho-it, is almoſt extinct, if we except ſome remains among the Soongares and Mongoles: of the Tummut, even the place of their preſent abode is not certainly known; and the fourth ſtem, Barga-Burat, which probably, at the time of the troubles excited by Tſchinghis, took up its reſidence in the mountains about the Baikal, has, with all its branches, ever ſince the conqueſt of Siberia, been under the Ruſſian ſovereignty. The Mongoles comprehend the remainder of that people who were driven out of China in the 14th century by the dynaſty of Ming, and are at preſent for the moſt part under the Mandſhur ſovereigns of that empire; though a ſmall portion of them own the Ruſſian ſceptre. Since the demolition of the Soongarian authority, and the reſtoration of peace in the Mongoley, they have inhabited the ſpacious region between Siberia and proper China, from the eaſtern ocean to the Soongarey; and at preſent there is ſcarcely any diſcernible difference between the yellow Mongoles, living from remote ages under the Chineſe protection, and the former Tſchinghiſes or Kalkas-Mongoles. See KALKAS.

When Siberia was conquered by the Ruſſians at the beginning of the 17th century, the Mongoles were ſtill a numerous and free people, governed by their own khans, under whoſe ſovereignty were alſo ſeveral Siberian nations. At firſt they ſubmitted to the Ruſſian arms; ſoon afterwards they regained their liberty, and even granted ſupport to ſeveral nations of Siberia in their reſiſtance to that power. In their inteſtine wars with the Kalmucks, they were generally conquerors, with the loſs, however, of one race after the other. Their frequent and bloody wars with China were ſtill more unfortunate in their iſſue, as their perpetual feuds finally terminated in a complete ſubjugation. At preſent they are not in a condition to liberate themſelves from the yoke; though they have preſerved their paternal ſeat, and oſtenſibly live under the government of their own hereditary princes. The Mongoles, who now form a part of the inhabitants of the Ruſſian empire, withdrew themſelves in the 17th century from the Chineſe dominions, and put themſelves under the Ruſſian ſupremacy; but this ſeceſſion was reſtrained by a border treaty entered into in the 18th century between Ruſſia and China, the former ſtipulating not to give admittance any more to Mongolian runaways. The Ruſſian Mongoles inhabit the regions about the Selenga in the Irkutſkoi diſtrict of the government of Irkutſk, their dwelling place extending from the 122d to the 125th degree of longitude, and between the 50th and 53d degree of north latitude. They conſiſt of ſeven ſtems, and theſe of 20 families or "aimaks," which, by the enumeration of the year 1766, compriſed, beſides 219 baptized, 6918 males.

The vaſt country of the Mongoles or Moguls is bounded on the N. by Siberia, on the E. by Eaſtern Chineſe Tartary, on the S. by the great wall and Leao-tong, and on the W. by Independent Tartary. It was partly from theſe dry deſerts that thoſe conquerors iſſued, who made all Aſia tremble. The Mogul nation is ſub-divided into a multitude of others, who all ſpeak the ſame language, called the Mogul language, comprehending ſeveral dialects underſtood by one another. Theſe have neither towns, villages, nor houſes; they form themſelves into wandering hordes, and live under plain tents, which they tranſport from one place to another, according to the temperature of the different ſeaſons, or the wants of their flocks; they paſs the ſummer on the banks of rivers, and the winter at the foot of ſome mountain, or little hill, which ſhelters them from the ſharp north wind. Each of theſe tribes has its reſpective limits, nor can they go beyond them without being thought to commit an act of hoſtility. They are naturally clowniſh, and dirty in their dreſs, as well as in their tents, where they live amidſt the dung of their flocks, which, when dried, they burn as fuel. Enemies to labour, they ſatisfy themſelves with the food ſupplied by their flocks rather than take the trouble of cultivating the earth; they neglect agriculture more from pride, alleging that "the graſs was for beaſts, and beaſts for man." The men hunt the numerous beaſts, and game, that roam through their vaſt wilds; the women tan leather, dig the culinary roots, prepare the winter proviſions dried or ſalted, and diſtil the koumiſs, or ſpirit of mares' milk. In ſummer they live only on milk, uſing, without diſtinction, that of the cow, mare, ewe, goat, and camel. Their ordinary drink is an infuſion of coarſe tea in warm water; with which they mix cream, milk, or butter, according to their circumſtances. Before they diſtil their ſour milk, thoſe of better condition mix with it ſome of the fleſh of their ſheep, which, as well as the milk, has been left to ferment. This liquor is ſtrong and nouriſhing; and their moſt voluptuous orgies conſiſt in getting drunk with it. Mead and brandy are now great favourites with them. The Moguls are rather ſhort in ſtature, with flat viſage, ſmall oblique eyes, thick lips, and a ſhort chin, with a ſcanty beard. Their ears are large and prominent, the hair black, and the complexion of a reddiſh or yellowiſh-brown; but that of the women is clear, and of a healthy white and red. They have ſurpriſing quickneſs of ſight, and apprehenſion. In their diſpoſition they are free, open, and ſincere; they are docile, hoſpitable, beneficent, active, and voluptuous. Induſtry is a virtue, entirely female; and though great, it is accompanied with perpetual cheerfulneſs. They pride themſelves chiefly on their dexterity in handling the bow and arrow, mounting on horſeback, and hunting wild beaſts. Polygamy is allowed, though they commonly content themſelves with one wife; marriages are celebrated at an early age, and the bride brings a dower in cattle or ſheep. Their tents are circular, in form of the fruſtum of a cone, and covered with a large piece of white or grey felt. A round hole in the top gives paſſage to the ſmoke, which riſes from a fire made in the middle of the tent. Theſe tents, which they have been accuſtomed to prefer to the Chineſe houſes, are cold in winter, and inſupportably warm, and noxiouſly damp, in ſummer.

The tents of the nobles are hung with ſilk, and the floor covered with Perſian carpets. The houſhold utenſils are numerous; and in the ſuperior tents are veſſels of pewter, ſilver, and porcelain. Their dreſs conſiſts of a flat yellow bonnet, which covers the head that is ſhaven, except one lock, wide trowſers, a veſt of light ſtuff with narrow ſleeves, and a girdle, which ſupports the ſabre, knife, and implements for ſmoking tobacco. The outer veſtment is of cloth, or ſkin, with wide ſleeves, and linen is wound about the feet, over which are drawn buſkins of leather, generally black or yellow. Shirts are unknown. The dreſs of the women is the ſame, but inſtead of the outer garment they wear a gown without ſleeves. The ſkins, which they uſe for clothing, are generally thoſe of ſheep; the wool ſide being inmoſt, and the ſkin on the outſide. They are well acquainted with the method of preparing and whitening theſe ſkins. But theſe ſkins, however carefully prepared, exhale a ſtrong and diſagreeable ſmell, on which account they are called by the Chineſe "Tſao-tatſe," ſtinking Tartars. The hair of the females is long, and plaited in treſſes.

When paſturage begins to fail, all the tribes ſtrike their tents, generally from ten to fifteen times in the year, proceeding in the ſummer to the northern, and in the winter to the ſouthern wilds. The herds, men, women, and children, form a regular proceſſion; and are followed by the girls, ſinging with harmony and ſpirit. The amuſements of theſe jovial wanderers conſiſt in running races on horſeback, in which even the girls excel; archery, wreſtling, pantomime, dances, and the ſongs of the young women, generally accompanied by the lute, viol, and pipe; the themes of their ditties being tales of gigantic chivalry, and amorous adventures and ſentiments; but the melody is harſh and diſmal. Cards are not unknown, but the favourite game is cheſs. The bodies of the princes and chief men are burned with many ſolemnities; and the tombs are ſometimes walled, and ornamented with high poles and fantaſtic drapery. They are unacquainted with the uſe of money, and trade only by barter. Such, alſo, with ſome ſhades of difference, are the manners of the Tartars and Mandſhurs. In the Mogul language there are many books written in the various countries to which their wide conqueſts extended.

The religion of the Mogul Tartars is confined to the worſhip of Fo. For their "Lamas" they entertain the moſt ſuperſtitious veneration; though theſe are clowniſh, ignorant, and licentious prieſts, yet to them they attribute the power of calling down hail or rain; and to them they give the moſt valuable of their effects in return for prayers, which they go about reciting from tent to tent. Theſe people are very devout, and continually wear hanging at their necks a kind of chaplet, over which they ſay their prayers.

All the Moguls are governed by khans, or particular princes independent one of the other, but all ſubject to the emperor of China, whom they conſider as the grand khan of the Tartars. When the Mantchews ſubdued China, they conferred on the moſt powerful of the Mogul princes the titles of "vang," "peilé," "peizé," and "cong," which correſpond to our titles of king, duke, count, and marquiſs; each of them had a revenue aſſigned him, but far inferior to the appointments of the Mantchew lords at Pe-king. The emperor ſettled the limits of their reſpective territories, and appointed the laws, according to which they are at preſent governed. Theſe tributary khans have not the power of condemning their ſubjects to death, nor of depriving them of their poſſeſſions: the two caſes of death and confiſcation being reſerved for the ſupreme tribunal eſtabliſhed at Pe-king for the affairs of the Moguls, to which every individual may appeal from the ſentence of his prince, who is obliged to appear in perſon whenever he is cited.

All the Mogul nations, under the Chineſe government, of which we have given an account in the cloſing paragraph of this article, are divided into four principal tribes, which are the Moguls, properly ſo called, the Kalkas, Ortous, and Tartars of Kokonor. The country of the Moguls, according to the map of Chineſe Tartary, taken from the Memoirs of the Jeſuits, extends more than 300 leagues from E. to W., and 200 from N. to S.; it is incloſed between the country of the Ortous, the great wall, Eaſtern Tartary, and the country of the Kalkas; theſe people compoſe 49 "ki," or ſtandards; every ſtandard comprehending an indeterminate number of companies, each of which conſiſts of 150 heads of families; and each company may be reckoned to contain 1000 individuals. Beſides theſe 49 ſtandards, there are five others, under the immediate government of the emperor of China, and commanded by officers whom he ſends thither.

The beſt cultivated canton of all the Mogul territories is the diſtrict of "Cartching," near the great wall, where the emperor every year hunts, and where he has cauſed to be built ſeveral pleaſure-houſes, the principal of which is "Geho." The extenſive domains in this diſtrict, belonging to the emperor, are let out to farmers, and the number of cattle kept by them is immenſe. It has been ſaid that they reckoned there 190,000 ſheep, diſtributed into 225 flocks, and almoſt as many oxen and cows, divided into herds, each of which contained 100. The number of ſtallions there is more conſiderable. Theſe riches in farms, ſtuds and flocks make greater impreſſion on the minds of the Tartar and Mogul princes, and render them much more ſenſible of the majeſty of the emperor, than all the magnificence of his court at Pe-king. Anc. Un. Hiſt. vol. xviii. Tooke's Ruſſia, vol. i. Groſier's China, vol. i. See MOGUL *Empire*, and TARTARY.

MONGON, a town of Peru, ſituated on its coaſt, in the South Pacific ocean; 10 leagues N. of the harbour of Guarmey, and four leagues from Bermajo iſland: it is known at ſea by a high mountain juſt over it, which is ſeen at a greater diſtance than any others on this part of the coaſt.

MONGON, *Cape*, lies on the S. ſide of the iſland of St. Domingo.

MONGOOSE, or MONGOOZ, in *Zoology*, is a ſpecies of *lemur* in the Linnæan ſyſtem, the woolly maucauco of Pennant, and by ſome called the Macaſſar fox. See LEMUR *Mongoz*.

MONGOPUNGOLE, in *Geography*, a town of Hindooſtan, in the circar of Meywar; 36 miles E. of Cheitore.

MONGOU KIAMEN, a poſt of Chineſe Tartary. N. lat. 44° 46'. E. long. 125° 28'.

MONGUILLEM, a town of France, in the department of the Gers; nine miles N.W. of Nogaro. N. lat. 43° 52'. W. long. 0° 7'.

MONGUIPATANE, a town of Hindooſtan, in the circar of Aurungabad; 24 miles S. of Aurungabad.

MONGULCOTE, a town of Hindooſtan, in Bengal; 18 miles N. of Burdwan.

MONGULHAUT, a town of Hindooſtan, in Bengal; 16 miles N. of Rungpour.

MONGUMMA, a town of Hindooſtan, in Boggilcund; 15 miles N.E. of Rewah.

MONHEGAN, or MENHEGAN, a ſmall iſland in the Atlantic

Atlantic ocean; 12 miles S.E. of Pemaquid Point, in the county of Lincoln and ſtate of Maine.

MONHEIM, a town of the duchy of Berg, on the Rhine; nine miles S.S.E. of Duſſeldorp.—Alſo, a town of Bavaria, in the principality of Neuburg; 18 miles W.N.W. of Neuburg. N. lat. 48° 47′. E. long. 10° 46′.

MONI, a ſmall iſland in the gulf of Engia.

MONIAGUR, a town of Hindooſtan, in Concan; 48 miles N. of Bancout.

MONIAN, a town of Bengal; 20 miles S. of Calcutta.

MONIEH, one of the ſmaller Hebrides. N lat. 57° 28′. W. long. 7° 36′.

MONJES, a cluſter of ſmall iſlands in the Spaniſh main, near the coaſt of South America. N. lat. 12°. W. long. 70° 40′.

MONIGLIA, Gio. Andrea, of Florence, in *Biography*, member of the academy della Cruſca; a phyſician by profeſſion, was author of a great number of poems for muſic. He may be regarded, ſays M. Laborde, as one of the firſt who began to reform the abuſes of the age; but this was only in his dramatic works, they were all printed at Florence, and dedicated to the grand duke, in 1698. He was eſtabliſhed in the ſervice of his court, which, by very expenſive efforts, ſeems to have delighted in the exhibition of whatever the wild imagination of poets could invent. His works were brought on the different ſtages of Italy from 1657 to about 1680.

MONIKEDAM, or Monikendam, in *Geography*, a ſea-port town of Holland, on the river Monick, on the borders of the Zuyder ſee, with a ſmall port; nine miles N.E. of Amſterdam. N. lat. 52° 29′. E. long. 4° 52′.

MONILIA, in *Botany*, from *monile*, a necklace, alluding to the beaded appearance of the threads, which are ſuppoſed to be the ſeat of the fructification. Perſ. Syn. Fung. 691. Obſ. Mycolog. faſc. 2. t. 4. f. 8, 9. (Aſpergillus; Mich. Gen. 212. t. 91.)—Claſs and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi*.

Eſſ. Ch. Stalked or diſperſed, fibrous. Threads beaded or jointed.

Perſoon defines 12 ſpecies of this minute, but curious genus. They are confounded by common obſervers, under the general idea of *Mucor*, or Mould, being found on various putrifying vegetable ſubſtances; ſometimes on the dung of animals. The author juſt mentioned diſpoſes them in three ſections, of which we ſhall cite an example or two.

Section 1. *Stalked; the threads collected into a round head.*

M. *glauca*. Perſ. n. 4. (Aſpergillus capitatus, capitulo glauco, ſeminibus rotundis; Mich. Gen. 212. t. 91. f. 1. Mucor glaucus; Linn. Sp. Pl. 1656. Fl. Dan. t. 777. f. 2.)—Tufted, of a glaucous grey.—Common on rotten apples, peaches, melons, &c. It forms tender greyiſh-white patches, of no determinate figure. When examined with a microſcope, each minute individual proves to be a globoſe *head of threads*, radiating in every direction, and ſupported by a long ſlender *ſtalk*. The texture is ſo tender and evaneſcent, that the plant cannot be preſerved.

M. *penicillus*. Perſ. n. 7. Obſ. Mycol. faſc. 2. 35. t. 4. f. 8, 9.—Cluſtered, lemon-coloured, permanent. Stalk downy. Threads even.—Found by Perſoon on the dung of mice, but very rarely. The texture is durable. *Stalks* rigid, ſhorter than the former, their height ſcarcely exceeding the diameter of the *head*. The *threads* are ſmooth, not beaded, forming an exception to the generic character, ſo that Perſoon juſtly doubts, whether this little plant be properly referred to *Monilia*. It can hardly however be reduced to any other known genus.

Section 2. *Cauleſcent; threads ſtraight, digitate.*

M. *digitata*. Perſ. n. 9. (Aſpergillus albus tenuiſſimus, graminis dactyloidis facie, ſeminibus rotundis; Mich. Gen. 215. t. 91. f. 3. Mucor cruſtaceus; Linn. Sp. Pl. 1656, with an erroneous quotation of Micheli's letter-preſs. M. penicillatus; Bull. v. 1. 107. t. 504. f. 11.)—Glaucous. Stalk ſimple. Threads finger-like.—Very common on all kinds of fermenting or corruptible ſubſtances, compoſing greyiſh uneven tufts, of an extremely delicate and minute ſtructure. The beaded *threads* ſtand four or five together, radiating, at the top of each common *ſtalk*. The latter is ſaid by Bulliard to be ſometimes branched.

Section 3. *Diſperſed, ſtemleſs; threads irregularly ſcattered, muſty.*

M. *antennata*. Perſ. n. 12. (Dematium antennæforme; Hoffm. Germ. Crypt. t. 13. f. 4. Aſpergillus cæſpitoſus, ex obſcuro nigricans, ſeminibus ovatis; Mich. Gen. 213. t. 91. f. 6?)—Diſperſed, black. Joints of the threads ovate.—Common in autumn on the trunks of trees, or on pales, which it renders black in patches. In ſummer it is ſaid by Perſoon to be, in a young ſtate, tender, more ſcattered, and almoſt of an olive colour.

Such minute productions as this, muſt neceſſarily be liable to confuſion. Thoſe who ſtudy *Conſervæ*, and look no further, would conſider the preſent as of that genus; Lichenographiſts might ſuppoſe it a *Collema*, deſtitute of fructification, or more probably a *Lepraria*, conſiſting of nothing elſe. The patient obſervers of theſe intricate works of creation do great ſervice in collecting them together, even under a confined or partial view of the ſubject, for the uſe of thoſe who can conſider it on a larger ſcale; becauſe every body cannot be ſo laboriouſly intent on every department of nature.

MONILIFERA, Vaillant's name for the *Oſteoſpermum* of Linnæus, alluding to the globoſe form and hard ſubſtance of its ſeeds, which are extremely ſingular in the claſs *Syngeneſia*. See Osteospermum.

MONIMASCA, in *Geography*, a town of Africa, in Cacongo, on the right bank of the Zaire. S. lat. 5° 55′. E. long. 12° 50′.

MONJOUL, a town of Hindooſtan, in Bahar; 45 miles E. of Hajypour. N. lat. 25° 34′. E. long. 86° 18′.

MONISTROL de Loire, a town of France, in the department of the Upper Loire, and chief place of a canton, in the diſtrict of Yſſengeaux; 19 miles N.E. of Le Puy. The place contains 3913, and the canton 10,453 inhabitants, on a territory of 192½ kiliometres, in five communes. N. lat. 45° 17′. E. long. 4° 13′.

MONITORY Letters, are letters of warning and admonition, ſent from an eccleſiaſtical judge upon information of ſcandals and abuſes within the cognizance of his court.

MONITOU Islands, in *Geography*. See Monetou.

MONJUIEH. See Mont-jouy.

MONJUR, a town of Aſiatic Turkey, in Caramania; 20 miles S. of Kirſhehr.

MONIY, a river of Brazil, which runs into the bay of Maranhao. S. lat. 2° 40′. W. long. 45° 29′.

MONK, George, in *Biography*, duke of Albemarle, was ſon of ſir Thomas Monk, and born in 1608. He received his education chiefly from the care of his maternal grandfather ſir George Smith, with whom he reſided. His father was in reduced circumſtances, and having ſubjected himſelf to an arreſt for debt, the ſon, indignant at the ſheriff's officer who came to ſerve the proceſs, aſſaulted and caned him without mercy. To avoid the conſequence of this outrage, he entered at the age of ſeventeen as a volunteer, under his

his relation fir Richard Greenville, then about to embark on an expedition againft the Spaniards. In this and a following enterprize the fuccefs was trifling, and in 1629 he went to ferve in the Low Countries, firft under lord Oxford, and then under lord Goring, the latter of whom advanced him to the rank of captain. During the following ten years he was prefent at various fieges and battles, and laid in a ftock of profeffional knowledge, which qualified him for a higher command. He returned home at the commencement of the civil wars, and was engaged in behalf of the king, but he appears, in a fhort time, to have fallen under fufpicion of being inclined to the caufe of parliament, and orders had been actually iffued to arreft him on his arrival, and his regiment was taken away. He was permitted to go on his parole to Oxford, where he completely juftified himfelf to the king, and was raifed to the rank of major-general in the Irifh brigade, then employed under lord Byron, in the fiege of Nantwich. He was foon made prifoner, and his whole brigade, by Fairfax, and being fent to the Tower of London, was kept in confinement till November 1646. He amufed himfelf, during his leifure, by compofing "Obfervations on military and political Affairs," which he fent in manufcript to lord Lifle, by whofe direction they were publifhed after his death. Through the intereft of this nobleman, Monk was liberated, on condition of taking the covenant; he went to Ireland, where he was appointed commander-in-chief for the parliament in the north of Ireland, and obliged O'Neal, who was at the head of a rebellion of the natives, to raife the fiege of Londonderry. The fuperiority of the royalifts, another party at that time in Ireland, and the unwillingnefs of the Scotch troops to act with thofe of the parliament, fo embarraffed him, that he found it neceffary to make a treaty with O'Neal, and to put Dundalk into the hands of the king's troops, after which he returned to England. The parliament was indignant at this termination, and paffed a vote of difapprobation of the treaty with O'Neal, but at the fame time fo far acquitted Monk, that it was refolved his conduct fhould not be enquired into. Monk probably never forgave this proceeding, though he foon after accepted a command in Scotland under Cromwell, who formed a regiment for him, and made him lieutenant-general of artillery. He performed feveral important fervices for the government, and when Cromwell left Scotland in purfuit of Charles II., Monk was left to command in that country at the head of 7000 men. In this ftation he acted with vigour and fuccefs: befieged and took Stirling caftle, whence he fent all the records of the kingdom to London. He ftormed Dundee, and, in imitation of Cromwell in Ireland, put the governor, and all the men in arms, to the fword. This example of favage feverity deterred other places from refiftance, and he became mafter of the whole country, with the exception of fome of the inacceffible parts of the Highlands. His health declined, and in 1652 he was obliged to go to Bath, but on his recovery he returned to Scotland, as one of the commiffioners for its union with the Englifh commonwealth.

The Dutch war, in the mean time, broke out, and in 1653 Monk was transferred to the fea-fervice. "He was now," fays Dr. Campbell, in his Lives of the Admirals, "nearly forty-five years of age, which feemed a little of the lateft to bring a man into a new fcene of life, yet it muft be remembered, that he was bred in a maritime country, and had ferved at fea in his youth; fo that the preferment was not abfolutely out of his way; or if it was, he foon made it appear that he could eafily accommodate himfelf to any fervice that might be beneficial to his country." In June 1653 he engaged, with the fleet of which he had the command, the Dutch fleet: and being on board the Refolution with admiral Deane, who in the very beginning of the action was killed by a chain-fhot, a new invention afcribed to De Witte, Monk with great prefence of mind threw his own cloak over the dead body, and having taken two or three turns on the deck, and encouraged the men to do their duty, ordered it to be removed into his cabin. The conteft lafted two days, and at length terminated in a complete victory obtained by the Englifh. Soon after Van Tromp had fitted out another fleet, with which, on the 29th of July, he engaged the Englifh under Monk. The Dutch admiral was killed in the action, and a moft decifive victory accrued to the Englifh, teftified by the capture or deftruction of more than thirty fhips, and the moment the refult was known the States General were obliged to fend their minifters here to conclude a peace upon any terms that could be obtained. At an entertainment fubfequent to the thankfgiving for this victory, Cromwell, now protector, with his own hand put a gold chain around the neck of his fuccefsful admiral. After this he was employed again in Scotland, and conducted the government with which he was entrufted, fo as to conciliate the perfonal good-will of the nation, however difaffected in their hearts, to the rule to which they were forced to fubmit. His former attachment to the royal caufe excited fome diftruft of him on the part of Cromwell, and fome hopes of him in the royalifts, but he was very cautious, and took care to give no ground of fufpicion by his actions. By his letters, and by his conduct, there feems now no doubt that he was fteadily and ftrongly attached to Cromwell, to whom he not only communicated all that he could difcover of the king's intelligence with others, but fent him alfo a copy of the letter, written by king Charles II. to himfelf, which for a confiderable time was confidered as a proof of Monk's early affection for the king's fervice, a fuppofition that is now clearly and abfolutely overturned. Cromwell, however, was fufpicious of him to the laft, and but a fhort time before his death he wrote the general, or admiral, a long letter, concluding with the following poftfcript, "which," fays the difcerning Campbell, "I conceive affords us a better picture of Oliver than is any where to be met with, and which is no lefs fingular, drawn by his own hand:"

P.S. "There be that tell me, that there is a certain cunning fellow in Scotland, called George Monk, who is faid to lie in wait there to introduce Charles Stuart. I pray you ufe your diligence to apprehend him, and fend him up to me."

Immediately on the death of Oliver, Monk proclaimed Richard, from whom he received a very kind letter, which among other things faid, "that his father had directed him to be governed chiefly by his advice." To this, Monk returned a prudent anfwer, but did not commit himfelf: he forefaw that Richard would not be able long to maintain his authority, and was unqueftionably preparing to act according to circumftances. But whatever were his private views, no politician could have kept them more clofely concealed. His relation and early patron, fir John Greenville, fent the general's brother to him in Scotland, with a letter from the king, foliciting his fupport; but though he received his brother with kindnefs, he fent him back with no confidential communication on the fubject. Lambert, his principal rival, was at this period poffeffed of the chief influence over the army in England. By direction of the Committee of Safety, who now held the reins of government, he marched northwards with the view of overawing Monk. The latter, to gain time, difpatched commiffioners to London to treat of an accommodation, and in the mean while the parliament refumed sumed its authority. Monk set out on his journey to the metropolis: his character was so highly estimated, that he received addresses on all sides requesting that he would use his influence, and exert his powers, in settling a legal and equitable government. On his arrival he took his quarters in Westminster, affecting a perfect and unlimited obedience to the existing parliament, and even caused some of their orders to be executed which revolted against his own mind. At length he complained of the odious service forced upon him, and required the House, in a peremptory manner, to issue writs for assembling a new and a free parliament. This was the death warrant to the long, or rump parliament, and the general rejoicings that were made on the occasion sufficiently proved the odium which that assembly had incurred with the nation. Every thing now manifestly tended to the restoration of monarchy, and yet Monk still maintained the appearance of attachment to republican principles, and allowed, at least openly, no channel of communication between him and the king. At length the general unbosomed himself to a person by the name of Morrice, a relation and intimate friend, and through his means sir John Greenville was admitted to a conference with the general, and entrusted with a verbal message to the king, consisting of assurances of fidelity, and advice for his conduct. Thus was the restoration begun, prosecuted, and perfected by Monk, who assisted, on the 8th of May, 1660, at the proclamation of Charles II. in the capital. On the landing of the king at Dover, he was met by the general, who was hailed by Charles and his brother with all the distinction justly due to one who had been so instrumental in the great event. It was unquestionably regarded as an additional benefit conferred on the sovereign, though perfectly unjustifiable on the part of Monk, that he discouraged and opposed all all those limitations of the royal power and prerogative which some of the best and most judicious friends to political liberty had proposed, and insisted that his restoration should be unconditional. His rewards, as was natural, soon followed, and they were as ample as a subject could expect. His titles, preferments, and fortune he received as favours from the king, all which he might, perhaps, have received in another way, as a very large party in the country would have gladly made him Oliver's successor, but as Campbell expresses it, "Monk generously despised a diadem to which he had no right, and with equal greatness of mind, refused to make any terms with him to whom it belonged, chusing to leave the king's power, and the people's freedom, to be discussed in the only assembly that could have a right to meddle with them." He was created a knight of the Garter, was admitted into the privy-council, made master of the horse, gentleman of the bed-chamber, first commissioner of the treasury, and created duke of Albermarle, with the grant of a landed estate of 7000*l. per annum*. His vast elevation he bore with the modesty and discretion that seemed to be inherent in his disposition. He sat as one of the commissioners for the trial of the regicides, an office which, it is hoped, he undertook with a view of moderating the ferocity of others connected with him, in the same commission. As for Monk, he conducted himself with at least the appearance of humanity in every case, except in the production of private letters from the marquis of Argyle on the trial of that nobleman, and for this he has been justly censured. The question respecting the production of these letters, to the prejudice of the marquis of Argyle, has been lately discussed with much eagerness. Mr. Fox, in his posthumous historical work, has no doubt of the fact, and he speaks of Monk, with that indignation which he was always known to feel for baseness and hypocrify. He says, "All depended upon the army, and that army had fallen into the hands of one, than whom a baser could not have been found in its lowest ranks. Personal courage appears to have been Monk's only virtue; reserve and dissimulation made up the whole stock of his wisdom." Mr. Rose endeavours to vindicate the character of the general, but his arguments are feeble, and his reasoning inconclusive. Mr. Serjeant Heywood, in his "Vindication of Mr. Fox's Historical Work," relates very fully and clearly the arguments, for believing that Monk was guilty of the charge imputed to him with respect to the unfortunate marquis. He proves, in the most satisfactory manner, that it is highly probable Monk did receive letters from Argyle which might affect his life, and then offers strong reasons to shew that he most likely produced them to the parliament, which was sitting in judgment on the marquis. Of Monk, the learned serjeant says, "though not guilty of the precise crime for which they [the regicides] were to be tried, he had waded to his dukedom through bloodshed, duplicity, and crimes." And he further adds, "he probably became the restorer of monarchy, only because he was disappointed in the hope of succeeding to the protectorate, on the abdication of Richard. He had recently acted with some of those who were brought before him for trial, and his crimes deserved the same punishment which he unblushing concurred in inflicting upon theirs." On this subject we refer our readers for more ample information to Heywood's "Vindication," and to the Monthly Review, vols. lix. and lxix. p. 366, 367.

Monk joined the lord chancellor Hyde in the constitutional measure of disbanding the army, with an exception in favour of his own regiment: and he was chiefly instrumental in the suppression of the insurrection of the Fifth-monarchy men. At the breaking out of the Dutch war in 1664, he exerted all his powers in refitting and manning the fleet, and was appointed joint-admiral of the fleet with prince Rupert. The two commanders put to sea in April 1666, and fell in with the Dutch under the younger Tromp and De Ruyter. By the duke's advice prince Rupert took a division of the fleet to oppose that of the French, which was coming to the aid of the Dutch. The English was now much inferior in number to their enemy, but the duke of Albermarle did not hesitate to begin the attack on the 1st of June, and a most bloody engagement ensued, which lasted four days. On the first three, the English, much inferior to the enemy, were obliged to make a retreating fight, the duke himself closing the rear, with the full resolution of blowing up his ship rather than be taken. On the fourth, the return of prince Rupert enabled the English to face about, and a fresh action ensued, at the end of which they retired to their harbours, having been on the whole the principal sufferers. A new combat, by the same commanders on both sides, on the 25th of July, ended to the disadvantage of the Dutch; after which the duke of Albermarle came home and struck his flag. The daring enterprize of the Dutch in 1667, who sailed up the Thames, and burnt some ships at Chatham, called forth the exertions of this veteran once more, who exposed himself to danger in their defence. At this time he was much out of health, being affected with symptoms of dropsy, which put a period to his life, in January 1670, in the 62d year of his age. His remains were deposited, with great funeral pomp, in Henry VIIth's chapel, in Westminster Abbey. Biog. Brit. Hume's Hist. Stockdale's edition of Campbell's Lives of the Admirals, vol. ii.

Monk, anciently denoted a person who retired from the world to give himself up wholly to God, and to live in solitude and abstinence.

The

The word is derived from the Latin *monachus*, and that from the Greek μοναχος, *solitary*, of μονος, *solus, alone;* because the ancient monks lived in solitude, as the true monks still do.

Such were the hermits and anachorets, who withdrew into deserts, and lived remote from all commerce of mankind.

Some writers, as father Helyot, (Differt. Prelim.) trace the origin of monks up as early as the time of the Therapeutæ; and maintain, that there had been an uninterrupted succession of monks from the Therapeutæ to St. Anthony. Others, on the contrary, are contented with going back as far as St. Paul the Hermit.

The original of monks seems to have been this. The persecutions which attended the first ages of the gospel, forced some Christians to retire from the world, and live in desarts and places most private and unfrequented, in hopes of finding that peace and comfort among beasts, which were denied them among men. And this being the case of some very extraordinary persons, their example gave so much reputation to retirement, that the practice was continued when the reason of its commencement ceased. After the empire became Christian, instances of this kind were numerous, and those, whose security had obliged them to live separately and apart, became afterwards united into societies. We may also add, that the mystic theology, which gained ground towards the close of the third century, contributed to produce the same effect, and to drive men into solitude for the purpose of enthusiastic devotion.

In this kingdom many persons might seek this kind of refuge, during the persecution of Diocletian about the year 303, and in those perilous and afflictive times, when the Romans oppressed the Britons, and when their situation was rendered more distressing by the invasion of the Scots from Ireland, the Picts and Attacots from the north, and the Saxons and Franks from the east and south.

The monks, at least the ancient ones, were distinguished into *solitaries*, *cœnobites*, and *sarabaites*.

The solitary are those who live alone, in places remote from all towns and habitations of men, as do still some of the hermits.

The cœnobites are those who live in community with several others in the same house, and under the same superiors.

The sarabaites were strolling monks, having no fixed rule or residence.

The houses of monks again were of two kinds, *viz. monasteries*, and *lauræ*. See MONASTERY, and LAURA.

Those we call monks now-a-days are cœnobites, who live together in a convent or monastery, who make vows of living according to a certain rule established by the founder, and who wear a habit which distinguishes their order.

Those that are endowed, or have a fixed revenue, are most properly called monks, *monachi;* as the Chartreux, Benedictines, Bernardines, &c. The Mendicants, or those that beg, as the Capuchins and Franciscans, are more properly called *religious*, and *friars;* though the names are frequently confounded.

The first monks were those of St. Anthony; who, towards the year 305, formed them into a regular body, engaged them to live in society with each other, and prescribed to them fixed rules for the direction of their conduct. These regulations, which Anthony made in Egypt, were soon introduced into Palestine and Syria by his disciple Hilarion. Almost about the same time, Aones, or Eugenius, with their companions Gaddanas and Azyzas, instituted the monastic order in Mesopotamia, and the adjacent countries; and their example was followed with such rapid success, that, in a short time, the whole East was filled with a lazy set of mortals, who, abandoning all human connexions, advantages, pleasures, and concerns, wore out a languishing and miserable life amidst the hardships of want, and various kinds of suffering, in order to arrive at a more close and rapturous communication with God and angels. From the East this gloomy institution passed into the West, and first into Italy and its neighbouring islands; though it is uncertain who transplanted it thither. St. Martin, the celebrated bishop of Tours, erected the first monasteries in Gaul, and recommended this religious solitude with such power and efficacy, both by his instructions and his example, that his funeral is said to have been attended by no less than 2000 monks. From hence, the monastic discipline extended, gradually, its progress through the other provinces and countries of Europe. There was, however, a great difference in point of austerity between the western and oriental monks; for the former could never be brought to bear the severe rules to which the latter voluntarily submitted; and the reason of this difference may be partly derived from the nature of the respective climates in which they dwell. The European countries do not so much abound with delirious fanatics, and with persons of a morose and austere complexion, as those arid regions that lie towards the burning east; nor are our bodies capable of supporting that rigid and abstemious method of living, which is familiar and easy to those who are placed under a glowing firmament, and who breathe in a sultry and scorching atmosphere. It was, therefore, the name, more than the thing itself, that was transported into the European countries; though this name was indeed accompanied with a certain resemblance or distant imitation of the monastic life instituted by Anthony and others in the East. There were besides the monks of St. Basil, called in the East, *Calogeri*, from καλος γερων, *good old man*, and those of St. Jerom, the hermits of St. Augustine, and afterwards those of St. Benedict and St. Bernard, at length came those of St. Francis and St. Dominic, with a legion of others; all which see under their proper heads, BENEDICTINES, &c.

Towards the close of the fifth century, the monks, who had formerly lived only for themselves in solitary retreats, and had never thought of assuming any rank among the sacerdotal order, were now gradually distinguished from the populace, and endowed with such opulence and honourable privileges, that they found themselves in a condition to claim an eminent station among the supports and pillars of the Christian community. The fame of their piety and sanctity was so great, that bishops and presbyters were often chosen out of their order; and the passion of erecting edifices and convents, in which the monks and holy virgins might serve God, in the most commodious manner, was at this time carried beyond all bounds. However, their licentiousness, even in this century, was become a proverb; and they are said to have excited the most dreadful tumults and seditions in various places. The monastic orders were at first under the immediate jurisdiction of the bishops, from which they were exempted by the Roman pontiff, about the end of the seventh century; and the monks, in return, devoted themselves wholly to advance the interests, and to maintain the dignity of the bishop of Rome. This immunity which they obtained was a fruitful source of licentiousness and disorder, and occasioned the greatest part of the vices with which they were afterwards so justly charged. In the eighth century the monastic discipline was extremely relaxed both in the eastern and western provinces, and all efforts to restore it were ineffectual. Nevertheless, this kind of institution was in the highest esteem, and nothing could equal

equal the veneration that was paid, about the close of the ninth century, to such as devoted themselves to the sacred gloom and indolence of a convent. This veneration induced several kings and emperors to call them to their courts, and to employ them in civil affairs of the greatest moment. Their reformation was attempted by Lewis the Meek, but the effect was of short duration. In the eleventh century they were exempted by the popes from the authority of their sovereigns, and new orders of monks were continually established; insomuch that in the council of Lateran, that was held in the year 1215, a decree was passed, by the advice of Innocent III. to prevent any new monastic institutions, and several were entirely suppressed. In the fifteenth and sixteenth centuries, it appears from the testimonies of the best writers, that the monks were generally lazy, illiterate, profligate, and licentious epicureans, whose views in life were confined to opulence, idleness, and pleasure. However, the reformation had a manifest influence in restraining their excesses, and rendering them more circumspect and cautious in their external conduct.

Monks are distinguished by the colour of their habits into *black*, *white*, *grey*, &c. Among the monks, some are called monks *of the choir*, others *professed* monks, and others *lay* monks; which last are destined for the service of the convent, and have neither clericate nor literature.

MONKS, *Cloistered*, are those who actually reside in the house; in opposition to *extra-monks*, who have benefices depending on the monastery.

Monks are also distinguished into *reformed*, whom the civil and ecclesiastical authority have made masters of ancient convents, and put in their power to retrieve the ancient discipline, which had been relaxed; and *ancient*, who remain in the convent, to live in it according to its establishment at the time when they made their vows, without obliging themselves to any new reform.

Anciently, the monks were all lay-men, and were only distinguished from the rest of the people by a particular habit, and an extraordinary devotion. Not only the monks were prohibited the priesthood, but even priests were expressly prohibited from becoming monks, as appears from the letters of St. Gregory. Pope Syricius was the first who called them to the clericate, on occasion of some great scarcity of priests, that the church was then supposed to labour under: and since that time the priesthood has been usually united to the monastical profession.

MONKS, *Professed*. See PROFESSED.

MONKS, *Proprietary*. See PROPRIETARY.

MONK-*Fish*, called also *Angel-fish*, in *Ichthyology*, a species of *squalus*. See SQUALUS *Squatina*.

MONK'*s-Hood*, a name given to several species of aconite, or wolf's-bane. See ACONITUM.

MONK'*s-Rhubarb*. See RHUBARB, and RUMEX.

MONK'*s-Seam*, among *Sailors*, is, when the selvedges of sails are laid a little over one another, and sewed on both sides.

MONKAH, in *Geography*, a town of Bengal; eight miles S. of Palamow.

MONKEARY, a town of Bengal; 20 miles S.S.E. of Palamow.

MONKEDOO, a town on the W. coast of Borneo. S. lat. 2° 40'. E. long. 109° 51'.

MONKEY, in *Zoology*, a name given by way of distinction to those apes which have tails; the others, or those without tails, being more properly called *apes*.

The same distinction holds in Latin, the tailed ones being called *papiones* or *baboons*, when they have short tails; *cercopitheci*, when their tails are longer; and those without tails *simiæ*. See CERCOPITHECUS and SIMIA.

MONKEY *of the West Indies*. See GUARIBA, and SIMIA *Beelzebub*.

MONKEY, *Green*. See CALLITRICHUS, and SIMIA *Sabæa*.

MONKEY, in *Ship Building*, a machine for driving bolts where more force is required than the common method, by a mall. It is composed of a long pig of iron traversing in a groove, or in a frame, with handles, with a groove on the underside, and slides upon a ridge of iron fixed in a bed. The whole is fixed to centre the bolt to be driven, and then the monkey is forcibly drawn, to strike the bolt, by ropes and pulies.

It also denotes the stand for the pinion and winch-handle, which draw the lock-paddles in a canal, &c. *Plate* V. *Canals*, *fig*. 38 and 39, *k*, *k*.

MONKEY-*Boat*, a name sometimes applied to a long narrow sort of boat.

MONKEY-*Blocks*, in *Ship-Building*. See BLOCKS.

MONKEY'*s-Bread*, in *Gardening*. See ADANSONIA.

MONKEY-*Flower*, the common name of a flower plant. See MIMULUS.

MONKEY-*Island*, in *Geography*, a small island in Currituck sound, near the coast of North Carolina. N. lat. 36° 22'. W. long. 76 4'.

MONKEY-*Key*, a small island in the bay of Honduras, near the coast of Mexico. N. lat. 16 25'. W. long. 89° 35'.

MONKEY-*Point*. See PUNTA *Chica*.

MON-KIEU-TCHIN-HOTUN, a town of Corea. N. lat. 43° 1'. E. long. 129 50'.

MONKTON, a post-town of America, in Addison county, Vermont, E. of Ferrisburg; containing 1080 inhabitants.—Also, a township of Annapolis county, in Nova Scotia, inhabited by Acadians, and a few families from New England; it consists chiefly of wood-land and salt-marsh, and contains about 60 families.

MONLIRAS, a town of the island of Cuba; 45 miles E. of Bayamo.

MONMOUTH, a large maritime county of New Jersey, in the United States, of a triangular shape; 80 miles in length, and from 25 to 40 in breadth; it is divided into six townships, and contains 19,872 inhabitants, including 1633 slaves. The face of the country is generally level, with few high lands, the most noted of which are Navesink and Centre-hill. The soil is for the most part sandy; but other parts are fertile. At the mouth of Navesink river there is a curious cave, now in a ruined state, 30 feet long, and 15 wide, containing three arched apartments.

MONMOUTH, or *Freehold*, a post-town and capital of the fore-mentioned county, situated 22 miles N.E. by E. of Allentown, 34 E. of Trenton, and 64 N.E. by E. of Philadelphia. It contains a court-house, gaol, and a few compact dwelling houses, with a Presbyterian and Baptist meeting-house.

MONMOUTH, a post-town of Lincoln county, on the E. side of Androscoggin river; 49 miles N. of Portland, containing 701 inhabitants.

MONMOUTH, *Cape*, lies on the E. side of the straits of Magellan.

MONMOUTH-*Island*, one of the four islands of Royal Reach, in the straits of Magellan, and the second from the westward.

MONMOUTH-*Island*, one of the Bashee islands in the East Indian sea.

MONMOUTH, a market-town and borough in the hundred of Scenfreth and county of Monmouth, England,

land, ſtands on a narrow peninſula, formed by the confluence of the rivers Monnow and Wye. It is a town of great antiquity, and according to Horſley (in his Britannia Romana) was the Bleſtium of Antoninus. No Roman remains, however, have been found here to corroborate this opinion, which, though probable, is chiefly founded on the fact of the coincidence of diſtances between that and the connecting ſtations, northward and ſouthward, with the actual diſtances between thoſe and the preſent ſcite of Monmouth. The caſtle at this place is mentioned in ancient records as being one of the ſtrong holds garriſoned by the early Saxons, to ſecure their conqueſts of the country between the Severn and the Wye; and to curb the depredatory incurſions of the Welſh. Very little, however, beſides this bare fact, is known concerning this fortreſs, till the era of the Norman conqueſt, when it appears, from a paſſage in Domeſday book, to have belonged to the king. William, the ſon of William Fitz-Baderon, to whom four "carucates of land in the caſtle of Monmouth, part of the royal demeſne, were given in cuſtody" about this time, took the ſurname of de Monmouth, from the place, which continued in the poſſeſſion of his deſcendants till the reign of Henry III., when John de Monmouth became the proprietor. During the reign of that monarch, which is recorded to have been one continued ſcene of civil ſtrife, this fortreſs was occaſionally beſieged and occupied by both parties; and was ultimately reſigned, together with the honour, to prince Edward and his heirs for ever, in conſideration of certain lands granted for life. The prince ſoon afterwards ſurrendered it to the king, who beſtowed it on his younger ſon Edmund, earl of Lancaſter, from whom it deſcended to John of Gaunt, king of Caſtile and duke of Lancaſter, who, as well as his ſon, Henry of Bolingbroke, (afterwards Henry IV.) made it their favourite reſidence. Henry V., the celebrated hero of Agincourt, was born in one of the rooms of Monmouth caſtle in the year 1387, and ſeems alſo to have paſſed his infancy here. This caſtle ſubſequently became the property of Henry VI. as part of the duchy of Lancaſter, which had deſcended to him by inheritance. Upon his dethronement and attainder, it fell to Edward IV., who granted it to William, lord Herbert, whom he created earl of Pembroke; but having once more reverted to the crown, Henry VII. poſſeſſed it by the ſame right that he aſcended the throne. Since that period, the caſtle has become private property, but at what date its alienation from the duchy took place is not aſcertained. Previouſly, however, to the cloſe of the 17th century, we find it in the poſſeſſion of Henry, the firſt duke of Beaufort, and it is now the property of his illuſtrious deſcendant, the preſent duke.

Under the auſpices of its lords, Monmouth early became a privileged place, and particularly enjoyed many immunities as forming a parcel of the duchy of Lancaſter. The earlieſt charter, however, which appears in the archives, is dated in the year 1549, and was granted by the monarch then reigning "to the burgeſſes of his burgh and town of Monmouth, in the marches of Wales, and within his duchy of Lancaſter." This deed confirms various franchiſes and privileges beſtowed upon the inhabitants by Henry VIII.; and in addition confers the power of electing a mayor and two bailiffs. Since that time therefore Monmouth has been governed by officers under that denomination, who are aſſiſted by a common council, compoſed of eighteen members.

The ſituation of this town is extremely pleaſant and highly pictureſque: it ſtands near the extremity of an expanded vale, ſurrounded by gentle hills and ſwelling eminences, either covered to their ſummits with rich woods, or laid out in fields of corn and paſture. It is a place of conſiderable extent, and contains many reſpectable buildings, but has only one principal ſtreet, which leads from the bridge over the Monnow, to the market place. In this ſtreet ſtands the town-hall, an edifice of modern erection, built upon pillars, which form a handſome colonnade. A ſtatue of Henry V. is placed in a niche over the front entrance. The other ſtreets are moſtly narrow. One of them leads from the market place to St. Mary's church. That edifice formerly belonged to an alien priory for black monks of the Benedictine order, an inſtitution which was founded in the time of Henry I. by Wihenoc, grandſon of Fitz-Baderon and third lord of Monmouth. Only a few veſtiges of the monaſtery can now be diſcovered a little to the north of the church, which, with the exception of the tower and ſpire, is entirely a new building. The church of St. Thomas, now ſubordinate to St. Mary's, is an ancient ſtructure. Coxe, in his hiſtorical tour through this county, ſays, "that the ſimplicity of its form, the circular ſhape of the door-ways, and of the arch ſeparating the nave from the chancel, and the ſtyle of their ornaments, which bear a Saxon character, ſeem to indicate that it was built before the conqueſt." Some authors even ſuggeſt, that there is a probability of the more ancient parts being of Britiſh origin. It is certainly, for Wales, a moſt curious ſpecimen of early architecture; and in no mean degree deſerves the attention of the antiquary, particularly the ſemicircular arch of the northern door-way.

The county gaol is a new maſſive edifice, well adapted to its purpoſe; the apartments are airy; and much attention is paid to the health and morals of the priſoners. This building ſtands at one extremity of the town, on the banks of the Monnow. Here is a free ſchool founded by William Jones in the reign of James I.; alſo an alms-houſe for 20 poor people, eſtabliſhed and endowed by the ſame individual.

The remains of walls, lines of circumvallation, curtains, baſtions, and other works of defence, clearly ſhew that this town muſt have been, at one time, a ſtrongly fortified place, and from its ſituation, there is little doubt but it might eaſily be made ſo again. On thoſe ſides which were unprotected by the river, it has been evidently environed by ſtrong walls, and a deep foſſe capable of being filled with water. It had four gates, only one of which is now ſtanding. The ſuburb of St. Thomas was defended in the ſame manner as the town, with which it communicated, as now, by a ſtone bridge with baſtion-towers on each ſide thrown over the Monnow. There are two other bridges in the immediate vicinity of the town, the Wye-bridge and Tibb's-bridge; the former of which is conſtructed of ſtone, and the latter of wood.

The ruins of the caſtle of Monmouth, the ancient reſidence of its powerful lords, are diſcovered occupying the ridge of an eminence ſituated between the market place and the river Monnow. From a view of theſe it is evident, that this fortreſs has been the work of ſeveral and even diſtant periods. Some portions of them beſpeak a Saxon if not a Roman origin, while others are of a date poſterior to the reign of Henry III. The maſſive ſtructure of part of the walls is particularly remarkable, being from ſix to ten feet thick, and are compoſed of pebbles and liquidated cement, ſo cloſely compacted as not to yield in hardneſs to ſtone itſelf. The chamber, in which king Henry was born, is wholly demoliſhed, but ſome of the beams, which ſupported the flooring, ſtill remain viſible. Adjoining to it is a large apartment, which probably formed the baronial hall, and was afterwards uſed for the county aſſizes till about the

middle

middle of the laſt century. A handſome domeſtic edifice, conſtructed of ſtone, ſtands in the middle of this vaſt pile of ruins. From the date over the principal door it appears to have been built in 1673, for the occaſional reſidence of the Beaufort family. Two hoſpitals, founded here by John de Monmouth about the year 1240, are now entirely levelled with the ground.

The manufactures of Monmouth, at the preſent period, are trifling; ſo that the inhabitants are chiefly ſupported by the navigation of the river Wye, the trade with Hereford and Briſtol, the ſupply of the neighbouring diſtrict with various kinds of ſhop-goods, and the number of perſons of independent fortune, who reſide either conſtantly or occaſionally in the town, or its vicinity. The paring and cleanſing of bark brought from the foreſts of the Upper Wye, for the purpoſe of exportation, conſtitutes, during the ſeaſon, the employment of a number of men, women, and children among the lower ranks. But though fallen in reſpect of its manufacturing importance now, Monmouth ſeems to have carried on a very conſiderable trade ſome centuries ago.

Monmouth caps are celebrated by Shakſpeare in his play of Henry V.; "If your majeſties is remembered of it, the Welſhmen did goot ſervice in a garden, where leeks did grow, wearing leeks in their Monmouth caps." Fuller likewiſe praiſes them highly, by calling them the moſt "ancient, general, warm, and profitable coverings of men's heads in this iſland." The old ballad of the caps, printed in "The Antidote againſt Melancholy," ſays,

"The ſoldiers that the Monmouth wear,
On caſtles' tops their enſigns rear."

Monmouth has ſent one member to parliament ſince the reign of Henry VIII. The right of election is in the burgeſſes inhabitants, in conjunction with the burgeſſes inhabitants of the towns of Newport and Uſk, as decided by the houſe of commons on a petition of right in 1680. According to the parliamentary returns of 1801, the population of this town then amounted to 3345 perſons, but Mr. Coxe, in his "Hiſtorical Tour," fixes it at about 2600 ſouls.

The vicinity of this town diſplays much beautiful and intereſting ſcenery. The views from the high conical hill, called the Kymin, are particularly fine, extenſive, and diverſified. A walk leads to the ſummit of this hill, which terminates in a level plain crowned with a wood, through which ſix viſtas have been cut. Each of theſe exhibits in fine perſpective a rich, grand, and varied proſpect, of an expanſive tract of country. In the centre of the wood, a pavilion, intended for a naval monument, has been lately erected by ſubſcription. It is a circular edifice, conſiſting of two ſtories, and built in the form of an embattled tower. The frieze round it is ornamented with medallions of the moſt eminent Britiſh admirals, accompanied with emblematical and appropriate devices. The view from the ſummit of this pavilion is perhaps the fineſt and moſt extenſive in England, embracing a circumference of nearly 300 miles, and including within its range all the materials of ſublime and beautiful ſcenery.

Troy-houſe, the ancient ſeat of the family of Herbert, and afterwards of that of Somerſet, is ſituated about a mile from the town on the banks of the Trothy, from which river its name is corruptly derived. Of the original edifice few traces can now be diſcovered, except an old gate-way with a pointed arch. The preſent manſion was built under the direction of the celebrated Inigo Jones, but though well proportioned and commodious, it poſſeſſes no features of peculiar beauty. This place was formerly much famed for its excellent and luxuriant gardens, particularly in the time of Charles I. when they were the property of ſir Thomas Somerſet, brother to the marquis of Worceſter. Two miles weſt from hence is a Treowen, the ſeat of the Jones family, but now converted into a farm-houſe. In the pariſh of Lanvihangel Tavanbarch', at the diſtance of three miles to the north, ſtand the remains of Grace-Dieu abbey, which was founded by John of Monmouth in the year 1229. In the pariſh of Landeilo Creſſeney appear the magnificent ruins of White Caſtle, anciently called Lanteilo caſtle, or Caſtell-Gwin. This fortreſs, at the time of the conqueſt, formed part of the poſſeſſions of Brian-Fitz-count, earl of Hereford, from whom it came, firſt to the Cantalupes, and afterwards to the Braoſes. Coxe's Hiſtorical Tour through Monmouthſhire, 4to. 1801. Beauties of England and Wales, vol. x.

MONMOUTHSHIRE, one of the weſtern counties of England, is bounded on the ſouth-eaſt by the Severn ſea or Briſtol channel; on the weſt by Glamorganſhire and part of Brecknockſhire; on the north by part of the latter county, and that of Hereford; and on the eaſt by Glouceſterſhire. It extends about 33 miles in length, and 20 in breadth, and compriſes, according to the lateſt ſurveys, an area of 550 ſquare miles, or 352,000 acres. By the returns made to parliament in 1801, it contained 9365 houſes, and a population of 45,582 inhabitants. The whole county is now divided into ſix hundreds: Scenfreth, Abergavenny, Wentloog, Caldecot, Uſk, and Raglan; and comprehends 127 pariſhes, and ſeven towns. The latter are Monmouth, Caerleon, Chepſtow, Uſk, Abergavenny, Newport, and Pontypool. All the pariſhes, with reſpect to eccleſiaſtical juriſdiction, are included in the province of Canterbury, and alſo in the dioceſe of Landaff, with the exception of ſix, *viz.* Welſh-Bicknor, Dixon, and St. Mary's being in the dioceſe of Hereford; and Oldcaſtle, Llanthony, and Cwmyoy, belong to St. David's.

At the period of the Roman invaſion Monmouthſhire formed part of the territory inhabited by the Silures, who, beſides this diſtrict, poſſeſſed the counties of Glamorgan, Brecknock, Radnor, Hereford, and ſuch parts of Glouceſterſhire as lay between the Severn, the Teme, and the Towy. On the diviſion of Britain into provinces by the Romans, this county was included in Britannia Secunda. From the period at which theſe illuſtrious conquerors left our iſland, till the eſtabliſhment of the Saxon heptarchy, the hiſtory of Monmouthſhire, in common with that of almoſt every portion of Britain, is uncertain and contradictory. In the legends of theſe times, however, it makes a moſt conſpicuous figure. Many of the heroic exploits of Uther Pendragon, and of the celebrated Arthur, are ſaid to have taken place within its boundaries. Caerleon was long the capital of the Britiſh dominions, and is frequently deſcribed by the bards as equalling Rome in ſplendour and magnificence. After the full eſtabliſhment of the Saxon power in England, this county ſeems to have formed a petty principality of itſelf, under the name of Gwent, whoſe princes were ſometimes bold enough to aſpire at independence, but who, for the moſt part, paid tribute to the princes of South Wales. The invincible courage which had marked their character at a more remote period, ſtill continued in full force during this era, and oppoſed a moſt effectual barrier to the attempts of the Saxon monarchs to ſubjugate the principality. Canute, the Dane, entered Gwent with a powerful army, in the year 1034, but though he defeated Rytherch-ap-Jeſtin, prince of of South Wales, he was unable to hold poſſeſſion of the country. It was not, indeed, till the reign of Edward the Confeſſor, that the Gwentians could be regarded as conquered, when Harold, having penetrated into the heart of Wales, forced the inhabitants to ſwear fealty to the crown of England, and retained military poſſeſſion of this county, in order the more effectually to ſecure the advantages he had gained. The Norman invaſion, however, was the ſignal to all the Welſh tribes for renewing the war, and throwing off the yoke which had been thus impoſed. In order again to reduce them, the conqueror, too politic to weaken his own army in ſuch a warfare as Wales preſented, encouraged his powerful barons to make incurſions into that country at their own expence, and with their own retainers, and, as a reward, granted them the privilege of holding the lands they conquered in capite. Monmouthſhire was accordingly overrun in this way after a long and bloody ſtruggle for its independence; but the conquerors having built numerous caſtles and fortreſſes in order to overawe the inhabitants, ſoon began, in their turn, to arrogate to themſelves an independent authority. Continual diſputes took place betwixt them, with reſpect to the extent and boundaries of their lands, which not unfrequently terminated in open hoſtility to each other, and even to the crown of England. The power poſſeſſed by theſe barons marchers, within the limits of their property, was little inferior to that of a prince. They held courts and adminiſtered juſtice at will to their tenants and dependants, in all queſtions both civil and criminal. This ſyſtem of juriſprudence, perhaps the moſt wretched and deplorable that could poſſibly be adopted, continued in this county, as well as in the other marches of Wales, till the reign of Henry VIII., when the government of the lords marchers was aboliſhed, and Monmouthſhire was detached from the principality, and included among the counties of England. The ſtatute, however, authoriſing this change, does not ſeem to have been immediately acted upon, for we find Monmouth regarded as a Welſh county ſo late as the reign of Charles II., when it firſt began "to be reckoned an Engliſh county, becauſe the judges kept the aſſizes here on the Oxford circuit." From this circumſtance it is difficult to fix, preciſely, the period at which Monmouthſhire might be ſtrictly conſidered as an Engliſh county: probably, however, not before the juriſdiction of the ſupreme "court of lords marchers," uſually held at Ludlow, was finally aboliſhed in the firſt year of William and Mary.

The general aſpect of Monmouthſhire preſents to the eye a continual recurrence of hill and dale, wood and water, corn fields and meadows; "the ſublime of wildly magnificent, and the beauty of mild and cultivated ſcenery combine to delight the traveller at every turn he makes in this uncommonly diverſified diſtrict." Nor is the air leſs favourable to health, than the face of the country is intereſting to the view. Except on the more elevated ridges, which are no doubt cold and bleak, it is, for the moſt part, mild and temperate. It is a remarkable circumſtance, that the fogs here, during winter, ſhift periodically; ſo that it is no uncommon thing to ſee the hills enveloped ſeveral days with a thick fog, while the valley beneath has the ſplendour of a genial ſun: but on a ſudden theſe effects are entirely reverſed; the fog deſcends into the valley, and the mountains are, in their turn, left open to the rays of heaven. Monmouthſhire abounds with rivers, of which the principal are the Severn, the Wye, the Uſk, the Rumney, the Monnow, or Mynwy, and the Ebwy. The Wye is particularly remarkable for the beauty and variety of its ſcenery, exhibiting a continued ſeries of enchanting views, which have been amply deſcanted on by Gilpin, Ireland, Warner, and many other touriſts; and latterly by Bloomfield, in a poem expreſsly devoted to the ſubject. (See WYE.) The Uſk likewiſe diſplays many charming ſcenes, and when ſwelled by mountain torrents ſpreads itſelf out into expanſive lakes, and occaſionally inundates the adjacent country. This river is navigable for barges up to Tredonnoc-bridge. There is only one canal in this county, which was begun in 1792, and finiſhed in 1798. It enters Monmouthſhire from Brecknockſhire, and divides it nearly into two equal parts, paſſing in its courſe cloſe to the towns of Abergavenny and Pontypool, and falls into the eſtuary of the Uſk at a ſhort diſtance below Newport. About a mile above that town, a branch ſtrikes off to Cramlin-bridge, near Llanhiddel, where it terminates. Still further to facilitate the conveyance of the more weighty articles which this county produces, rail-roads have been formed in different parts of it. One, which connects the iron-works at Blaenavon with the canal at Pontnewydd, is particularly remarkable. It only extends five miles and a quarter in length, and riſes no leſs than 610 feet. The roads in Monmouthſhire, with the exception of thoſe from New-Paſſage to Newport, Caerdiff, and Uſk, and thence to Abergavenny, were, till lately, proverbially bad; and though improved, are capable of ſtill further amendment.

Monmouthſhire, conſidered in an agricultural point of view, may be properly divided into three diſtricts. The firſt, compriſing the ſouthern part of the county, conſiſts, almoſt entirely, of moor, or marſh lands, with a portion of meadow-grounds. The ſecond diviſion, which takes in the eaſtern line of the county, is particularly fertile. The third diviſion forms the weſtern and moſt hilly part of the county. The kinds of corn generally raiſed are wheat, barley, and oats, with a very ſmall proportion of peas and beans. Theſe are, of courſe, principally produced in the eaſtern diviſion, the other two being much more paſtoral, or grazing, than farming diſtricts. The cattle reared are oxen, ſheep, and mules. The firſt are principally bred in the northern parts, and fed in the ſouthern. Theſe generally grow to a large ſize, are extremely docile, and well fitted for the labours of the field. The ſheep are naturally of an inferior kind, but the ſtock has been greatly improved of late years, by various croſſes with the Coteſwold, Southdown and Dorſet breeds. Mules are very abundant here, and are a peculiarly fine race, ſtrong in the bone, and of exquiſite ſymmetry, running from fourteen to ſixteen hands high, and are ſo valuable as to ſell for thirty or forty pounds each. The breed is conſtantly kept up to its priſtine ſtandard of excellence by the importation of ſtallion aſſes from Spain. But whether this traffic ſhould be encouraged is extremely doubtful, conſidering the ſuperior qualifications of the horſe, the breeding of which animal is, in conſequence, almoſt wholly neglected in this county. Indeed the Monmouthſhire horſes are by far the moſt miſerable race of their ſpecies in our iſland, neither adapted for the ſaddle, nor uſeful for agricultural purpoſes.

Monmouthſhire was formerly celebrated for its manufacture of ſtockings and knit caps, but that trade almoſt entirely diſappeared ſoon after the eſtabliſhment of the iron works in the reign of queen Elizabeth. Since that period the iron buſineſs, though in different degrees at different times, has conſtituted the chief employment of the manufacturing claſſes in the county. This branch of trade has of late years increaſed to a prodigious extent, ſo that Monmouthſhire will, in all probability, ſoon take the precedence, as an iron diſtrict, of every other county in Great Britain.

At

At Pontypool and at Usk there are still considerable manufactories of japanned goods, generally distinguished by the name of Pontypool ware, because first invented in that town, but this trade has suffered much from the competition of Birmingham, joined to the unfavourable state of our foreign relations. The commerce of Monmouthshire, which is very considerable, is almost entirely confined to the towns of Chepstow and Usk: under these respective names the reader will find the different articles of export mentioned. See Newport and Usk.

Monmouthshire, to the antiquary, is particularly interesting: Caerwent was first the capital of the Silurian dominions, and afterwards a Roman station. The other stations of that people in this district were Isca-Silurum at Caerleon, Gabannum at Abergavenny, Burrium at Usk, and Blestium at Monmouth; but some antiquaries place the two last at Oldcastle and at Caerphilly. To trace the direction of the Roman roads, particularly of the Julia Strata, in their passage through this country, is a subject of much difficulty. This has arisen chiefly from the disagreement of antiquaries with respect to the point at which the legionary troops usually crossed the Severn, which some have fixed at Amesbury, and others at Oldbury, Aust, New Passage, Henbury, and Portishead. The Julia Strata is most distinctly visible in the vicinity of Caerwent, running in the direction of Penhow. A few traces of it can likewise be discovered near Caerleon and Newport, but its course between these towns is wholly uncertain. Mr. Evans, however, conjectured that it proceeded along the right bank of the Usk, leaving Malpas church on the west, and Crindahouse on the east, and passed to the scite of St. Woolo's church, on the hill north of Newport, where is a large encampment, and a tumulus, now nearly destroyed, which Mr. Harris regarded as an *arx speculatoria*. Of the roads which struck off from the Julia Strata, one led from Isca-Silurum to Burrium, where dividing into two ramifications, one proceeded to Gobannium and the other to Blestium. Another has evidently run in a south-westward direction, from Abergavenny to Neath, or to some station in Gloucestershire. This road is called by the natives *Sarn-hir*, or the long paved causeway, and in the neighbourhood of Bydwelly still remains almost entire. Besides these, various other marks of Roman civilization have been discovered in this county at different periods, consisting of aqueducts, baths, tessellated pavements, columns, statues, bas-relievos, sudatories, hyppocausts, altars, votive and sepulchral stones, sarcophagi, urns, medals, coins, fibulæ, &c. Numerous encampments of different forms and sizes are likewise distributed over this county, some of them no doubt originally British, and afterwards altered by the Romans, Saxons, or Danes, and others of them originally Roman, and altered in the same way by the warriors of a later period. A few seem to be Saxon or Danish entirely. Castles and other places of more permanent defence, are no less frequent here than encampments. Several of these have claims to very high antiquity, but the precise period of their erection is unknown. The most distinguished among them are the castles of Caerleon, Usk, and Scenfreth, which are said to be of British origin. The rest are no doubt of a much later date, and most probably not earlier than the period of the Norman conquest. Some of the churches in this county are very ancient, as appears from the style of their architecture, the circular arch, and the crenellated and billetted moulding for which they are so conspicuous, being characteristic of the Saxon and early Norman eras. The custom of whitewashing these edifices is unhappily too much practised here, and destroys the venerable appearance which they would otherwise display. The disgusting and highly injurious practice of burying in churches is likewise extremely prevalent in Monmouthshire.

In concluding this article, it may be remarked, that though Monmouthshire is an English county, the inhabitants more generally speak the Welsh than the English language, particularly in the north-western and south-western districts. Their manners and customs bear a very strong resemblance in every respect to those of the principality. They display the same antipathy to the language and manners of the English, and an attachment to their own ancient practices. Catholics are very numerous in this county, and not only they, but the Protestants also, retain many vestiges of Romish superstition. Thus the custom of begging bread for the souls of the departed, still continues to be practised, on All-Souls' day, among the lower orders. A very interesting and satisfactory account of the antiquities, scenery, &c. of this county, will be found in Coxe's "Historical Tour in Monmouthshire," 4to.

MONNEROU, a small island in the channel of Tartary, between the island of Saghalien, and the continent. N. lat. 46° 20'. E. long. 142° 21'.

MONNIER, Peter le, in *Biography*, an eminent professor of philosophy, was born at Vire, in Normandy, about the year 1685. By his talents he became professor in the college of Harcourt, at Paris, and was elected a member of the Royal Academy of Sciences. He died Nov. 27, 1767. He was author of "Cursus Philosophicus," in six volumes 12mo., which was made a text-book in many of the French colleges. Monnier contributed also a variety of papers, that form a part of the "Memoirs" of the academy of which he was a member. He left behind him two sons, inheritors of his abilties, and both of them admitted to seats in the Academy of Sciences, of whom the eldest is the subject of the following article; the youngest, Lewis William, was made physician to the king at St. Germain-en Laye. Du Fresnoy.

Monnier, Peter-Charles le, a celebrated French astronomer, was born at Paris in 1715. From a very early period of his life he devoted himself to the study of astronomy, and is said to have made very accurate observations when he was only sixteen years old. At the age of twenty he had the high honour of being nominated a member of the Royal Academy of Sciences at Paris. At this period he accompanied Maupertuis in his expedition to Lapland for the purpose of measuring a degree of latitude. In 1748 he went to Scotland, to join lord Macclesfield in observing an annular eclipse of the sun, and he was the first astronomer who had the satisfaction to measure the diameter of the moon on the sun's disk. The king of France, Lewis XV., was much attached to astronomy, and patronized those who successfully pursued that science; and it is said he not only respected, but honoured and even loved Le Monnier. "I have seen the king," says Lalande, "come out of his cabinet, and look around for Le Monnier, and when his younger brother was presented to him, on his appointment to the office of first physician, his majesty was pleased to wish him the merit and reputation of his brother the astronomer." Monnier was always with the king when he observed the remarkable celestial phenomena. Thus they were together to witness the two transits of Venus, in the year 1761 and 1769. While these important observations were making, at which the celebrated La Condamine was present, the king was particularly careful not to disturb, by the smallest motion, the astronomers in their occupation. It is so described fcribed by the aftronomer himfelf, in his differtation on the fubject; "His majefty," fays he, "perceiving that we judged the laft contacts to be of the greateft importance, a moft profound filence, at that moment, reigned around us." In the year 1750, Le Monnier was directed to draw a meridian-line at the royal chateau of Bellevue, where the king was accuftomed to make his obfervations. On this occafion Lewis prefented him with fifteen thoufand livres, which the aftronomer expended in inftruments, with which he afterwards made his beft and moft important obfervations. The king had already prefented him with a beautiful houfe at Paris, where he refided till the revolution, and purfued his aftronomical labours. Le Monnier was inceffant in his application to his favourite fcience, and apparently unwearied in thofe obfervations which tended to perfect it. Le Monnier was the preceptor of Lalande, and was worthy of fuch a fcholar, as the fcholar was of his inftructor. Le Monnier forefaw in young Lalande, when he was but fixteen years old, the acute, learned, and indefatigable aftronomer. When Lalande was fent to Berlin in 1742, to make obfervations for the purpofe of determining the parallaxes of the moon, Le Monnier lent him his five feet mural quadrant. Le Monnier died at Lizieux, in Normandy, on the fecond of April 1799, at the advanced age of eighty-four years. He was ardent in his friendfhips, but his hatred was implacable. Lalande once difpleafed him, and he could never after regain his favour, but his pupil's gratitude and refpect for him were always the fame, and were, on every occafion, publicly declared. In 1797, Lalande wrote an eulogium on Le Monnier for the "Connoiffance des Temps," in the language of gratitude, refulting from fentiments of profound veneration and efteem for the venerable aftronomer, but Le Monnier refufed to read it. This great man left behind him a number of valuable MSS. with fome good obfervations. He had by him a feries of lunar obfervations, and a multitude of obfervations of the ftars, which he had announced as early as the year 1741, but he refufed to publifh them, nor could the moft earneft entreaties of thofe whom he moft efteemed, lead him to alter his intentions. Annual Regifter 1799. See LE MONNIER.

MONNIERIA, in *Botany*, fo named by Lœfling and Linnæus, in honour of M. le Monnier, firft phyfician to the French king Louis XV., who accompanied Caffini through the fouthern provinces of France, in the fummer of 1739, and fubjoined an account of their natural hiftory, particularly their more curious plants, to the geometrical remarks of that aftronomer. M. le Monnier was greatly inftrumental in promoting the introduction of hardy exotics into France. He had a choice garden at Verfailles, where the writer of this vifited him in 1786, and a very extenfive and valuable herbarium. Of the time of his death we have no information. Another genus had been previoufly dedicated to this able botanift, by Bernard de Juffieu; but this was reduced by Linnæus, and fubfequent writers, to *Graticla*. Mr. R. Brown has however re-eftablifhed it, under the appellation of HERPESTIS; fee that article, and GRATIOLA.—Lœfl. It. 197. Linn. Gen. 363. Schreb. 480. Willd. Sp. Pl. v. 3. 856. Mart. Mill. Dict. v. 3. Juff. 421. Lamarck Dict. v. 4. 261. Illuftr. t. 596.—Clafs and order, *Diadelphia Pentandria*. Nat. Ord. uncertain; fufpected by Juffieu and Lamarck to be near the *Borragineæ*, (*Afperifoliæ* of Linnæus,) or poffibly akin to *Spigelia*. We perceive ftrong indications of the *Euphorbiæ* in fome of its characters, however difcordant others may appear.

Gen. Ch. *Cal.* Perianth inferior, in five deep, unequal, permanent fegments; the upper one longeft, linear, incurved over the flower; the lateral one on the outer fide lanceolate, half as long, the reft ftill fhorter and obtufe. *Cor.* of one petal, fhorter than the upper fegment of the calyx, ringent; tube cylindrical, narroweft in the middle, curved; upper lip ovate, obtufe, undivided; lower in four equal, parallel, ftraight, oblong, obtufe, deep fegments. Nectary an ovate fcale, at the bafe of the germen, within the lower filament. *Stam.* Filaments two, dilated, membranous; the uppermoft concave, cloven at the extremity; the lowermoft flat, three-cleft; anthers on the upper filament two, combined, hairy within, embracing the ftigma; on the lower three, very minute, cylindrical, probably fterile. *Pift.* Germen fuperior, roundifh, five-angled, five-lobed; ftyle folitary, thread-fhaped; ftigma capitate, oblong, flattened within, orbicular, fharp-edged. *Peric.* Capfules five, ovate, fhort, compreffed, of one cell, divided half way down into two valves. *Seeds* folitary, ovate, tubercular, filling the capfule, ftraighter and blunter at their inner margin, each enclofed in a tunic, of two fmooth elaftic valves.

1. M. *trifolia*. Linn. Sp. Pl. 986. Aubl. Guian. v. 2. 730. t. 293.—Gathered by Lœfling at Cumana in South America; by Aublet in the meadows and cultivated land of Cayenne and Guiana. A fpecimen, fent by Mr. Alex. Anderfon, from the Dutch fettlements in the laft-mentioned country, was given us by fir Jofeph Banks, there being none in the Linnæan herbarium. The *root* is annual and fibrous. *Stem* about a foot high, repeatedly forked, leafy, round; the upper part rough with minute hairs, curved upward. *Leaves* ternate, on hairy ftalks, the lower ones oppofite, the reft ufually alternate; leaflets nearly equal, above an inch long, ovate, entire, pale green, hairy, efpecially the edges and ribs, thickly befprinkled on both fides with fmall refinous dots; the middle one flightly ftalked. *Flowers* in terminal, folitary, cloven, divaricated, fimple clufters, rather than fpikes, with a folitary flower between, at the bafe. *Calyx* hairy. *Corolla* white. The *leaves*, though they have been dried 20 years, retain an acrid or burning flavour, without any fragrancy.—The natural affinity of this rare plant has puzzled the greateft botanifts. We venture to hint its relationfhip to the *Euphorbiæ*, rather as a conjecture than otherwife. The *capfules* are pale, dotted like the leaves. *Seeds* dark grey, almoft black, rough with prominent points. S.

MONNOYE, BERNARD DE LA, in *Biography*, was born at Dijon in the year 1641. He was brought up to the bar, but his tafte and eagernefs for polite literature gave him difguft for legal purfuits. He contented himfelf therefore with a very trifling office, the duties of which gave him an opportunity to employ much time in his favourite ftudies. He acquired an accurate knowledge of the Greek, Latin, Spanifh, and Italian languages, and attained confiderable excellence in the compofition of French poetry. In 1671, he obtained a prize of the French academy for a poem entitled "Le Duel aboli." Several of his other pieces, written in praife of Lewis XIV., obtained fimilar honours. He was free from ambition, and notwithftanding the celebrity which he had acquired, he preferred living in his native province to a refidence in the capital. He paffed his time in an eafy ftate of independence, till the fatal fyftem of Law reduced him, with thoufands, to abfolute poverty. (See LAW.) In this fituation his merit was not overlooked; his diftrefs was alleviated by a penfion from the duke of Villeroi, and he lived to the advanced age of eighty-eight. He was extremely converfant with literature in all its branches, and was accounted the oracle of bibliographers of his time. The works by which he is principally known are "Poefies Francoifes,"

coifes," and "Nouvelles Poesies," which consist of miscellaneous pieces of different degrees of merit. There are annexed to them Latin poems and small pieces which may be ranked with fables, epigrams, and tales, written with elegance and true classical simplicity, but many of them have a licentious tendency. The Latin poems were also published by the abbè d'Olivet, together with those of Huet, Massieu, and Fraugier; "Noels Bourguignons," a set of Christmas carols in the Burgundian dialect, much applauded for their humour, but on account of the grossness of some of them, they were condemned by the Sorbonne. Monnoye was author also of "Remarques sur le Menagiana avec une Dissertation sur le Livre De tribus Impostoribus;" "Remarques sur les Bibliotheques de du Verdier et de la Croix-du-Maine." He was editor of "Recueil des Pieces choisies." His own works have been printed in three vols. 8vo. Moreri.

MONOCASY, in *Geography*, a river of America, in Maryland, which, after a S.S.W. course, discharges itself into the Patowmac, about 50 miles above Georgetown.

MONOCEROS, UNICORN, in *Astronomy*, a southern constellation formed by Hevelius, containing in his catalogue, nineteen stars, and in the Britannic Catalogue thirty-one. See CONSTELLATION.

MONOCEROS, in *Ichthyology*, a species of *monodon;* which see.—Also, a species of *Balistes*, with the fin of the head unirradiated, and the caudal rays carinated. This is the *Balistes unicornu* of Bloch, with 51 rays in the anal fin, the *Capriscus longus*, &c. of Klein, and the Acaramucu of Marcgrave and Willoughby. There is a variety of this, or a distinct genus of *Balistes*, denominated *Scriptus β*, the unicorn fish of Bahama, described in Catesby's Carolina. It is found in the sea that washes the coasts of Asia and South America; its colour is varied with cinereous and brown; the first is somewhat more than a foot in length; the second is three feet long; they feed on young crocodiles, and the latter is held to be poisonous.

MONOCEROS, a name which has been given to several animals, among which are, the *unicorn*, generally supposed to be a fabulous animal, but the existence of which, in the interior of Africa, is insisted upon by several writers. A Mahometan African prince is said to have sent two of them to Mecca in the year 1799; an insect called Meloë monoceros by Linnæus, and Notoxus monoceros by Fabricius. See the preceding article.

MONOCHORD, a musical instrument with which to try the variety and proportion of musical sounds.

The monochord, according to Boethius, is an instrument invented by Pythagoras, for measuring geometrically, or by lines, the quantities and proportions of sounds.

The ancient monochord was composed of a rule divided and subdivided into divers parts, on which there was a string pretty well stretched upon two bridges, at each extremity. In the middle between both was a moveable bridge, called *magas*, by means of which, in applying it to the different divisions of the line, the sounds were found to be in the same proportion to one another, as the divisions of the line cut by the bridge were.

The monochord is also called the *harmonical canon*, or *canonical rule;* because serving to measure the degrees of gravity, and acuteness of sounds. Ptolemy examines his harmonical intervals by the monochord.

There are also monochords with divers strings, and a multitude of fixed bridges; but the use of all these may be supplied by one single moveable bridge; by only shifting it under a new chord or string, which is placed in the middle, and represents the entire sound, or open note, answering to all the divisions on the other bridges.

When the chord was divided into equal parts, so that the terms were as 1 and 1, they called them unisons; if they were as 2 to 1, octaves, or diapasons; when they were as 3 to 2, fifths, or diapentes; if they were as 4 to 3, they called them fourths, or diatessarons; if the terms were as 5 to 4, diton, or a greater third; if as 6 to 5, demi-diton, or a lesser third; lastly, if as 24 to 25, demi-diton, or diesis.

The monochord, being thus divided, was probably what they call a system, of which there were many kinds, according to the different divisions of the monochord.

Dr. Wallis has taught the division of the monochord in the Philosophical Transactions; but that instrument is now disused, the modern music not requiring such division.

Censorinus informs us that Apollo found the monochord in the sound of the string of his sister Diana's bow; and it seems at least probable, that the first stringed instrument was a monochord, and that that single string was the string of a bow.

Aristides Quintilianus says that the monochord was recommended by Pythagoras on his death-bed as the musical investigator, the criterion of truth. It appears to have been in constant use among the ancients, as the only means of forming the ear to the accurate perception, and the voice to the true intonation of those minute and difficult intervals which were then practised in melody.

MONOCHORD, Μονοχορδος, formed of μονος, *solus, single,* and χορδη, *chord*, is also used for any musical instrument, consisting of only one chord or string.

The monochord, called also the *vielle*, and vulgarly the *hurdy-gurdy*, has frets which are raised by the action of the fingers on a row of keys; and instead of a bow, the string is made to vibrate by the motion of a wooden wheel: there is also a second string serving as a drone, producing always the same sound: this is furnished with a bridge loosely fixed, which strikes continually against the sounding board, and produces a peculiar nasal effect. The trumpet marine, or trumpet Marigni, was a string of the same kind, which was lightly touched at proper points, so as to produce harmonic notes only: it was impelled by a bow. The Æolian harp is also an instrument, which, when agitated by the wind, affords a very smooth and delicate tone, frequently changing from one to another of the harmonics of the string, according as the force of the wind varies, and as it acts more or less unequally on different parts of the string. See ÆOLUS's *Harp*.

MONOCHROMA, Μονοχρωμα, compounded of μονος, *single*, and χρωμα, *colour*, a picture all of one colour.

MONOCOLI, Μονοκωλοι, a kind of fabulous men, who, as the Arabians give out, inhabit the country of Segir, in Arabia Felix; and are but half formed.

The word is Greek, compounded of μονος, *one*, and κωλον, *a member*.

MONOCOTYLEDONES, in *Botany*, from μονος, *one*, and κοτυληδων, *a cotyledon*, or *seminal leaf*, one of three great tribes or assemblages of plants, into which the whole vegetable kingdom is divided, by botanists who study a natural system of arrangement, the other two being the ACOTYLEDONES and DICOTYLEDONES; see those articles, especially the latter. Some plants indeed have been esteemed polycotyledonous, as Flax, and the Fir tribe. But these are so very few, and agree so perfectly in their nature and physiology with the *Dicotyledones*, that they are best comprehended under the same

ſame denomination. The only vegetables for which we ſhould be diſpoſed to eſtabliſh a claſs of *Polycotyledones*, are the Ferns and Moſſes, hitherto referred, by Juſſieu and his followers, to the *Acotyledones*, but phyſiologiſts are not agreed on the ſubject of the germination of theſe plants. (See FILICES and MUSCI). A ſtill greater difficulty exiſts as to a diſtinction between the *Monocotyledones* and the *Acotyledones*, to which we have already ſufficiently adverted; ſee COTYLEDONES and GERMINATION. We ſhall therefore here conſider thoſe two ſuppoſed families as but one, for which the denomination of *Acotyledones* would be the moſt proper of the two, the other term having originated in an old opinion, that what is now known to be the *albumen* of the plants in queſtion, (and was obſerved in palms and graſſes, which make a part of the number,) was really a ſimple cotyledon.

But although we conſider the above two families as but one, as far as concerns the preſence, or rather abſence, of a cotyledon, we mean not to ſay the *Fungi*, *Algæ*, and *Hepaticæ*, which make the firſt three orders of Juſſieu's *Acotyledones*, have any conſiderable affinity to thoſe of his orders which he refers to *Monocotyledones*. On the contrary, they are, as well as the *Filices* and *Muſci*, his 4th and 5th orders, ſo very diſtinct, that no ſyſtem which combines them all together can be called natural. As to his remaining order of *Acotyledones*, the *Naiades*, they are too heterogeneous for us to decide upon with any certainty; but their natural affinity to the *Monocotyledones* of Juſſieu, and their diſſimilitude to his *Acotyledones*, are equally obvious. In the following remarks therefore we wiſh to be underſtood as ſpeaking of thoſe natural orders which the great French botaniſt comprehends under his diviſion of *Monocotyledones*, though we conſider them as not having properly any cotyledon at all. Theſe are fixteen in number, *Aroideæ*, *Typhæ*, *Cyperoideæ*, *Gramineæ*, *Palmæ*, *Aſparagi*, *Junci*, *Lilia*, *Bromeliæ*, *Aſphodeli*, *Narciſſi*, *Irides*, *Muſæ*, *Cannæ*, *Orchideæ*, and *Hydrocharides*. Under the laſt however Juſſieu, by miſtake, comprehends ſome dicotyledonous plants.

The plants in queſtion are remarkable for a great ſimplicity or plainneſs of ſtructure. Their leaves are for the moſt part alternate, ſimple, with ſimple parallel ribs. The number three prevails in the parts of fructification inſtead of five, which belongs to the *dicotyledones*. Their germination is lateral; their interior ſubſtance peculiarly ſoft and cellular. It is a favourite hypotheſis of Juſſieu that theſe flowers have no corolla, the gorgeous integument of the liliaceous plants being conſidered by him as a coloured calyx. His arguments in ſupport of this opinion only prove the great ſimplicity, and want of decided diſtinction, in their ſeveral parts. Thus, the petal of a tulip is alike liable to become half leaf, or half ſtamen. The outſide of petals of lilies, however richly they may be adorned within, in many inſtances approaches to the colour and texture of a calyx; while in *Pancratium* and *Narciſſus*, there is a ſuperabundance, or doubling as it were, of the more delicate part of the flower, ſo that theſe genera, far from wanting a corolla, appear to have two.

The internal ſtructure of the *Monocotyledones*, as explained by the learned Desfontaines and Mirbel, is extremely peculiar, and differs very eſſentially from that of other plants. They have no proper bark and wood, augmented gradually by concentric layers. (See CORTEX, and CIRCULATION *of the Sap*). Their cuticle indeed is like that of the *Dicotyledones*, generally ſpeaking; except that in ſome it abounds with a flinty ſecretion, in no ſmall quantity, nor is that ſecretion always confined to the cuticle; witneſs the order of graſſes. Their woody ſubſtance is depoſited round their numerous longitudinal tubes, as ſo many centres, ſuch tubes uniting here and there, compoſing a ſort of network, which gives firmneſs and tenacity to the body of the plant. Indeed the depoſition of wood, though not in concentric layers, is regular, according to ſome determinate arrangement in each family, and in ſeveral acquires a great degree of denſity and hardneſs. The peculiar ſecretions of this tribe are very frequently of a ſaccharine nature; and ſcarcely ever of a mucilaginous, never, we believe, of a reſinous kind. In their conſtitutions, ſome of them are very tender with regard to cold, others, in every reſpect nearly, the moſt hardy of plants; all are generally of rather rapid growth, though ſome very long-lived. Their roots are very generally perennial, to which there is ſcarcely an exception, beſides what occur in the natural order of graſſes. In conſideration of the order laſt mentioned, the *Monocotyledones* deſerve to be conſidered as the moſt important of all plants for the ſupport of mankind.

MONOCULUS, in *Entomology*, a genus of inſects of the order Aptera, of which the generic character is as follows: legs from four to eight, formed for ſwimming, and very long; body covered with a cruſt or ſhell divided into ſegments; ſome have four, ſome two antennæ, and ſome are without any; it has *one* or *two* eyes, notwithſtanding its name *monoculus;* when there are two eyes they approximate and are fixed in the ſhell; there are four feelers, in continual motion when ſwimming; the hind ones are very ſmall, and hook-ſhaped.

There are fixty-eight ſpecies, ſeparated into eight diviſions, named according to the firſt eight letters in the alphabet. Theſe are found chiefly in Europe, a few in India, commonly in muddy ditches, frequently in ſea-waters, often paraſitic on fuci, confervæ, ulvæ, and other aquatic plants. Many inhabit our own ditches or ſea-coaſts.

Of all the monoculi by far the greater part are very ſmall water inſects, requiring the aſſiſtance of the microſcope for the inveſtigation of their particular organs; ſome, however, as we ſhall ſee, are ſo large as to require no very minute inſpection, and one ſpecies is of a ſize ſo gigantic that it is generally conſidered as the largeſt of the whole cruſtaceous tribe. This is the polyphemus, and will be found in the diviſion G.

The inſects in diviſion A have a ſingle eye and cruſtaceous body.

Species.

OCULUS. In this ſpecies there are no antennæ, but two feelers, which are long and branched; the tail is inflected. The inſects of this ſpecies are found in the pools and ſtagnant waters in many parts of Europe; they ſwim in ſwarms upon their back; each inſect has a large black eye, which appears to occupy the whole of the head.

* QUADRICORNIS. The antennæ in this ſpecies are four; the tail is ſtraight and bifid, the diviſions are branched. It is deſcribed in Donovan's Engliſh Inſects. It is found in different parts of Europe, and in the ſtagnant waters of this country. The body is ſometimes greyiſh or greeniſh, ſmooth or covered with hair; it has eight legs that are hairy; the female poſſeſſes an oval bag, containing the eggs on each ſide the tail. This is a very minute inſect, it derives its ſpecific name from its four horns, and is well known, being very common in almoſt every ſtagnant water, and ſometimes makes its appearance in that of pumps and wells, and is accordingly obſervable frequently in water brought to table.

Its

Its ſize is not greatly ſuperior to that of the common mite.

MINUTUS. Here the antennæ are two and linear; the tail ending in two briſtles. This inſect is found at the banks of ditches, generally among duck-weed, and at firſt ſight is thought to reſemble the Lepiſma ſaccharina. The number of legs is ten, which are long and hairy; the tail ends in two papillæ.

CÆRULEUS. Antennæ two, linear; body blueiſh, with a ſtraight two-lobed tail. It inhabits Germany in muddy ditches. The head, the tail, and antennæ are red; the eyes black; abdomen green; legs eight.

* RUBENS. Antennæ two, linear; body reddiſh, with a ſtraight forked tail. Found in ditches and rivulets, and is common through the whole year; it has eight legs.

LACINULATUS. In this the antennæ are two, linear and white; tail curved forked. It inhabits Germany, in ditches.

LONGICORNIS. Antennæ two, linear and very long; tail bifid. It inhabits the ſea round Finmark. The tail ends in two briſtles.

CAPTIVUS. Antennæ two, linear; head covered with a dilated ſhield; tail ſtraight cleft. This is found in Germany. It has ſix legs; and the tail has ſix joints.

MINUTICORNIS. In this the antennæ are two, ſhort and linear; the tail is cleft and ending in two briſtles. It is ſometimes though not often found in ſea-water. The feelers are about half as long as the antennæ.

CLAVIGER. The antennæ two, ſubclavate, rigid; tail bifid. It inhabits, though very rarely, the rivers of Germany, and glides ſlowly along, alternately on its back, ſides, and belly, and ſometimes it will raiſe itſelf upright. The body above is white, and red beneath; the tail is without joints, and the legs are eight.

CRASSICORNIS. The antennæ two, dilated and ſhort; tail bicuſpidate. Sometimes found in marſhy places. The body is in five ſegments; the antennæ branched at the baſe.

CURTICORNIS. Antennæ two, which are minute and ſtraight, with three hairs at the tip; the body is inarticulate; the hands unarmed; the tail forked.

CHELIFER. Antennæ two, ſhort and recurved; body inarticulate; hands chelate; tail forked. Found in ſea-water.

BREVICORNIS. Antennæ two, thoſe of the male hooked; the tail is ſet with very ſhort briſtles. It inhabits ſea-marſhes, and reſembles the quadricornis. The antennæ of the female are forked at the tip.

The inſects in diviſion B have a ſingle eye and bivalve ſhell; the antennæ are branched.

Species.

* PULEX. Tail inflected; ſhell mucronate behind. This inſect derives its ſpecific name, *pulex* or *water-flea*, on account of its peculiar ſtarting or ſpringing motion; it is almoſt an univerſal inhabitant of ſtagnant waters, appearing ſometimes in ſuch vaſt ſwarms as to cauſe an apparent diſcolouration of the water. It is an inſect of a highly ſingular and elegant appearance, exhibiting, when magnified,, a beautiful diſtribution of internal organs. It is generally about $\frac{1}{10}$th of an inch in length, but ſometimes conſiderably larger. It is of an oval ſhape, ſomewhat truncated in front, and ſharply pointed behind; the body is incloſed in a bivalve tranſparent ſhell, which, when examined by the microſcope, appears finely reticulated. The eyes of theſe animals are of a ſingular conſtruction, they are large in proportion to the inſect, and placed very near each other, and appear to conſiſt of many ſeparate globules of a black colour, united under a common ſkin. In the female inſect the ovarium is generally very conſpicuous, filling the greater part of the ſpace between the ſhells; the ova are very large in proportion to the ſize of the animal, and the young are hatched before their excluſion from the parent. This animal is ſaid to poſſeſs, in an inferior degree, the ſurpriſing property of the genus aphis, *viz.* that of producing a ſeries of already impregnated deſcendants.

LONGISPINUS. Tail inflected; ſhell ſerrulate before and prickly behind. Found in freſh water. The ſhell is ovate, white, and pellucid, ending behind in a ſtrong ſpine ſerrate each ſide, and half as long as the ſhell; it has eight legs.

QUADRANGULA. The tail is inflected; ſhell quadrangular unarmed. Found in ſtagnant pools; the body is ſometimes red, and it has ſix legs.

SIMUS. Tail inflected; ſhell oval unarmed; found in marſhes; the ſhell is pellucid and yellowiſh.

RECTIROSTRIS. Tail inflected; hind head with two projecting horns: inhabits marſhes. The ſhell is oval pellucid, with gaping valves, and ciliate on the fore-margin; the tail two long briſtles; legs ſix to eight.

CURVIROSTRIS. Tail inflected; the front has two inflected horns. It is found in pools; the ſhell is hairy on the fore-margins; front has two pendent horns; the tail ends in two hooks; it has eight legs.

* MUCRONATUS. Tail inflected; ſhell ovate, beneath inflected, and prickly behind. It is found in marſhes. Swims on its back on the ſurface of the water. The ſhell has four black dorſal ſtreaks; it has twelve legs.

CRYSTALLINUS. Tail inflected; oblong cryſtalline; head with two ſhort horns at the tip. Found in freſh water. The body is white pellucid, with twelve hairy legs.

PEDICULUS.. The tail of this ſpecies is inflected. It inhabits freſh water.

SETIFER. The tail is ſtraight; ſhells with long tufts of hair at the angles of the valves. It inhabits ſtagnant pools. The ſhell is oblong, pellucid, and cryſtalline; the antennæ have three branches; the legs, which are eight or more, are very hairy; and the tail is divided at tip.

The inſects in diviſion C have a ſingle eye and bivalve ſhell; the antennæ are ſimple.

Species.

VIRIDIS. Shell ovate, downy, green; the fore-legs falcate, and ſerrate within. It is found in ſea-water on fuci and confervæ.

* LUTEUS. Shell ovate, gibbous, glabrous, pale yellow. Found on fuci.

* FLAVIDUS.. Shell oblong, glabrous, pale yellow. It is found frequently on the Fluſtra lineata. The ſhell is pellucid; fore-legs round.

GIBBOSUS. Shell ovate, hiſpid, and gibbous each ſide. Found on ulvæ. The ſhell is ovate, pale, and briſtly.

COARCTATUS. Shell ovate, glabrous, and contracted in the middle. It inhabits fuci. The ſhell is of a greeniſh hue, with a black eye.

The inſects in diviſion D have a ſingle eye and bivalve ſhell; antennæ tufted at the tip.

Species.

DETECTUS. Shell oblong, white, pellucid; tail with two briftles. Inhabits ditches. It has four legs, the fore ones are recurved; hind-ones reflected.

STRIGATUS. Shell kidney-fhaped, brown, with three white bands. Found in muddy ruts. The fhell is glabrous; the antennæ have eleven briftles.

ORNATUS. The fhell of this fpecies is ovate, fituate beneath, on the fore-part, and variegated with white, green, and fulvous.

PILOSUS. The fhell is ovate, brown, ciliate before and behind. This fpecies is found in the nectaries of the Utricularia minor. The fhell is fmooth, glabrous, and opaque.

CANDIDUS. Shell ovate, fnow-white, immaculate. It is found in marfhes. Shell obtufe before and behind.

LÆVIS. Shell ovate, glabrous, greenifh. Inhabits ditches. The fhell is obtufe and opaque; tail ending in a fpire.

VIDUA. Shell ovate, white, with three black bands. Found in muddy water. In this fpecies two of the bands are in the middle, and one on the fore-margin. The valves are gibbous and whitifh.

TELEMUS. Shell fub-globular, three-toothed behind with a truncate lip on the fore-part. It is found at Algira, and is pellucid. Some naturalifts imagine that it does not belong to this genus.

LENTICULARIS. Shell compreffed and lentiform. Found in Finland.

* CONCHACEUS. Shell ovate, downy. Found in ftagnant water. This is an Englifh infect, and has been defcribed and figured by Mr. Donovan. The body is green, opaque, with yellowifh legs; its abdomen nearly two-lobed, and fulvous, with a black circle in the middle: it contracts itfelf within the fhell, and fwims on the belly.

FASCIATUS. The fhell is oblong, whitifh, with a green band. Found in ftagnant water, and refembles a grain of barley. The green band is placed in the middle behind the eye.

MONACHUS. Shell glabrous, yellow, edged with black; the fhell is opaque, truncate before, and rounded behind.

CRASSUS. Shell oblong, gibbous, yellowifh, with an oblique, abbreviated, fulvous band. It inhabits fenny places.

Infects in divifion E with a fingle eye and univalve fhells, and two antennæ.

* SATYRUS. Shell ovate, pellucid, and emarginate behind; antennæ obtufe. This fpecies is noticed by Baker and Adams on the microfcope. The fhell is flat and membranaceous; fore-legs with a double fhank; tail truncate, and cleft in the middle.

SILENUS. Shell is ovate, opaque, and fub-marginate behind; laft joint of the antennæ fubulate. It is found in ditches filled with the leaves of trees. The fhell is fometimes yellowifh.

MÆNUS. Shell oval; antennæ horizontally extended; body truncate at the bafe. Inhabits fea-water. Swims on its back; fhell with a convex fulvous back.

FAUNUS. Shell ovate, pellucid, and emarginate behind; laft joint of the antennæ fubulate. Found in ditches among duck-weed. Shell gibbous; antennæ bent back.

BACCHUS. The fhell is ovate, emarginate behind, and ending in two briftles. It inhabits rivers. The antennæ are ftretched forwards.

THYAS. The fhell of this fpecies is dilated, linear; the antennæ are incumbent. Found in ftinking fea-water. The fore-legs are branched.

BRACTEATUS. The fhell is globular, and unarmed; it has fix legs. Is found in frefh water. The antennæ are obtufe; fhell very pellucid.

* SALTATORIUS. Shell oval-oblong, and briftly behind. This is defcribed by Baker and Adams. The fhell is pellucid, and terminated by briftles.

Infects in divifion F have their fhells univalve, and two eyes placed beneath.

CHARON. Shell pellucid, and four legs. Found in ditches. The eyes are fpherical, remote, deep black, with four capillary circles round them.

* DELPHINUS. Shell gibbous; eight legs. Inhabits rivers. It is defcribed by Baker on the microfcope.

ARMIGER. This fpecies has fix legs.

Infects in divifion G have their fhells bivalve; two eyes placed on the back.

Species.

POLYPHEMUS. Shell orbicular; the future lunate, and toothed behind; tail fubulate, and very long. This fpecies is commonly diftinguifhed by the title of molucca, or king-crab. Specimens have fometimes been feen two feet in length, exclufive of the tail. It is a native of the Indian ocean, and is generally found in pairs. The colour of the whole animal is of a yellowifh-brown; the fhell is very convex, rounded in front, and lunated behind, where it joins the lower part of the body. The fhell, which is of a cruftaceous nature, is marked on each fide into feveral fpiny incifions. It has feven legs on each fide, which are fituated beneath the concavity of the large or round part of the fhell, and are each terminated by a double claw; the branchiæ, or refpiratory organs, are difpofed in the form of feveral flat, rounded, imbricated lamellæ, on each fide the lower part of the body; the tail, which is ftraight, triangular, and of the fame cruftaceous nature with the reft of the fhell, is equal in length to the whole body, and gradually tapers to a fharp point. The eyes in this fpecies are diftant from each other, of a femi-lunar form, and the furface is divided into a great number of minute conical convexities: this part is, however, regarded as conftituting the cornea, or exterior covering of the eye, the organs themfelves being placed on a pedicle, beneath each of the femi-lunar corneæ. A writer in the Philofophical Tranfactions, fpeaking of this infect, fays, "the eyes, inftead of being approximated, as is required in the Linnæan generic character, are extremely diftant from each other, being fituated towards the fides of the fhell. The whole ftructure of the animal is very remarkable, and particularly his eyes, which are between the fourth and laft pair of claws on each fide, reckoning from his mouth, and excluding the fmall pair there placed, are inferted the rudiments of another pair, or a claw broken off on each fide, at the fecond joint or elbow: on thefe extremities are the eyes, like thofe of the horns of fnails, but under the covert of a thick and opaque fhell, nature in that place hath wonderfully contrived a tranfparent lanthorn, through which the light is conveyed.

CYCLOPS. Shell convex, with three lines of raifed fpines; tail very long, and unarmed. It is about one-third the fize of the polyphemus, and is found in India. Shell lunate before, with three raifed dorfal lines, and two acute teeth, finely ferrate behind, with a raifed line in the middle, in which are three teeth.

* APUS. Shell oblong, truncate, and ferrate behind; tail ending in two briftles. It is found in ftagnant water. This is the largeft of the European monoculi. It is a rare fpecies in this country, having been only obferved in a few particular fituations. In its general fhape it is confiderably allied

allied to the large exotic fpecies above-defcribed, but the form of the body is more lengthened. The branchiæ, or refpiratory organs, are large, and diftributed into numerous imbricated rows on the under part of the body: beneath the front is a pair of jointed trifid arms, extending on each fide to a confiderable diftance; the eyes are placed near each other in front of the fhell; the tail is terminated by a pair of long forks, or fetaceous proceffes; the colour of the whole infect is of a pale greenifh-brown above, and reddifh beneath. An account has been given in the 40th vol. of the Phil. Tranf. that this fpecies has been feen in numbers in a pond at Bexley, in Kent. It is alfo added, that the fame pond, having been perfectly dried, and being fuddenly filled, during a heavy thunder-ftorm, fwarms of the fame animals were again obferved in it within the fpace of forty-eight hours after.

* Piscinus. Shell heart-fhaped and flat; body fhort; tail bifid, and compofed of one thin flap. It is a native of European feas. Found on flounders, cod-fifh, falmon, &c. adhering on the outfide between the fcales, running fwiftly, with its tail elevated, both on the fifh and on the water. Shell pellucid, with yellowifh marks; abdomen very fhort, with a long bifid tail.

Pennigerus. Shell hemifpherical, with a linear future; tail feathered. Inhabits frefh water.

Salmoneus. Shell oblong; tail imbricate, and four-leaved. It is found, as its name denotes, fticking to the falmon, between the fcales.

Infects of divifion H have bivalve fhells, two eyes, and capillary antennæ.

Species.

Brachyurus. Shell globular; tail deflected; four antennæ. It is found in marfhes. The fhell is pellucid, reddifh-brown when young, and green as it grows older, with a white eye on the fore-part, and a black one behind; legs are twenty to twenty-four.

* Sphæricus. Shell globular; tail inflected; two antennæ. This fpecies is found among the duck-weed in ftagnant water. It is a native of Europe, and found frequently in this country. It is very minute; the fhell is reddifh; it has two antennæ; twelve legs; and the tail is furnifhed with a fmall hook at the extremity, and concave beneath; the ovariæ are green.

Quadrangularis. Shell quadrangular, hence its fpecific name; tail inflected; antennæ two; legs in number are from twelve to fixteen, befides numerous fmaller ones; the tail is armed with two minute fpines at the tip.

Lamellatus. Shell ventricofe; tail inflected lamellate; antennæ two. Found in ftagnant water. The fhell is convex; eyes are green; legs capillary; the tail has a broad ferrate lamina beneath, and two fpines at the tip.

Trigonellus. Shell gibbous before; tail inflected, ferrate; four antennæ. Found in ditches. The fhell is ciliate, with a fharp probofcis; antennæ with three briftles at the tip; ovaries black.

Truncatus. Shell ovate, and toothed behind; tail inflected, ferrate; four antennæ. Inhabits ftagnant waters. Shell oblique, ftriated, ciliate before, and ferrate behind; the tail is broadifh, and ending in a claw.

Longirostris. Shell roundifh; tail inflected; fhell prickly on the fore-part. It inhabits rivulets. The probofcis is longer than the head, curved, and fubulate.

Macrourus. Shell oblong; tail ftraight; antennæ four. It is found in lakes. The fhell is pellucid, whitifh; legs eight; nail lanceolate.

Socors. Shell ovate; tail projecting, curved; antennæ two. Found in almoft all kinds of waters. The fhell is pellucid, without ftriæ, teeth, or fringe. It has four legs, and the tail is bicufpidate at the tip.

Monoculus, or *Monophthalmus*, (from μονος, *fingle*, and *oculus*, or οφθαλμος, *an eye*,) a bandage in *Surgery*, formerly much more employed than at prefent. It confifted of a roller, ten or twelve feet in length, and about three inches in breadth. It was firft fixed on the occiput, about a foot of the bandage being left hanging down. It was then carried obliquely round the head, over the forehead, to the occiput again. After being applied thrice round the head in this oblique direction, the remainder of the bandage was expended in more horizontal turns. The end, hanging down behind, was laftly brought over the vertex to the forehead, and the whole was fecured with pins. The chief ufe of the monoculus was to retain dreffings and application on difeafes about the eye. The old furgeons had alfo a double monoculus; but it fcarcely merits defcription, as it is now feldom or never made ufe of.

MONODON, in *Ichthyology*, a genus of fifhes of the order Cete. The generic character is: two teeth in the upper jaw, extending ftraight forwards, long, fpiral; fpiracle on the fore and upper part of the head. Dr. Shaw has altered the generic character, by ufing the fingular, *tooth* projecting, inftead of *two teeth*, becaufe though he admits there are fometimes two teeth, yet as the animal is generally found with one only, and becaufe the generic name *monodon* is derived from that very circumftance, the alteration feems neceffary. According to Gmelin there is but one fpecies, *viz.* the *monoceros*, but Dr. Shaw mentions two fpecies. We fhall defcribe them both:

Species.

Monoceros, or *Narwal*, is a native of the northern feas, where it is fometimes feen of more than twenty feet in length from the mouth to the tail. It is at once diftinguifhable from every other kind of whale, by its very long, horn-like tooth, which is perfectly ftraight, of a white or yellowifh-white colour, fpirally wreathed throughout its whole length, and gradually tapers to a fharp point. It meafures from fix to nine or ten feet in length, and proceeds from a focket on one fide of the upper jaw, having a large cavity at its bafe or root, running through the greater part of the whole length. In young ones, and fometimes in thofe that are full grown, there are two teeth, but in general the narwal is found with a fingle tooth, the focket of the other being clofed, or at moft but obfurely vifible, and now and then the appearance of a fecond tooth in an extremely fmall ftate, or juft beginning to emerge, is perceptible, as if intended by nature to fupply the place of the other, if broken or caft. The head of the narwal is fhort, and convex above, the mouth is fmall; the fpiracle or breathing-hole is duplicated within; the tongue is long; the pectoral fins are fmall. The general form of the animal is rather long than thick in proportion to its fize. The colour, when young, is nearly black, but the belly is lighter. As, however, it advances in age, it becomes marbled, or variegated with black and white on the back and fides, while the belly is nearly white. The fkin is fmooth, and there is a confiderable depth of oil or blubber beneath it. It is chiefly found in the northern parts of Davis's ftraits, and its food is fuppofed to confift of fmall flat fifh, as well as of actiniæ, medufæ, and other marine animals. It is commonly feen in the fmall open or unfrozen fpots towards the coafts of the northern feas. To fuch places the narwals refort in multitudes, for the

the conveniency of breathing, and becaufe they are fure to find, near the fhores, a due fupply of food: they are taken by means of harpoons, and the flefh is eaten by the Greenlanders, raw, boiled, and dried; the inteftines and oil are alfo ufed as a food; the tendons make good thread, and the teeth ferve the purpofe of hunting horns, as well as that of building tents and houfes. A throne made for the Danifh monarchs is faid to be ftill preferved in the caftle of Rofenberg, compofed entirely of narwals' teeth, which were formerly confidered as more valuable than gold.

Spurius. This, if it be a diftinct fpecies of the monodon, has a pinnated back, and two fmall teeth in the upper jaw.

It is defcribed by Fabricius, in his *Fauna Groenlandica*, as a fpecies moft allied to the narwal, but not perhaps, ftrictly fpeaking, of the fame genus; it has no teeth in the mouth, but from the extremity of the upper mandible project two minute, conic, obtufe teeth, a little curved at the tips, weak, and not above an inch long; the body is elongated, cylindric, black. Befides the pectoral fins and horizontal tail, there is alfo a minute dorfal fin. Its flefh and oil are confidered as purgative; it is among the rareft of whales, and inhabits the main ocean, feldom coming to the fhore. It has a fpiracle like other whales. It is very feldom taken alive, but found dead on the fhores.

MONODY, Monodia, compounded of μονος, *folus*, and ωδη, *a fong*, in the *Ancient Poetry*, a kind of mournful fong or ditty, fung by a perfon alone, to utter his grief.

Monody, in *Mufic*, a fong for a fingle voice, in oppofition to what the ancients called chorodies, or mufic executed by a chorus.

MONOECIA, in *Botany*, from μονος, *one*, and οικια, *a houfe*, the 21ft clafs of the artificial fyftem of Linnæus, confifting of fuch plants as have barren, or male, flowers on the fame individual with fertile, or female, ones; whereas in the 22d clafs fuch flowers grow upon diftinct individuals of the fame fpecies. (See Dioecia.) How far thefe claffes are natural or not, we have explained under that article.

The orders of *Monoecia* in Linnæus are eleven, diftinguifhed upon the fame principles as thofe of *Dioecia*. 1. *Monandria* is exemplified by *Aegopricon* and *Zannichellia*, permanently monoecious genera, as having a different ftructure in the acceffory parts of their male and female flowers. 2. *Diandria* is fcarcely tenable, one of its two genera, *Anguria*, having no fuch difference of ftructure, and the other, *Lemna*, having certainly the ftamens and piftil in the fame flower, except by accidental or partial imperfection. 3. *Triandria* contains *Carex*, *Sparganium*, &c., with fome plants of the order of *Tricoccæ*, or *Euphorbiæ*, all properly placed here. 4. *Tetrandria* confifts of the *Littorella*, *Betula*, *Buxus*, *Urtica* and others. 5. *Pentandria* embraces a remarkable tribe, clofely allied, for the moft part, to the Syngenefious, or compound, clafs; but their anthers are feparate, and in fome of them, as *Xanthium* and *Nephelium*, the female flowers have no refemblance to that clafs, nor to their own males. 6. *Hexandria* confifts chiefly of a very few graffes. 7. *Heptandria* depends only on *Guettarda*, much better placed in *Pentandria Monogynia*. (See Guettarda and Matthiola.) 8. *Polyandria*, (having eight or more ftamens,) is beft illuftrated by the important genera *Fagus*, *Quercus*, *Juglans*, &c. whofe male flowers are, in moft cafes, amentaceous. 9. *Monadelphia* has the no lefs important genus *Pinus*, with fome of the *Euphorbiæ*. 10. *Syngenefia* confifts of the Gourd or Cucumber tribe; but it is difficult to account for their being placed here, their anthers being in no manner combined. On the contrary, their filaments are more or lefs united, infomuch that Willdenow removes them to the 9th order, *Monadelphia*. This does not feem correct with refpect to any of the tribe; and in thofe we have examined the filaments are united, more or lefs completely, into three fets, fo as ftrictly to conftitute an order of *Monoecia Polyadelphia*, which fhould take place of this 10th Linnæan order. (See Momordica.) 11. *Gynandria*, compofed of *Andrachne* and *Agyneia*, does not appear to exift in nature at all, thefe genera belonging more properly to the 9th order, *Monadelphia*, where fome of their allies already find a place.

We cannot too often proteft againft the abolition of the monoecious and dioecious claffes, whether we confider them in the light of natural or commodious arrangements, although fome plants may have been improperly referred to them.

MONOEMUGI, or Nimaama, in *Geography*, a kingdom of Africa, having, as it is faid, great extent, and reaching northward to Abyffinia; bounded on the E. by the kingdoms of Mongallo, Mozambique, and other fmall ftates along the coaft of the Indian fea; on the S. by Mocaranga, and on the W. by Congo and Angola; but its real limits have not been afcertained. The fovereign, however, is reprefented as a rich and powerful prince, and has fubdued moft of the furrounding and adjacent kingdoms. To this fovereign belong many rich gold, filver, and copper mines, which enable him to carry on commerce with Abyffinia and other countries, as well as with fome of the eaftern coafters, with whom he is under a neceffity of exchanging the precious metals for Indian and European commodities, as he has no port of his own in either the eaftern or weftern fea. Elephants being numerous fupply vaft quantities of ivory for this trade, and afford to the emperor confiderable profit, as well as benefit to his fubjects. M. de Lifle, in his Atlas, divides this kingdom into the five following provinces or fovereignties: *viz.* the Maracates, the Moffagueras, the kingdom of the Bengas, of Mafty, and of Maravi; and this laft M. d'Anville places on the fouthernmoft border of the lake of that name.

MONOGAMIA, in *Botany*, from μονος and γαμος, *a fimple marriage*, the fixth order of the clafs *Syngenefia* in the Linnæan fyftem, as left by its author, deftined to admit fuch genera as have their anthers combined, the flowers being fimple. Such were fuppofed to be *Lobelia*, *Viola*, *Impatiens*, *Jafione*, among Britifh plants, and the exotic *Seriphium*, *Strumpfia*, and *Corymbium*, to which might be added *Calicera*, Cavan. Ic. t. 358, and *Barreria* of Schreber. But the union of the anthers is found by no means univerfal throughout all the fpecies of thefe genera, at leaft of the two firft, which are very natural genera; and on the other hand this union occurs here and there among the fpecies of others no lefs natural, as *Gentiana*. In fhort, the character in queftion proves of no avail in fimple flowers; nor is there any natural affinity, between the above Britifh genera at leaft, and the moft natural clafs of compound flowers with combined anthers, the true *Syngenefia*. *Seriphium* and *Corymbium* caufe no difficulty; for they are in every refpect genuine Syngenefious plants, and though the florets are folitary in each partial calyx, the flowers are aggregate, or collected in a common calyx; fo that they readily go to the 5th order of *Syngenefia*, termed *Polygamia-fegregata*, and ferve but to ftrengthen and confirm that moft natural clafs. The order *Monogamia* is now therefore generally abolifhed, certainly with great advantage. The plants which compofed it are removed to *Pentandria Monogynia*, where moft of them meet with many natural allies. *Calicera* of Cavanilles appears to be referrible to *Syngenefia Polygamia-fegregata*. The affinity of *Strumpfia* is doubtful. *Barreria*, Aublet's *Poraqueiba*, is confidered by Juffieu as akin to his *Berberides*.

MONO-

MONOGAMY, compounded of μονος, *ſolus*, and γαμος, *marriage*, the ſtate or condition of thoſe who have only married once, or are reſtrained to a ſingle wife. See POLYGAMY.

MONOGASTRIC, in *Anatomy*, a name given by Vieuſſens, and ſome of the French writers, to one of the muſcles of the ear, called by Cowper the internus auris, and more properly by Albinus, the tenſor tympani.

MONOGRAM, MONOGRAMMUS, a cipher, or character, compoſed of one or more letters interwoven; being a kind of abbreviation of a name; anciently much uſed as a badge, ſeal, arms, &c.

Among medalliſts, a monogram is the name of a prince, city, or the like, of which the characters are, as it were, woven together, and the limb of one character applies to three or four others; ſo that in the ſmall ſpace of one or two characters a whole name is comprehended.

Under the eaſtern empire, it is uſual to find M I K, which are the monogram of Maria, Jeſus, Conſtantine.

The uſe of monograms is of an ancient ſtanding, as appears from Plutarch, and from ſome Greek medals of the time of Philip of Macedon, Alexander his ſon, &c. The Roman labarum bore the monogram of Jeſus Chriſt, conſiſting of two letters, a P placed perpendicularly through the middle of an X, *e. gr.* ☧, as we find it in ſeveral medals of the time of Conſtantine, thoſe being the two firſt letters of the word Χριστος, *Chriſt*.

Kings formerly marked their coins with their monograms: of this we have inſtances in Charlemagne's coins. That prince alſo uſed the monogram for his ſignature. Eginhard gives us this reaſon for it, *viz.* that Charlemagne could not write; and that, having attempted in vain to learn in his grown age, he was reduced to the neceſſity of ſigning with a monogram.

The ancients alſo uſed monograms as notes, or abbreviations of inſcriptions; for the underſtanding of which we have expreſs treatiſes of Valerius Probus, Sert. Urſatus, &c.

MONOGRAPHI, in *Botany*, authors who have written expreſs treatiſes on only one plant; as Douglas on the Guernſey lily, &c.

MONOGYNIA, from μονος, *one*, and γυνη, *a female*, is the name of ſuch orders in the firſt thirteen claſſes of the Linnæan ſyſtem, as have a ſingle ſtyle, or ſeſſile ſtigma, in each flower. A ſingle ſtyle however is by no means confined to theſe claſſes, being univerſal in the 14th and 15th as well as in the 17th and 19th, all very extenſive and natural claſſes of the ſame ſyſtem, and it occurs here and there amongſt the others; though in none of theſe inſtances does it give a denomination to any order, or ſection. See DIGYNIA.

MONOK, in *Geography*, a town of Hungary; 12 miles W.N.W. of Tokay.

MONOKA, a river of Maryland, which runs into the Cheſapeak, N. lat. 38° 10'. W. long. 76° 53'.

MONOLOGUE, Fr. an opera tune by one actor alone, who only ſpeaks or rather ſings to himſelf. In declamation it is a ſoliloque. "It is in monologues (ſay the French) that all the powers of muſic are diſplayed; the performer giving way to all the ardour of his genius, unreſtrained in the length of his air or recitative by the preſence of an interlocutor." The accompanied recitatives of the Italians, which produce ſuch great effects, are always monologues.

MONOMACHIA, Μονομαχια, from μονος, *ſolus*, and μαχη, *combat*, a duel, or ſingle combat of man againſt man. Monomachia was anciently allowed by law, for the trial or proof of crimes. It was even permitted in pecuniary cauſes, as appears by ancient records. It is now forbidden both by the civil and canon laws. See COMBAT.

Alciat has written a treatiſe "De Monomachiâ."

MONOMERES, a word uſed by the ancients alone, but more frequently joined with the word *phorbeia*, to expreſs one ſort of the bandage uſed to confine the breath, by thoſe who played on the ancient pipe. This conſiſted only of one ſtraight and one tranſverſe piece; and the latter came fully over the mouth, and cloſed it up, except that a hole was cut in it to receive the mouth-piece of the pipe. The *diemeres* conſiſted of ſeveral pieces, and only tied up the lower-lip.

MONOMIAL, in *Algebra*, a root or quantity that has but one name; or conſiſts but of one part or member. Such are *a b*, *a a b*, *a a a b b*. See QUANTITY, BINOMIAL, TRINOMIAL, ROOT, &c.

Monomials may be either rational, or irrational.

MONOMIES CASTLE, in *Geography*, a fort of America, on the river Winebago. N. lat. 44° 18'. W. long. 87° 34'.

MONOMIES *River*, a river of North America, from which is derived the name of a tribe of Indians, and which runs into that part of lake Michigan, called "Green bay," N. lat. 44° 46'. W. long 87° 27'.

MONOMONIL, a town of N. America, on the W. ſide of Green bay. N. lat. 44° 32'. W. long. 87° 28'.

MONOMOTAPA. See MOCARANGA.

MONONGAHELA RIVER, a branch of the Ohio, 400 yards wide at its junction with the Alleghany at Pittſburg; navigable with batteaux and barges beyond Redſtone creek, and ſtill farther with lighter craft. It riſes at the foot of the Laurel mountain in Virginia, paſſes into Pennſylvania, ſeparates Fayette and Weſtmoreland from Waſhington county, and then joining the Alleghany river at Pittſburg, forms the Ohio.

MONONGALIA, a county in the N.W. part of Virginia, about 40 miles long and 30 broad; containing 8540 inhabitants.

MONOPAGIA, a word uſed by ſome *medical* writers, for that ſpecies of head-ache which affects only one point, or ſmall part of the head.

MONOPETALOUS, in *Botany*, a flower whoſe *corolla* conſiſts of but one piece, or petal, as in the Primroſe. A monopetalous corolla is almoſt univerſally tubular. Very rarely the tube is ſlit, from top to bottom, at one ſide, as in *Goodenia* and *Scævola*. There are indeed a few monopetalous flowers which ſeem to be ſo from a partial defect, as *Amorpha*, the only petal of whoſe corolla is the ſtandard (*vexillum*), the wings and keel being wanting, though the form of every part of the fructification, as well as the habit of the ſhrub, indicates its ſtrictly papilionaceous nature. Another genus, *Rittera* of Schreber, (*Poſſira* of Aublet and Juſſieu,) which is alſo of the leguminous kind, though not papilionaceous, has a ſingle lateral petal, of a broad roundiſh figure, with a very ſhort claw. (See RITTERA.) The diſtinction between a monopetalous and polypetalous corolla, is the moſt abſolute of all, in the ſyſtems of thoſe who arrange plants by this part; and is indeed leſs liable to variation than even the abſence or preſence of the corolla itſelf. See COROLLA and CLASSIFICATION.

MONOPHAGI, Μονοφαγοι, in *Antiquity*, a deſignation given to thoſe who celebrated the Æginean feſtival, becauſe they feaſted or eat together without the aſſiſtance of their ſervants; none but the denizens of that iſland being allowed to be preſent.

MONOPHYSITES, from μονος, *solus*, and φυσις, *natura*, in *Ecclesiastical History*, a general name given to all those sectaries in the Levant, who only own one nature in Jesus Christ; and maintain, that the divine and human natures of Christ were so united, as to form only one nature, yet without any change, confusion, or mixture of the two natures. See EUTYCHIANS.

The Monophysites, however, properly so called, are the followers of Severus, a learned monk of Palestine, who was created patriarch of Antioch in 513, and Petrus Fullensis, whence they were called " Severians."

The Monophysites were encouraged by the emperor Anastasius, but depressed by Justin and succeeding emperors. However, this sect was restored by the eloquence, activity, and diligence of Jacob Baradæus, an obscure monk, insomuch, that when he died bishop of Edessa, A.D. 578, he left it in a most flourishing state in Syria, Mesopotamia, Armenia, Egypt, Nubia, Abyssinia, and other countries. The laborious efforts of Jacob were seconded in Egypt, and the adjacent countries, by Theodosius, bishop of Alexandria, and he became so famous, that all the Monophysites of the East considered him as their second parent and founder, and are to this day called Jacobites, in honour of their new chief. The Monophysites are divided into two sects or parties; the one African, the other Asiatic: at the head of the latter is the patriarch of Antioch, who resides, for the most part, in the monastery of St. Ananias, near the city of Merdin, his episcopal seat; and also at Amida, Aleppo, and other Syrian cities: the former are under the jurisdiction of the patriarch of Alexandria, who generally resides at Grand Cairo, and are subdivided into Cophts and Abyssinians. From the fifteenth century downwards, all the patriarchs of the Monophysites have taken the name of Ignatius, in order to shew that they are the lineal successors of Ignatius, who was bishop of Antioch in the first century, and consequently the lawful patriarchs of Antioch. In the 17th century, a small body of the Monophysites in Asia, abandoned, for some time, the doctrines and institutions of their ancestors, and embraced the communion of Rome: but the African Monophysites, notwithstanding that poverty and ignorance which exposed them to the seductions of sophistry and gain, stood firm in their principles, and made an obstinate resistance to the promises, presents, and attempts employed by the papal missionaries, to bring them under the Roman yoke: and in the 18th century, those of Asia and Africa have persisted in their refusal to enter into the communion of the Roman church, notwithstanding the earnest intreaties and alluring offers, that have been made from time to time by the pope's legates, to conquer their inflexible constancy. The Monophysites propagate their doctrine in Asia with zeal and assiduity, and have not long ago gained over to their communion a part of the Nestorians, who inhabit the maritime coasts of India. Mosheim's Eccl. Hist.

MONOPIN HILL, in *Geography*, a hill on the island of Banca, which forms the N.E. point of the entrance of the Straits. S. lat. 2° 3′. E. long. 105° 18′. The difference of longitude between the island Lusepara, which lies in the S. entrance of the straits of Banca, and Monopin hill, which forms one side of the entrance from the north, is 55′. See *Straits of* BANCA.

MONOPOLI, a town of Naples, in the province of Bari, on the coast of the Adriatic sea; the see of a bishop; containing six churches and nine convents; 144 miles E. of Naples. N. lat. 41° 8′. E. long. 17° 19′.

MONOPOLY, strictly speaking, in the language of the law, is very similar to engrossing: the latter is the act of buying up corn and other provisions, for the purpose of selling them again; the former is the same offence, extended to other branches of trade: both are supposed to be done for the purpose of gaining the entire command of the market, and by this means raising the prices of the commodities engrossed or monopolised.

Monopoly is also a term applied to a " licence or privilege allowed by the king, for the sole buying, selling, making, working and using of any thing whatsoever, whereby the subject is restrained from that liberty of manufacturing or trading which he had before." These licences and privileges, in all despotic governments, have been made use of to favour and enrich individuals; or, by the sale of them, to contribute to the wants of the sovereigns: and even in freer governments, ignorant of the real mode of promoting industry and enriching the people, licences and privileges of this kind have been too frequently granted on the erroneous idea, that their commerce would be fostered and protected in its infancy. In this kingdom, during the reigns of Elizabeth and James I. monopolies were carried to a most vexatious and destructive extent; so that many branches of trade and manufacture were absolutely closed, except to those who had obtained licences to engage in them, and the great body of consumers were inadequately supplied with bad articles at an exorbitant rate. These evils at last became so oppressive and glaring, that by the 21st James I. c. 3. all such monopolies were declared to be contrary to law and void (except patents to the authors of new and useful inventions, for a term not exceeding fourteen years). By the same statutes, monopolists are liable to be punished by treble damages and double costs, if they disturb any persons engaged in a trade to which they claim the privilege of monopoly. This statute evidently refers only to those cases where a monopoly licence is claimed, and endeavoured to be acted upon, so as to disturb the trade of those engaged in the same line.

The engrossing or monopoly of corn and provisions is an offence at common law, and is described by statute 5 and 6 Edw. VI. c. 14.; by this statute, the penalty is the forfeiture of the goods or their value, and two months imprisonment for the first offence; double value, and six months imprisonment for the second; and for the third, the offender to forfeit all his goods, to be set in the pillory, and imprisoned at the king's pleasure.

Monopoly, as a subject in political economy, may be considered under three points of view. In the first place, the practicability of the alleged crime of getting into one's possession, or buying up, all, or such a quantity of, any commodity as will give the command of the market, and consequently of the price. In the second place, the monopoly, which by patent is given for a term of years, to the authors of new and useful inventions: the propriety and policy of this kind of monopoly afford ample room for discussion; of course, if this kind of monopoly were to be set aside, some other mode of rewarding the authors of new inventions, less objectionable, must be suggested: this kind of monopoly will be considered under the article PATENT. In the third place, that species of monopoly, wherein a government grants either to a body of men, which secures them any particular trade; or to the nation at large, by which the colonial trade is not suffered to be touched by any foreign nation. This last species of monopoly, or the monopoly of the colonial trade, will be considered under the article NAVIGATION *Act*: at present, therefore, we shall confine our observations to the alleged crime of engrossing or monopolizing any commodity, for the purpose of commanding the market, and raising the price; and to that monopoly which

which a government grants to any particular body of men, by which they alone can carry on the trade which is the object of the monopoly.

Smith's opinion reſpecting engroſſing and foreſtalling is well known: the popular fear reſpecting them he compares to the popular terrors and ſuſpicions of witchcraft, and he concludes by obſerving, that the law which ſhould reſtore entire freedom to the inland trade of corn would probably prove as effectual to put an end to the popular fears of engroſſing and foreſtalling; as the law which put an end to all proſecutions for witchcraft, deſtroyed the fear and ſuſpicion of it, by taking away the great cauſe which encouraged and ſupported them.

Indeed, when we conſider the numerous and great obſtacles and difficulties which muſt lie in the way of every perſon who attempts to get into his poſſeſſion the whole, or the greater part of any commodity; the immenſe capital, or credit which he muſt poſſeſs; the confidence he muſt place on the integrity of his agents, and the reliance he muſt have on their ſkill and judgment; the effect on the price of the commodity, which his attempts to monopolize it muſt neceſſarily produce; and the great probability that he will be compelled to deſiſt from his undertaking, long before he has brought it to a cloſe, from an erroneous calculation of his means: it will appear evident that it cannot be the intereſt of any man to riſque his capital in ſuch an abſurd and impracticable undertaking. If there ſhould be perſons ſo blind to their own intereſts as to begin the attempt, their puniſhment may ſafely be left to flow from their own meaſures, as, long before they can materially, or even in a trifling degree, injure the public, they will either open their eyes to their own folly, or be incapacitated by their own ruin from proceeding in their enterpriſe.

But though monopoly, ſtrictly ſpeaking, appears thus impracticable, yet there is no doubt that the price of commodities may be partially and temporarily affected by the quantity of capital poſſeſſed by thoſe who have them for ſale. It is well known that if the farmer, for inſtance, be ſtraightened for money, he will be compelled to bring his grain to market early in the ſeaſon, in a much larger proportion than if his capital were ſufficient to enable him to pay his rent, and carry on his agricultural labour, without having recourſe to this meaſure: if, on the other hand, his capital is ſuch, that he has no occaſion for the money the early ſale of his corn would produce, he will bring it to market only in thoſe quantitities, and at thoſe ſeaſons, which he thinks will conduce moſt to his own intereſt. At firſt ſight it might ſeem as if the public would be moſt benefited by farmers of the former deſcription; but a very little reflection will convince us, that the temporary reduction in the price of corn, occaſioned by their want of adequate capital, will be much more than balanced, in a national point of view, by the unequal diſtribution of it through the year, to which this will give riſe, as well as by the want of economy in the uſe of it, which the forced and unauthorized reduction of it will produce.

It may then ſafely be inferred that the attempt to monopolize any commodity is ſo abſurd, and ſo contrary to the moſt narrow and obſcure views of ſelf-intereſt, that no law is neceſſary to prevent or puniſh it; and that, with reſpect to the ſuppoſed effect of capital, in raiſing the price of commodities, in many points of view capital, by enlarging the quantity produced, and giving riſe to competition, muſt have the oppoſite effect; while an inadequate capital muſt narrow and thwart the induſtry and operations of the poſſeſſor, and even at the time that it compels him to diſpoſe of his produce, is injurious, not only to himſelf, but to the nation at large.

In a monopoly of the colony trade, no particular body of men in the nation are favoured: the monopoly regards the whole nation as contradiſtinguiſhed from foreigners: but in the monopoly of any trade granted by government to a particular body of men, the privilege is granted at the expence, and to the loſs of the reſt of the nation. This is the firſt and moſt ſtriking evil, but there are others not inferior in magnitude and extent. Not only is a large portion of the nation excluded from the means of increaſing their induſtry and conſequently their wealth; but they are compelled to purchaſe the articles of the monopoly trade at the monopoly price, and to ſell ſuch articles as they manufacture for that trade, at the price which the holders of the excluſive privilege may chooſe to give. Nothing ſupplies a market ſo regularly, or ſo cheaply, or with goods of ſuch good quality, as open and fair competition; nothing, on the contrary, renders the ſupply ſo irregular, or the goods ſo high priced, or of ſuch inferior quality, as monopoly. For theſe and various other ſubordinate reaſons, therefore, a monopoly trade muſt be injurious to the nation at large; and it not unfrequently happens that it is conducted with ſuch negligence, ignorance, and extravagance, as not to be beneficial to thoſe who poſſeſs it. Under certain circumſtances, when there was little ſpirit of enterprize, when individual capital was ſmall, and combined with theſe circumſtances, in caſes where the riſque was great, where great length of time was neceſſary to eſtabliſh the trade, and where the returns, at firſt, were ſlow and trifling, it might have been wiſe and politic to grant excluſive privileges of trade; but certainly it cannot be wiſe and politic to grant or to continue them, under circumſtances of an oppoſite deſcription.

MONOPS, in *Natural Hiſtory*, a name given by Ælian, and ſome other of the old Greek writers, to the bonaſus. The name *monapus* was given this animal, according to Ariſtotle, by the people of the country where the creature was moſt frequent, and therefore is not to be attempted on any Greek etymology. Some of the Greeks have called the ſame creature *monepos*, and ſome *bolinthos*.

MONOPTERE, Μονόπτερος, a kind of temple among the ancients, round, and without walls; having its dome ſupported by columns.

MONOPTOTE, Monoptoton, in *Grammar*, a noun, which has only one caſe; as *inficias*.

MONOPTRAL Temple, in *Architecture*, an edifice, conſiſting of a circular colonnade ſupporting a dome. The monoptral temple is open, or without any incloſing wall, and conſequently without a cell, as in other temples.

MONOPYRENEOUS Fruits, in *Botany*, are ſuch as only contain one kernel or ſeed.

MONORCHIS, the ſpecific name of an *Ophrys* in Linnæus, Sm. Fl. Brit. 936. Engl. Bot. t 71, which remains in the ſame genus in Dr. Swartz's new arrangement of this tribe. It is ſo called from having but one apparent globular bulb, or rather knob, to the root; the other being formed at the end of a longiſh ſhoot, about, or after, the time of flowering, ſo as commonly to eſcape obſervation.

Monorchis. Beſide the common ſignification of this word as the name of a plant, phyſicians have alſo uſed it to expreſs a man who has but one teſticle.

MONORHYMÆ, from μονος, *ſolus*, and ρυθμος, *rhyme*, a poetical compoſition, all the verſes of which end with the ſame rhyme.

Monorhymes are ſaid to have been invented by the old French poet Leonin, who addreſſed ſome Latin verſes of

this

this kind to pope Alexander III., whence they are alſo called Leonine verſes.

MONOS, in *Geography*, a river of Guinea, which runs into the Atlantic, 15 miles S. of Tombi.

MONOSPERM-ALTHÆA, in *Botany*, a name contrived by Iſnard for the *Waltheria* of Linnæus, and intended to expreſs a plant of the Marſh-mallow kind, with a ſingle ſeed. See WALTHERIA.

MONOSTICH, MONOSTICHON, an epigram, or poetical piece, conſiſting of one ſingle verſe.

MONOSYLLABLE, MONOSYLLABUM, a word of a ſingle ſyllable; or, that conſiſts of one or more letters which are pronounced together.

The French language abounds in monoſyllables more than any other. This renders it the more perplexing to foreigners, and yet the beauty of the language ſeems to conſiſt in it. One of the beſt and ſmootheſt lines in Malherbe conſiſts of twelve monoſyllables: ſpeaking of Caliſta, he ſays, "Et moi je ne voi rien quand je ne la voi pas." In this the genius of the Engliſh tongue differs very much from the French, an uninterrupted ſeries of monoſyllables in the former having always an ill effect. This Mr. Pope both intimates and exemplifies in the ſame verſe. "And ten low words oft creep in one dull line." Paſquier cites an elegy of forty-two verſes, conſiſting wholly of monoſyllables.

MONOTHELITES, compounded of μονος, *ſingle*, and θελημα, *will*, of θελω, *volo*, *I will*, in *Eccleſiaſtical Hiſtory*, an ancient ſect, which ſprung out of the Eutychians and Monophyſites; thus called, as only allowing of one will in Jeſus Chriſt.

The opinion of the Monothelites had its riſe in 630, and had the emperor Heraclius for an adherent, who, by publiſhing an edict in favour of it, hoped thus to reſtore peace and concord both in church and ſtate: it was the ſame with that of the Acephalous Severians.

They allowed of two wills in Chriſt, conſidered with regard to the two natures; but reduced them to one, by reaſon of the union of the two natures; thinking it abſurd there ſhould be two free wills in one and the ſame perſon. See ECHTHESIS and TYPE.

They were condemned by the ſixth general council, in 680, as being ſuppoſed to deſtroy the perfection of the humanity of Jeſus Chriſt, depriving it of will and operation. Moſheim gives the following account of the ſtate of this ſubtile controverſy; the grounds of which are not, indeed, eaſily underſtood and explained. 1. The Monothelites declared, that they had no connection with the Eutychians and Monophyſites; but maintained, in oppoſition to both theſe ſects, that in Chriſt there were two diſtinct natures, which were ſo united, though without the leaſt mixture or confuſion, as to form by their union only one perſon. 2. They acknowledged, that the ſoul of Chriſt was endowed with a will, or faculty of volition, which is ſtill retained, after its union with the divine nature. For they taught, that Chriſt was not only perfect God, but alſo perfect man; whence it followed, that his ſoul was endowed with the faculty of volition. 3. They denied that this faculty of volition in the ſoul of Chriſt was abſolutely inactive; maintaining, on the contrary, that it co-operated with the divine will. 4. They, therefore, in effect, attributed to our Lord two wills, and theſe, moreover, operating and active. 5. They, however, affirmed, that, in a certain ſenſe, only one will and one manner of operation were in Chriſt. Their ſentiments were afterwards embraced by the Maronites.

MONOTOCA, in *Botany*, from μονος, *one*, and τοκος, *a fœtus*, or *conception*, becauſe the germen has, from the firſt, the rudiments of but one ſeed, by which this genus is diſtinguiſhed from others of its natural order. Brown. Prodr. Nov. Holl. v. 1. 546.—Claſs and order, *Pentandria Monogynia*. Nat. Ord. *Epacrideæ*, Brown.

Gen. Ch. *Cal.* Perianth inferior, of five equal, erect, concave, permanent leaves, with a pair of ſmaller ones at the baſe, which are ſometimes deciduous. *Cor.* of one petal, funnel-ſhaped, twice the length of the calyx; its limb in five equal, ſpreading, ſmooth, beaked ſegments; throat naked and pervious. Nectary a lobed cup-ſhaped gland, ſurrounding the baſe of the germen. *Stam.* Filaments five, thread-ſhaped, equal, inſerted into the tube of the corolla, ſhorter than its limb; anthers oblong, incumbent. *Piſt.* Germen ſuperior, roundiſh; ſtyle columnar, ſhort; ſtigma obtuſe. *Peric.* Drupa oval, pulpy. *Nut* ſolitary, oval, of one cell. *Seed* ſolitary.

Eſſ. Ch. Outer calyx of two leaves. Corolla five-cleft, funnel-ſhaped, naked at the mouth and border. Germen ſingle-ſeeded. Drupa pulpy.

A New Holland genus of ſhrubs, or ſmall trees, ſeparated by Mr. Brown from the *Styphelia* of preceding authors, on account of the above characters. The *leaves* are ſcattered, ſimple. *Spikes* axillary, rarely terminal, of few *flowers*, which are ſmall, white, often becoming dioecious, by a partial defect in their organs of impregnation.

Section 1. *Outer calyx deciduous. Small trees, with dioecious flowers.*

1. M. *elliptica.* (Styphelia elliptica; Sm. Bot. of New Holl. 49.)—Cluſters erect, either nearly terminal and aggregate, or axillary and ſolitary. Leaves elliptic-oblong, four times as long as broad.—Sent by Dr. J. White, in 1793, from the neighbourhood of Port Jackſon, New South Wales, where it was alſo gathered by Mr. Brown. The *branches* are variouſly divided, round, leafy, downy when young. *Leaves* numerous, ſcarcely an inch long, obovate or elliptic-lanceolate, entire, tipped with a ſpinous point; dark glaucous green and ſmooth above; pale, convex, with ſomewhat radiating, but nearly parallel, ribs beneath. *Footſtalks* broad and ſhort. *Cluſters* about the length of the leaves, their ſtalks angular and downy. *Bracteas* ſolitary, concave, at the baſe of each partial ſtalk. *Flowers* ſcarcely a line in length. The outer calyx is permanent in our ſpecimens.

2. M. *albens.* Br. n. 2.—Cluſters erect, ſolitary, either terminal or axillary. Leaves oblong-linear, acute, ſpinous-pointed, white beneath.—Native of Port Jackſon. Like the former, but the *leaves* are longer, narrower, and paler, more tapering at the point, their edges appearing minutely crenate under a microſcope.

3. M. *lineata.* Br. n. 3. (Styphelia glauca; Labill. Nov. Holl. v. 1. 45. t. 61.)—Spikes axillary, very ſhort, drooping, ſtalked. Leaves elliptic-oblong, acute, ſpinous-pointed, nearly flat.—Native of Van Diemen's land, where it was gathered by both the above authors. The ſhape of the *leaves* is moſt like the firſt ſpecies, but the very ſhort, axillary, ſtalked, obtuſe *ſpikes* (not *cluſters*), which Mr. Brown ſays are drooping, though the French author repreſents them erect, diſtinguiſh the preſent plant. The *germen* is, erroneouſly it ſeems, drawn with five cells in Labillardiere's plate.

Section 2. *Outer calyx permanent. Shrubs, with both organs of the flower perfect.*

4. M. *ſcoparia.* (Styphelia ſcoparia; Sm. Bot. of New Holl. 48.)—Spikes axillary, very ſhort, nearly ſeſſile, drooping, of few flowers. Leaves linear-oblong, ſomewhat revolute.

revolute. Stem erect.—Native of Port Jackſon, New South Wales. The *ſtem* is very buſhy, branched in a determinate manner, ſmooth throughout. *Leaves* numerous, about half an inch long, narrow, but ſomewhat elliptical, entire, ſpinous-tipped, the edges reflexed. *Flowers* ſmall, three or four, in a little, recurved, minutely bracteated, ſpike.

5. M. *empetrifolia.* Br. n. 5.—"Spikes axillary, drooping, of two or three flowers. Leaves oblong-oval, pointed, divaricated; convex above; ſtriated and whitiſh beneath. Stem proſtrate."—Gathered by Mr. Brown in Van Diemen's land. Of this we have ſeen no ſpecimen.

MONOTONIA, Monotony, in *Rhetoric*, a want of variation, or inflexion of the voice; or a fault in pronunciation, where a long ſeries of words is delivered with one unvaried tone. This is one of the principal faults of our Engliſh orators.

Dr. Blair obſerves, that monotony is the great fault into which writers are apt to fall, who are fond of harmonious arrangement; and to have only one tune, or meaſure, is not much better than having none at all. A very vulgar ear will enable a writer to catch ſome one melody, and to form the run of his ſentences according to it; which ſoon proves diſguſting. But a juſt and correct ear is requiſite for varying and diverſifying the melody; and hence we ſo ſeldom meet with authors, who are remarkably happy in this reſpect.

In pronunciation, care ſhould be taken to guard againſt monotony. It is juſtly obſerved by a good writer on this ſubject, that for an orator always to uſe the ſame tone or degree of his voice, and to expect to anſwer all his views by it, would be much the ſame thing, as if a phyſician ſhould propoſe to cure all diſtempers by one medicine. From hence it is evident, that though various inflections and tones of the voice are requiſite to make it harmonious and pleaſing to the ear, yet the degree of it ſhould differ according to the nature of the ſubject, and deſign of the ſpeaker. And as a perfect monotony is always unpleaſant, ſo it can never be neceſſary in any diſcourſe. Lect. on Rhet., &c. vol. i. Ward's Orat., vol. ii. See Period, Pronunciation, Sentence, and Voice.

Monotonia is oppoſed to chanting or ſinging in ſpeaking.

MONOTONOUS, Monotony, uſed figuratively in muſic, except in ſpeaking of drums, implies dull, pſalmodic ſtrains, always in the ſame ſtyle or key.

MONOTRIGLYPH, in *Architecture*, denotes the ſpace of one triglyph, between two pilaſters or two columns.

MONOTROPA, in *Botany*, received that appellation from Linnæus, in exchange for *Hypopitys*, though the alteration ſeems, in our humble opinion, by no means for the better. The word is formed from μονος, *one*, and τρεπω, *to regard* or *conſider*, alluding to the regard paid by its author to the ſingle terminal flower, for the determination of the claſs and genus, in preference to the lateral ones, according to a favourite principle aſſumed by himſelf, and exemplified in this genus, *Ruta*, *Adoxa*, *Chryſoſplenium*, and others. He appears in the *Philoſophia Botanica*, p. 186, to have loſt ſight of this original idea, claſſing the name in queſtion with thoſe deduced from the ſoil, ſtumbling, as it were, between *ſolum* and *ſolus;* an error rather to be lamented than cenſured, when we reflect that this immortal book was dictated haſtily from a ſick bed. (See Linnæus.) We muſt nevertheleſs ſtill contend, that the name previouſly beſtowed on this plant by Bauhin and Dillenius, from ὑπο, *under*, and πιτυς, *a fir-tree*, alluding to its perhaps invariable ſtation, was liable to no exception. Linn. Gen. 214. Schreb. 291. Willd. Sp. Pl. v. 2. 573. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 440. Juſſ. 430. Michaux Boreali-Amer. v. 1. 266. (Hypopitys; Dill. Gen. 134. t. 7.)—Claſs and order, *Decandria Monogynia.* Nat. Ord. doubtful, Linn. Juſſ. The latter obſerves, that it is "a genus by itſelf, akin to no other." Its habit is that of *Cytinus*, whatever difficulty there may be in bringing them together by technical characters. The want of green in the colour of ſuch paraſitical plants is remarked by Linnæus, in Fl. Suec. 135, though the diſcovery has lately been attributed to one of his pupils.

Gen. Ch. *Cal.* none, unleſs the five outer petals be conſidered as a coloured calyx. *Cor.* Petals ten, inferior, oblong, erect, parallel, ſerrated at the extremity, deciduous; the five outermoſt, or alternate, ones gibbous at the baſe, concave, and bearing honey, at the inſide. *Stam.* Filaments ten, awl-ſhaped, erect, ſimple; anthers ſimple, two-lobed. *Piſt.* Germen ſuperior, roundiſh, pointed; ſtyle cylindrical, the length of the ſtamens; ſtigma capitate, obtuſe. *Peric.* Capſule ovate, with five angles, obtuſe, of five valves. *Seeds* numerous, chaffy.

Obſ. This deſcription is taken from the terminal flower, according to the rule in *Phil. Bot.* ſect. 178. The lateral flowers, in ſuch ſpecies as have any, loſe one-fifth, in the number of every part of the fructification.

Eſſ. Ch. Calyx none. Petals ten; the five outermoſt concave and honey-bearing at their baſe. Capſule ſuperior, of five valves.

1. M. *Hypopitys.* Yellow Bird's-neſt. Linn. Sp. Pl. 555. Engl. Bot. t. 69. Fl. Dan. t. 232. Ehrh Phytoph. 44. (Orobanche hypopitys lutea; Mentz. Pugill. t. 3. Moriſ. ſect. 12. t. 16. f. 13.)—Flowers ſpiked, externally ſmooth, as well as their bracteas; the lateral ones octandrous.—Native of fir woods in Europe and North America, growing paraſitically on the roots of thoſe trees, and flowering in July. Dillenius ſays, on the authority of Mr. Manningham, that it grows alſo in beech woods. Michaux aſſerts the American plant to be but half the ſize of the European. With us it is nearly a ſpan high. The whole herb ſucculent, of a pale ſtraw-colour, turning browniſh when arrived at maturity, and then acquiring a fragrant ſmell, like that of primroſe flowers, though generally compared to their roots. The *ſtem* is ſimple, thick, round, clothed with ſcattered ovate *ſcales*, rather than *leaves*, and terminating in a *ſpike* of ſeveral *flowers*, at firſt drooping, finally erect. Each *flower* is accompanied by a *bractea*, exactly reſembling the ſcales of the ſtem, rather ſhorter than the *flower*, which, with its very ſhort partial ſtalk, is nearly an inch long. Sometimes the *ſtamens*, and inner ſide of the *petals*, are hairy. Willdenow ſays there is a variety with upright flowers, which is occaſionally ſingle-flowered. We have ſometimes found the lateral bloſſoms with only ſix petals and ſtamens.

2. M. *lanuginoſa.* Downy Bird's-neſt. Michaux n. 2.—Flowers ſpiked, all over downy, as well as their bracteas.—Sent from North America, by Kalm, to Linnæus, who confounded it with the former. Michaux gathered the ſame in the woods of North Carolina. He juſtly deſcribes it as having the habit of the foregoing, but ſmaller in all its parts, varying with a drooping or upright *ſpike*, the *flowers* turned all one way. The *ſcales* of the *ſtem* are rather pointed. The *ſtem*, *ſcales*, *petals*, and every other part of the *flowers*, are clothed with fine, ſoft, denſe hairs, peculiar to this ſpecies. The ſpecimen of the former in the Linnæan herbarium, as well as one we have from France, has indeed ſcattered hairs on the *ſtamens*, as well as on the inner ſide of the *petals*, near the edge. Whether theſe indicate a ſpecific diſtinction,

diſtinction, we have not materials to decide, but we have ſeen them in no Britiſh ſpecimen.

3. M. *uniflora*. Drooping Single-flowered Bird's-neſt. Linn. Sp. Pl. 555. Michaux n. 3. (Orobanche virginiana, flore pentapetalo cernuo; Pluk. Phyt. t. 209. f. 7.) — Stem ſingle-flowered. Scales bluntiſh. Flower pendulous.—Native of Maryland, Virginia, and Canada; *Linn.*; of ſhady woods in South Carolina; *Michaux*. *Root* a denſe congeries of entangled fibres. *Stem* about ſix inches high, ſeldom quite ſtraight in any part, angular, ſmooth. *Scales* obovate, bluntiſh, ſmooth, ſcattered, not numerous. *Flower* terminal, ſolitary, perfectly pendulous, the upper part of the ſtem, for about an inch, being curved into an arch. *Corolla* bell-ſhaped, the ſize of the firſt ſpecies, or bigger. *Stamens* ten, hairy. Plukenet's figure is very good.

4. M. *Moriſoniana*. Upright Single-flowered Bird's-neſt. Michaux n. 4. (Orobanche monanthos virginiana, flore majore; Moriſ. ſect. 12. t. 16. f. 5.)—Stem ſingle-flowered, ſtraight. Scales lanceolate. Flower erect.—Native of the ſhady woods of Carolina. *Michaux*. A ſpecimen, ſent by Kalm from North America, is confounded in the Linnæan herbarium with the laſt. The *ſtem* of the preſent ſpecies is nearly twice the height of *M. uniflora*, perfectly ſtraight, except its taper baſe, which is ſlightly flexuoſe. *Scales* larger, more lanceolate and acute, eſpecially the upper ones. *Flower* always perfectly erect, about the ſize of the laſt, or rather bigger, with ten *petals*, and as many hairy *ſtamens*.

Moriſon's figure, with which Linnæus finds fault, ſuppoſing it done for the foregoing, expreſſes this ſpecies ſufficiently well. Michaux has firſt diſtinguiſhed the two, and, as it appears to us, very juſtly. He deſcribes the *ſcales* as more diſtant in the preſent, which is not the caſe in the only ſpecimen we have ſeen, any more than in Moriſon's plate. The *ſtem*, in five ſpecimens of the *uniflora* before us, is alſo the moſt ſlender of the two; Michaux terms it thick, as well as ſhorter than the other.

No ſucceſsful attempt, as far as we have heard, was ever made to cultivate any of this genus; yet as gardeners now ſucceed with ſeveral of the *Orchideæ*, at one time thought quite as unmanageable, we know not why they ſhould deſpair, even of theſe paraſitical plants. Rotten ſtumps of fir, placed ſo as to receive their minute ſeeds, and then removed into a fit ſituation, might poſſibly attain the deſired end. S.

MONOU, in *Geography*, a country of Africa, north of the Grain coaſt.

MONOVAC, a town of Spain, in the province of Valencia; 21 miles W. of Alicant.

MONOULLAH, a town of Bengal; 12 miles N.W. of Goragot.

MON-PADRE, a town of the iſland of Margaretta.

MONPARA, a river on the weſt coaſt of the iſland of Borneo, which runs into the ſea, N. lat. 0° 36′. E. long. 109° 33′.

MONPAZIER, a town of France, in the department of the Dordogne, and chief place of a canton, in the diſtrict of Bergerac; 18 miles S.W. of Sarlat. The place contains 1028, and the canton 4691 inhabitants, on a territory of 245 kiliometres, in 14 communes. N. lat. 44° 40. E. long. 0° 59′.

MONPON, a town of France, in the department of the Dordogne, and chief place of a canton, in the diſtrict of Riberac. The place contains 1500, and the canton 5615 inhabitants, on a territory of 247½ kiliometres, in 10 communes.

MONQUEGNA, a juriſdiction of South America, in the dioceſe of Arequipa; about 40 leagues S. of the city of Arequipa, and 16 from the coaſt of the South ſea. This juriſdiction extends at leaſt 40 leagues in length, in an agreeable climate, adorned with large vineyards, from the produce of which great quantities of wine and brandy are made, which conſtitute its whole commerce. They ſupply all the provinces bordering on the Cordilleras, as far as Potoſi, by land carriage; while they are exported by ſea to Callao, where they are greatly valued. Here are alſo papas and olives. The principal town, which bears the ſame name, is inhabited by Spaniards, among whom are ſeveral noble and opulent families. S. lat. 17° 24′. W. long. 70° 56′.

MONREAL, a town of Spain, in Aragon; 23 miles W. of Calataiud.—Alſo, a town of Spain, in Navarre; 8 miles S.E. of Pamplona.

MONREALE, a town of Sicily, in the valley of Mazara, ſituated on a lofty hill; 3 miles W.S.W. of Palermo.

MONRO, Alexander, M.D., in *Biography*, an eminent anatomiſt, and the father of the medical ſchool of Edinburgh, was deſcended both by his paternal and maternal parents from diſtinguiſhed families in the north of Scotland. He was born in London, in September 1697, where his father, then a ſurgeon in the army of king William in Flanders, reſided upon leave of abſence in the winter. On quitting the army, Mr. Monro ſettled in Edinburgh; and perceiving early indications of talent in Alexander, his only child, he took great intereſt in ſuperintending his education. After having given him the beſt inſtruction which Edinburgh then afforded, he ſent him to London, where he attended the anatomical courſes of Cheſelden, and was extremely aſſiduous in diſſections: he made numerous anatomical preparations, which he ſent home; and, while here, even laid the foundation of his moſt important work on the bones, a ſketch of which he read before a ſociety of young phyſicians and ſurgeons, of which he had been elected a member. From London, Alexander went to Paris, where he purſued the ſame object; and in the autumn of 1718, repaired to Leyden, with the view of profiting by the tuition of the great Boerhaave, who conceived a high opinion of his talents and induſtry, and wrote a favourable account of him to his friends. On his return to Edinburgh, in the autumn of 1719, he was appointed profeſſor and demonſtrator of anatomy to the company of ſurgeons, the joint demonſtrators having ſpontaneouſly reſigned in his favour. Soon after accepting this appointment, he began alſo to give public lectures on anatomy, illuſtrating them by the preparations which he had made when abroad; and at the ſame time Dr. Alſton, then a young man, united with him in the plan, and began a courſe of lectures on the materia medica and botany. Theſe were the firſt public courſes that had ever been given at Edinburgh, and may be regarded as the opening of that medical ſchool, which has ſince extended its fame, not only throughout Europe, but over the new world. Mr. Monro ſuggeſted this plan; and by the following circumſtance, probably, contributed to lead his ſon into a mode of lecturing, which ſubſequently carried him to excellence. Without the young teacher's knowledge, he invited the preſident and fellows of the College of Phyſicians, and the whole company of ſurgeons, to honour the firſt day's lecture with their preſence. This unexpected company threw the doctor into ſuch confuſion, that he forgot the words of the diſcourſe, which he had written and committed to memory.

Having

Having left his papers at home, he was at a loſs for a little time what to do: but, with much preſence of mind, he immediately began to ſhew ſome of the anatomical preparations, in order to gain time for recollection; and very ſoon reſolved not to attempt to repeat the diſcourſe which he had prepared, but to expreſs himſelf in ſuch language as ſhould occur to him from the ſubject, which he was confident that he underſtood. The experiment ſucceeded: he delivered himſelf well, and gained great applauſe as a good and ready ſpeaker. Thus diſcovering his own ſtrength, he reſolved henceforth never to recite any written diſcourſe in teaching, and acquired a free and elegant ſtyle of delivering lectures.

In the ſame year, 1720, a regular ſeries of medical inſtruction was inſtituted at Edinburgh, through the intereſt of Dr. Monro's father: theſe two lectureſhips were put upon the univerſity eſtabliſhment, to which were ſoon after added thoſe of Drs. Sinclair, Rutherford, Innes, and Plummer. This ſyſtem of medical education was, however, incomplete, without affording ſome opportunity to the ſtudents of witneſſing the progreſs and treatment of diſeaſes, as well as of hearing lectures. A propoſal was, therefore, made to erect and endow an hoſpital by ſubſcription; and Dr. Monro publiſhed a pamphlet, explaining the advantages of ſuch an inſtitution. The royal infirmary was ſpeedily raiſed, endowed, and eſtabliſhed by charter; and the inſtitution of clinical lectures, which were commenced by Dr. Monro on the ſurgical caſes, and afterwards by Dr. Rutherford, in 1748, on the medical caſes, completed that admirable ſyſtem of inſtruction, upon which the reputation and uſefulneſs of the medical ſchool of Edinburgh have been ſubſequently founded.

None of the new profeſſors contributed ſo much to the celebrity of this ſchool as Dr. Monro, who was indefatigable in the labours of his office, and in the cultivation of his art, and ſoon made himſelf known to the profeſſional world by a variety of ingenious and valuable publications. During a period of nearly forty years he continued, without any interruption, to deliver a courſe of lectures, extending from the end of October to the beginning of May: and ſo great was the reputation which he acquired, both for himſelf and the univerſity, that ſtudents flocked to him from the moſt diſtant corners of the kingdom.

His firſt and principal publication was his "Oſteology, or Treatiſe on the Anatomy of the Bones," which appeared in 1726, and was intended for the uſe of his pupils; but it became a very popular work among the faculty in general: for he had the ſatisfaction of ſeeing it paſs through eight editions during his life, and it was tranſlated into moſt of the languages of Europe. The French edition, in folio, publiſhed by Mr. Sue, demonſtrator of ſculpture to the Royal Academy of Paris, was adorned with moſt elegant and maſterly figures. To the later editions of this work he ſubjoined a conciſe *neurology*, or deſcription of the nerves, and a very accurate account of the lacteal ſyſtem and thoracic duct.

Dr. Monro was alſo the father and active ſupporter of a ſociety, which was eſtabliſhed by the profeſſors and other practitioners of the town, for the purpoſe of collecting and publiſhing papers on profeſſional ſubjects, and to which the public is indebted for ſix volumes of "Medical Eſſays and Obſervations by a Society at Edinburgh," the firſt of which appeared in 1732. Dr. Monro was the ſecretary of this ſociety; and after the publication of the firſt volume, when the members of the ſociety became remiſs in their attendance, the whole labour of collection and publication was carried on by himſelf; "inſomuch that after this," ſays his biographer, "ſcarce any other member ever ſaw a paper of the five laſt volumes, except thoſe they were the authors of, till printed copies were ſent them by the bookſeller." Of this collection, many of the moſt valuable papers were written by Dr. Monro, on anatomical, phyſiological, and practical ſubjects: the moſt elaborate of theſe is an "Eſſay on the Nutrition of the Fœtus," in three diſſertations. Haller, ſpeaking of theſe volumes as highly valuable to the profeſſion, adds, "Monrous ibi eminet."

After the concluſion of this publication, the ſociety was revived, at the ſuggeſtion of the celebrated mathematical profeſſor, Colin Maclaurin, and was extended to the admiſſion of literary and philoſophical topics. Dr. Monro again took an active part in its proceedings, as one of its vice-preſidents, eſpecially after the death of Maclaurin, when two volumes of its memoirs, entitled "Eſſays Phyſical and Literary," were publiſhed, and ſome materials for a third collected, to which Dr. Monro contributed ſeveral uſeful papers. The third was not publiſhed during his life. His laſt publication was an "Account of the Succeſs of Inoculation in Scotland," written originally as an anſwer to ſome inquiries addreſſed to him from the committee of the faculty of phyſicians at Paris, appointed to inveſtigate the merits of the practice. It was afterwards publiſhed at the requeſt of ſome of his friends, and contributed to extend the practice in Scotland. Beſides the works which he publiſhed, he left ſeveral MSS. written at different times, of which the following are the principal; *viz.* A Hiſtory of Anatomical Writers;—An Encheireſis Anatomica;—Heads of many of his Lectures;—A Treatiſe on Comparative Anatomy;—A Treatiſe on Wounds and Tumours;—and, An Oration de Cuticula. This laſt, as well as the ſhort tract on comparative anatomy, has been printed in an edition of his whole works, in one volume, quarto, publiſhed by his ſon, Dr. Alexander Monro, at Edinburgh, in 1781. This tract had been publiſhed ſurreptitiouſly, in 1744, from notes taken at his lectures; but is here given in a more correct form.

In the year 1759, Dr. Monro reſigned his anatomical chair, which he had ſo long occupied with the higheſt reputation, to his ſon, juſt mentioned; but he ſtill continued to lecture as one of the clinical profeſſors on the caſes in the infirmary. His life was alſo a ſcene of continued activity in other affairs, as long as his health permitted. For he was not only a member, but a moſt aſſiduous attendant, of many ſocieties and inſtitutions for promoting literature, arts, ſciences, and manufactures in Scotland; he was alſo a director of the bank of Scotland, a juſtice of the peace, a commiſſioner of high roads, &c. and was punctual in the diſcharge of all his duties. His character in private life was as amiable and exemplary as it was uſeful in public. To the literary honours, which he attained at home, were added thoſe of a fellow of the Royal Society of London, and an honorary member of the Royal Academy of Surgery, at Paris.

Dr. Monro was a man of middle ſtature, muſcular, and poſſeſſed of great ſtrength and activity; but was ſubject for many years to a ſpitting of blood on catching the leaſt cold, and through his life to frequent inflammatory fevers. After an attack of the influenza, in 1762, he was afflicted with ſymptoms of a diſeaſe of a painful and tedious nature, which continued ever after, until it terminated his exiſtence. This was a fungous ulcer of the bladder and rectum, the diſtreſs of which he bore with great fortitude and reſignation, and died with perfect calmneſs, on the 10th of July, 1767, at the age of ſeventy.

Two of his fons became diftinguifhed phyficians. Dr. Alexander, his fucceffor, filled the anatomical chair with great credit to himfelf and to the univerfity, for upwards of forty years, and became known throughout Europe by his valuable publications; efpecially by his Treatife on the Lymphatics, in 1770;—On the Anatomy of Fifhes, 1785; —On the Nerves, 1783;—On the Burfæ Mucofæ, 1788; and three treatifes on the Brain, the Eye, and the Ear, in 1797. Advancing in years, and wifhing to relieve himfelf from the fatigues of the profefforfhip, he affociated with himfelf, in 1801, his fon, the third Alexander Monro, who now, 1812, continues to carry on the bufinefs of that chair with confiderable zeal and credit, while the refpected veteran fpends his age in repofe.

Dr. Donald Monro, the other fon of the firft Alexander, fettled as a phyfician in London, and attained confiderable eminence. He became known as the author of an Effay on the Dropfy, in 1765;—On the Difeafes of Military Hofpitals, 1764;—On Mineral Waters, 1771;—On preferving the Health of Soldiers; and fome other works, and died in the year 1802. See Life of Dr. Monro, prefixed to his works. Gen. Biog.

MONROE, in *Geography*, a county of Virginia, taken from Green Briar, on the fouth fide; 320 miles from Wafhington.

MONROYO, a town of Spain, in Aragon, on the frontiers of Catalonia and Valencia; 20 miles S. of Alcaniz.

MONS Veneris, in *Anatomy*, the elevation of the integuments over the pubes in the female fubject. See Generation.

Mons, in *Geography*, a town of France, and principal place of a diftrict, in the department of Jemmappe, or Gemmappe, of which it is the capital, fo called from its fituation on a hill. The river Trouide, which runs through it, joins the Haifne in its fauxbourg. Its caftle, which was demolifhed in 1618, is faid to have been built by Julius Cæfar, and Quintus Cicero, brother to the celebrated orator, was befieged in this place, and relieved by Cæfar, 50 years B.C. The town is large, the ftreets are broad, and the great market-place, which is very fpacious, contains the townhoufe, which is a fine old building, with a fteeple erected by the ftates in 1716, the palace of the government, and that of the council of the province. Thefe three palaces are adorned with fculpture and painting. The great church is a fine building, the fide altar and chapel being wholly conftructed of fine marble: here is a marble tomb, finely embellifhed; and the ftatues, among which are the four cardinal virtues, and the refurrection, are in high eftimation. Mons is a place of good trade for various articles, particularly woollen ftuffs, which are manufactured here in large quantities. The magiftracy is compofed of a chief, ten fchevins, two penfioners, three greffiers, &c. This town has frequently fuffered by the calamities of war. In 1746 its fortifications were demolifhed by the French; and in this ftate it was reftored to the emperor by the peace of Aix-la-Chapelle. After the battle of Jemmappe, it was fummoned by Dumourier, and furrendered the next morning. It contains 18,291 inhabitants, in 2 cantons; the north canton including 13,381, on a territory of $37\frac{1}{2}$ kiliometres, in 5 communes; and the fouth containing 14,252, on a territory of 45 kiliometres, in 8 communes. N. lat. 50° 27′ 10″. E. long. 3° 37′ 15″.

MONSEFU, a town of Peru, in the bifhopric of Truxillo; 12 miles S. of Lambayeque.

MONSEIGNEUR, compounded of *mon, my,* and *feigneur, lord,* in the plural meffeigneurs, a title of honour and refpect ufed by the French in writing to perfons of fuperior rank or quality.

Dukes, peers, archbifhops, bifhops, and prefidents *a la mortier*, are complimented with the title of monfeigneur.

In the petitions prefented to the fovereign courts, they ufe the term meffeigneurs.

Monseigneur, abfolutely ufed, was a title formerly reftrained to the dauphin of France.

This cuftom was unknown till the times of Louis XIV., till then the dauphin was ftyled monfieur le dauphin.

MONSIEUR, a compound of *mon, my,* and *fieur, fir,* in the plural meffieurs, a term or title of civility, ufed by the French, in fpeaking to their equals, or thofe a little below them; anfwering to Mr. or Sir, among the Englifh.

The fuperfcription of all letters begin *A monfieur, monfieur* fuch a one.

The ufe of the word monfieur was formerly more extenfive than at prefent: they applied it to people who lived many ages before them. Thus monfieur St. Auguftine, monfieur St. Ambrofe; and the vulgar ftill fay, monfieur St. Paul, monfieur St. Jaques, &c. The Romans, during the flourifhing time of their liberty, were unacquainted with that term of parade and flattery, which they afterwards made ufe of in the word *dominus*. In fpeaking or writing to each other, they only gave each other their proper names; which practice lafted even after Cæfar had brought the republic under his command: but after the Roman emperors were once well feated on the throne, the courtiers and minions, who by flattery fought to procure favours from them, ftudied new honours. Suetonius obferves, that a comedian on the theatre having called Auguftus *dominus, lord;* the fpectators all ftared at him; fo that the emperor forbad, for the future, the title to be attributed to him. Caligula was the firft who exprefsly commanded himfelf to be called *dominus*. Martial, entirely devoted to tyranny, calls Domitian *dominum deumque noftrum*. In time, the title was alfo applied to the people; and of *dominus*, at length was formed *dom*.

Monsieur, abfolutely ufed, is a title or quality formerly appropriated to the fecond fon of France, or the king's brother.

In a letter of Philip De Valois, that prince, fpeaking of his predeceffor, calls him *monfieur le roy*, monfieur the king.

MONSIGNI, M. de, in *Biography*, formerly maitre d'hotel to the duke of Orleans, father of l'Egalité, was one of the creators of the French comic opera, for which, between the years 1759 and 1777, he compofed eleven or twelve different dramas, which, we believe, were all fuccefsful; particularly "Le Cadé Dupé; on ne s'avife jamais de tout;" "Le Roi et le Fermier;" "Rofe et Colas, &c."

This kind of drama was eftablifhed at the theatre de la Foire, in 1754, upon the idea of the Italian burletta, in all things except the recitative, the dialogue in the French opera comique being fpoken, and incidentally mixed with airs. This ingenious and pleafing compofer's name of Monfigni feems Italian; but his ftyle of melody is neither Italian nor French, but a mixture of both. Nothing could be more pleafing and amufing than thefe dramas to the natives of all Europe, not great critics in finging; for it muft be owned, that they were all well written, well fet, and well acted; and in the principal man's part, when performed by the admirable Caillot, well fung. Duni, Philidor, and Monfigni, were the patriarchs of the comic mufical dramas, and Gretry the king David.

MONSOL,

MONSOL, in *Geography*, a town of Africa, in the kingdom of Anziko, and residence of the micocco or king. S. lat. 1°. E. long. 3° 50'.

MONSON, *Sir* WILLIAM, in *Biography*, a naval commander, and a writer upon naval subjects, was born about the year 1569, and was sent, at an early age, to Baliol college, Oxford, where he remained about two years. Being desirous of engaging in the sea-service, to which, probably, his parents objected, he entered, without their knowledge, on board a small vessel, fitted out to cruise against the Spaniards. After some years' active service, he accompanied the earl of Cumberland in two expeditions, in the second of which he was taken by the Spaniards, and was detained a prisoner two years. As soon as he was liberated, in 1593, he attached himself again to the earl's service, in which he made two more voyages. In 1596, he was captain of a ship in the earl of Essex's expedition to Cadiz, and in the next year in that to the Azores. After the accession of king James, he was appointed, in 1604, admiral of the narrow seas, an office which he sustained twelve years with credit to his own well earned reputation, and honour to the British flag, by protecting the trade and fisheries from all encroachments. His zeal against the pretensions of the Dutch, and his endeavours to promote an enquiry into the state of the navy, against the will of the earl of Nottingham, lord high admiral, involved him in troubles, and occasioned his committal to the Tower, in 1616; but upon examination into his conduct he was discharged. He was consulted on the duke of Buckingham's expedition against Algiers, Cadiz, and the isle of Rhé, all which he disapproved, and his opinion was fully justified by their want of success. To his country his opposition was unavailing, and to him it was unfortunate, having been kept out of employ for several years; but in 1635 he was appointed vice-admiral. After this he withdrew to a life of privacy, and employed himself in finishing his "Naval Tracts." He died in February, 1642-3, leaving a high reputation as a brave, prudent, and upright commander. He had not the good fortune to perform any very splendid services, yet his zeal for the improvement of the navy of his country merits an honourable mention. His Naval Tracts contain plans and projects for the advancement of the interests of trade and navigation. They are inserted in the third volume of Churchill's Collection of Voyages. Biog. Brit. Campbell's Lives of the Admirals, Stockdale's edition.

MONSON, in *Geography*, a township of Hampshire county, Massachusetts, E. of Brimfield.

MONSONIA, in *Botany*, is designed to commemorate the late lady Ann Monson, a lady of distinguished talents, as well as of eminent botanical taste and knowledge, who by a long residence in the East Indies, had great opportunities of cultivating the study of plants, as well as insects. We trust we shall betray no inviolable secret, in recording that it was to this excellent lady the late Mr. Lee alluded, in the preface to his Introduction to Botany, first published in 1760, where he says he was enjoined not to acknowledge his obligations to those who had kindly helped him in his undertaking. A most elegant East Indian *Illecebrum* was first chosen by Koenig, if we mistake not, to bear the name of *Monsonia*, which remains as its specific appellation; and a more distinct genus, of greater splendour, has been selected for the purpose. Some have thought this but too near to *Geranium*.—Linn. Mant. 14. Schreb. 459. Willd. Sp. Pl. v. 3. 717. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. ed. 1. v. 3. 100. Juss. 269. Lamarck Illustr. t. 638. Cavan. Diss. 179.—Class and order, *Polyadelphia Dodecandria*. Nat. Ord. *Gruinales*, Linn. *Gerania*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of five lanceolate, awned, equal, permanent leaves. *Cor.* Petals five, obovate, abruptly toothed, and jagged, longer than the calyx, inserted into the short annular receptacle, or nectary. *Stam.* Filaments fifteen, united into five sets, three in each set, all inserted into the nectary; anthers oblong. *Pist.* Germen superior, pentagonal, short; style awl-shaped; stigmas five, oblong, spreading. *Peric.* Capsules five, aggregate, cartilaginous, oblong, lateral, separating at their inside, each attached upwards to a very long, spiral, elastic awn. *Seeds* solitary, lateral, oblong, somewhat cylindrical.

Eff. Ch. Calyx of five leaves. Petals five, abrupt, toothed. Stamens in five sets, united by a common base. Style five-cleft. Fruit beaked, of five aggregate capsules, with long spiral awns.

1. M. *speciosa*. Large-flowered Monsonia. Linn. Mant. 105. Curt. Mag. t. 73. Cavan. Diss. 179. t. 74. f. 1.—Leaves quinate; leaflets bipinnatifid.—Native of the Cape of Good Hope, like the whole genus. It was sent to Kew in 1774, by Mr. Masson, and decorates the green-house magnificently in spring. *Root* perennial. *Stems* sometimes very short. *Leaves* numerous, mostly radical, on long stalks, and composed of five radiating hairy leaflets, doubly pinnatifid; their segments linear-lanceolate, bluntish, decurrent. *Flowers* two or three inches broad, with deeply cut petals, variegated with shades of rose-colour, ribbed, the eye purple and white; each on a long, bent, simple *stalk*, with a whorl of lanceolate *bracteas* at its joint. *Calyx-leaves* membranous at the edge, downy upward. Beak of the *fruit* three inches long, its awns hairy at the inside.

2. M. *lobata*. Broad-leaved Monsonia. Dryand. in Ait. Hort. Kew. ed. 1. v. 3. 100. Willd. n. 3. (M. filia; Linn. Suppl. 341. Cavan. Diss. 180. t. 74. f. 2. Andr. Repos. t. 276.)—Leaves heart-shaped, deeply lobed, toothed.—Differs from the last in having the *leaves* lobed, not compound, though they are sometimes so deeply cut as almost to approach the former. In the *flowers* there is scarcely a permanent distinction. The *petals* of the present species are usually greenish at the back, white, with a tinge of red, above. It is much to be suspected that these are but varieties of each other.

3. M. *ovata*. Undulated Monsonia. Willd. n. 4. Cavan. Diss. 193. t. 113. f. 1. (M. emarginata; L'Herit. Geran. t. 41. Geranium emarginatum; Linn. Suppl. 306.)—Leaves ovate-oblong, toothed, plaited; somewhat heart-shaped at the base.—Sent from the Cape to Kew garden, in 1774, by Mr. Masson, with both the former. This is more caulescent than those, but more slender, and only a biennial. The *leaves* are nearly ovate, about an inch long. *Flowers* pale yellow, about an inch in diameter. Beak of the *fruit* two inches in length. The *branches*, *flower-stalks*, and *calyx* are clothed with very long spreading hairs.

4. M. *spinosa*. Thorny Monsonia. Willd. n. 5. L'Herit. Geran. t. 42.—Leaves elliptical, pointed, entire. Footstalks permanent, hardening into thorns.—*Stem* shrubby, branched, beset with thorns, which are the hardened *footstalks* of former leaves. *Flowers* larger than in the last.

M. *tenuifolia*, Willdenow's first species, is our *Grielum tenuifolium*. See GRIELUM.

MONSONIA, in *Gardening*, contains plants of the herbaceous under-shrubby biennial and perennial kinds, for the green-house, of which the species cultivated are, the fine-leaved monsonia (M. speciosa); the broad-leaved monsonia, (M. lobata); the undulated monsonia (M. ovata.)

Method of Culture.—The first sort, as it rarely if ever ripens seeds in this climate, must be increased by cuttings of the

the root, which ſhould be planted in pots of good mould, and plunged in a tan hot-bed, watering them occaſionally, when in a little time buds appear on the tops of the cuttings which are left out of the ground. They ſhould be treated as hardy green-houſe plants, or be afterwards removed into ſeparate pots, and ſheltered under a good garden-frame in the winter ſeaſon. And the ſecond ſort may be beſt raiſed in the ſame manner.

But the third ſort ſhould be raiſed from ſeeds, which muſt be ſown in the early ſpring, in pots of light earth, and plunged in a mild hot-bed. When the plants are come up, they ſhould be removed into other pots ſeparately and be managed as the other kinds.

Theſe afford variety among other potted plants.

MONSOON, a regular or periodical wind in the Eaſt Indies, blowing conſtantly the ſame way, during ſix months of the year, and the contrary way the remaining ſix.

In the Indian ocean, the winds are partly *general*, and blow all the year round the ſame way, as in the Ethiopic ocean; and partly *periodical*, *i. e.* half the year blow one way, and the other half year on the oppoſite points: and thoſe points and times of ſhifting differ in different parts of this ocean. Theſe latter are what we call monſoons.

The ſhifting of theſe monſoons is not all at once: and in ſome places the time of the change is attended with calms, in others with variable winds, and particularly thoſe of China, at ceaſing to be weſterly, are very ſubject to be tempeſtuous: and ſuch is their violence, that they ſeem to be of the nature of the Weſt India hurricanes, and render the navigation of thoſe ſeas very unſafe at that time of the year. Theſe tempeſts the ſeamen call the *breaking up of the monſoons*.

Monſoons, then, are a ſpecies of what we otherwiſe call *trade-winds*.

They take the denomination monſoon from an ancient pilot, who firſt croſſed the Indian ſea by means of it. Though others derive the name from a Portugueſe word ſignifying *motion*, or change of wind, and ſea.

Lucretius and Apollonius make mention of annual winds which ariſe every year, *eteſia flabria*, which ſeem to be the ſame with what in the Eaſt Indies we now call monſoons. For the phyſical cauſe of theſe winds, ſee METEOROLOGY and WIND.

END OF VOL. XXIII

Strahan and Preſton,
New-ſtreet Square, London.

34